EFFECTIVE INSTRUCTION AND STUDENT DIFFERENCES IN THE COLLEGE CLASSROOM

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy

Department of Psychology

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EFFECTIVE INSTRUCTION AND STUDENT DIFFERENCES IN THE COLLEGE CLASSROOM

BY

DIETER JURGEN SCHONWETTER

A Thesis/Practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Abstract

The purpose of this thesis was to examine the relationship between effective teaching and student learning. This was accomplished by first investigating the causal links between effective instruction and student learning of novel lecture material, and second, by exploring the student entry characteristics that benefit from and are compensated for by effective teaching behaviors.

The experimental design involved 295 introductory psychology students and consisted of a Lecture Expressiveness (low, high) by Lecture Organization (low, high) by Locus of Control (low, high) by Test Anxiety (low, moderate, high), 2 x 2 x 2 x 3 design. Four teaching conditions were defined by the following manipulations: low expressiveness/low organization, low expressiveness/high organization, high expressiveness/low organization, high expressiveness/high organization. Dichotomizing the Multidimensional-Multiattributional Causality Locus of Control subscale scores distinguished students as either externals or internals and a trichotomization of the Test Anxiety Scale scores categorized students as low, moderate, or high test-anxious. The dependent variables included student attention and achievement.

Locus of control proved to be a poor predictor of student learning. Test anxiety, on the other hand, consistently predicted student differences in learning. High test anxiety interfered with achievement performance.

In the present study, organization demonstrated a consistent pattern of student learning outcomes. First, it had a strong influence on student attention and achievement outcomes. Second, high organized instruction, in combination with high expressiveness, produced an optimal learning condition for students.

Third, low organized instruction seemed to interfere with the facilitative effects previously found with high expressiveness, thwarting students' learning. Fourth, students with more adaptive learning orientations benefited from highly organized instruction. Not unexpectedly, organized instruction was effective for students with more positive cognitive qualities, such as those with an internal locus of control or with low or moderate levels of test anxiety. However, in some cases, students with less adaptive learning orientations also benefited from the facilitative effects of highly organized instruction. High expressiveness, on the other hand, provided an optimal learning condition for internals and compensated for high test-anxious students' less adaptive learning orientations.

The implications of these findings were discussed. First, specific explanations were postulated as to how the differences in effective teaching behaviours and student differences may operate together to produce ideal and less than ideal learning environments. Second, a number of new directions were suggested for future research in order to identify the critical links of the teaching/learning paradigm. Finally, students seeking potentially effective instructors and administrators searching for potentially facilitative teaching are encourage to not only focus on elocutionary skills, but also on organization skills.

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Introduction

Although recent research on college and university teaching has increased our knowledge of what behaviours constitute effective instruction (e.g., Cohen, 1987; Feldman, 1989; Marsh & Dunkin, 1992; Murray, 1991; Perry, 1991) and of which student differences constitute adaptive learning orientations (McKeachie, Pintrich, Lin, & Smith, 1986, Perry & Dickens, 1984), there has been a notable lack of progress in understanding the joint contribution of effective teaching and student variables in learning conditions. Furthermore, much of the research in this area tends to be atheoretical, lacking suitable conceptual frameworks. Thus, the purpose of this thesis was to help clarify the teaching-learning process first by investigating the links between effective teaching and student learning outcomes, and second, by examining the student entry characteristics that benefit from and are potentially compensated for by effective teaching behaviours.

Two major themes guide the thesis. The first section focused specifically on how commonly recognized effective teaching behaviours, expressiveness and organization, compare with each other; the second section dealt with how these teaching behaviours and student differences impact on student learning. Each section defines the unique set of critical variables of interest, reviews empirical evidence supporting the phenomenon under consideration, provides a theoretical framework, and concludes by identifying the critical hypotheses to be empirically tested.

Effective Teaching Behaviours

Specific instructional methods comprise what is considered as teaching in the college classroom. These include lectures, group discussions, personalized instruction, seminars, and technology (Dunkin & Barnes, 1986). The present

study focused on the lecture method for two reasons. First, it is still the pervasive style of presenting knowledge in the college classroom (Dunkin & Barnes, 1986). For example, more than 70% of instructors reported lecturing as their principle teaching method (Educational Testing Service, 1979). Second, in contrast to most other teaching methods, the behaviours denoting the lecture method, such as expressiveness, organization, clarity, and lecture content, are more easily isolated and manipulated through videotape presentation (e.g., Abrami, Leventhal, & Perry, 1982). The videotape presentation, in turn, provides an ideal format for conducting experimental investigations, since specific teaching behaviours can be held constant, while others are systematically manipulated.

Research on teaching behaviours associated with the lecture method mainly consists of two methodological approaches: observational and experimental. The observational approach is used to rate the frequency of teaching behaviours as they occur in the classroom and to draw correlations between these behaviours and student outcomes. The experimental approach is used to manipulate one or more teaching behaviours, while holding other factors constant, and to determine the impact that these behaviours have on student learning. Rather than attempting an exhaustive review of the research to date, the next section focuses on the important studies that exemplify these research approaches.

Descriptive Studies

Field studies have demonstrated effective teaching behaviours over the past seven decades (McKeachie, 1990). Initially descriptive and unstructured, research relied on students' spontaneous open-ended responses (e.g., Epstein, 1981; Hildebrand, Wilson, & Dienst, 1971; Uranowitz & Doyle, 1978). This

resulted in a myriad of descriptions defining effective teaching. The summarizing and clustering of student responses created closely related dimensions, such as "intellectual excitement" and "interpersonal rapport" (Lowman, 1984). Based on these initial findings, a number of evaluative ratings and observational questionnaires of effective teaching have been developed.

These instruments, in turn, have been completed by countless students (see Marsh, 1984) and have been subjected to factor-analysis and meta-analysis procedures (Cohen, 1981; Feldman, 1989; Frey, 1978; Hildebrand et al., 1971; Solomon, Rosenberg, & Bezdek, 1964) in order to identify specific effective teaching behaviours. These procedures have found anywhere from 2 to 28 distinct behaviours. For instance, in a series of studies, Feldman (1984; 1989) expanded the range of teaching behaviours that Cohen (1981) had initially observed in his meta-analysis. Feldman's (1989) list of 28 categories provides the most complex set of teaching behaviours to date.

These teaching behaviours have been subjected to correlational analyses and a number of them have been linked statistically with student achievement. For example, Table 1 lists 17 teaching categories that Feldman (1989) found to correlate with student achievement. Of these 17 teaching categories, organization demonstrates the highest correlation coefficient with student achievement. Although Table 1 describes the strength of the relationship between effective teaching and student achievement, and demonstrates the rank ordering of their strength, these correlations fail to reveal the critical causal linkages. According to Feldman (1994), it is still empirically unclear which behaviours "are more likely and which are less likely to produce achievement" (p. 21, italics underlined). The present thesis addresses this issue by examining the causal relationship and the effect sizes between certain effective teaching

Table 1

Correlations Between the Instructional Dimensions of Effective Teaching and Student Achievement

Instructional Dimension	Correlation with Student Achievement
1. Organization	.57
2. Clarity & Understandableness	.56
3. Perceived Outcome or Impact of Instruction	.46
4. Stimulation of Interest in the Course and Its Subject Matter	.38
5. Encouragement of Questions & Discussion, & Openness to Opinions of Others	.36
6. Availability & Helpfulness	.36
7. Elocutionary (Expressiveness) Skills	.35
8. Clarity of Course Objectives & Requirements	.35
9. Knowledge of Subject	.35
10. Sensitivity to & Concern with, Class Level & Progress	.30
11. Enthusiasm for Subject or Teaching	.27
12. Instructor Fairness	.26
13. Intellectual Challenge	.25
14. Respect For Students	.23
15. Feedback to Students	.23
16. Course Material	.17
17. Supplementary Materials & Teaching Aids	.11

Note. Table adapted from Feldman (1989).

behaviours and student learning outcomes under highly controlled laboratory conditions.

Experimental Studies

Descriptive research findings present a reasonably consistent picture of the effective college teacher. A number of teaching behaviours are repeatedly reported. These reoccurrences have prompted further investigation of the different fundamental teaching dimensions through experimental studies. Of specific interest are expressiveness and organization. These behaviours were selected for several reasons. As seen in Table 1, expressiveness (r = .35) and organization (r = .57) are more highly correlated to student achievement than are other teaching behaviours, such as rapport. These higher correlation coefficients, in turn, give reason to investigate the potential causal nature between these two teaching behaviours and student achievement. Moreover, expressiveness and organization, in comparison to other teaching behaviours, lend themselves to manipulation using videotape format. By manipulating specific teaching behaviours, the causal relation between effective teaching and student learning may be better understood. Finally, lectures presented in large amphitheaters, a common occurrence in introductory courses, diminish the frequency and potency of other teaching behaviours such as interaction, rapport, and feedback. A detailed definition of expressiveness and organization, empirical evidence showing their influence on student achievement, and hypotheses regarding the links between each teaching behaviour and the learning outcomes are provided below.

Expressiveness. Experimental studies have consistently shown that expressive instruction is associated with student learning (Marsh, 1984; Perry, 1991). Low inference behaviours denoting expressiveness include "movement

while presenting material", "gesturing with hands and arms", "eye contact with students", "voice inflection", "minimal reliance on lecture notes", and "humor that is relevant to lecture content" (Murray, 1991; Perry, 1991). Expressiveness predicts students' scholastic behaviours such as achievement (Coats & Smidchens, 1966; Mastin, 1963; Perry, 1991), attendance to a delayed lecture and amount of homework completed (Perry & Magnusson, 1987; Perry & Penner, 1990), and paying for additional lecture material (Slater, 1981; cited in Murray, 1991). Expressiveness has also been found to affect outcomes related to students' performance, such as generating a stronger internal attributional orientation toward achievement (i.e., ability/effort), and increasing positive affects (i.e., pride), self-confidence (i.e., self-competence), and motivation (Magnusson & Perry, 1989; Perry & Dickens, 1984; Perry, Magnusson, Parsonson, & Dickens, 1986; Perry & Penner, 1990; Schonwetter, Perry, Menec, Struthers, & Hechter, 1993; Schonwetter, Perry, & Struthers, 1994). Thus, expressiveness is not only correlated with, but also causally linked to, student achievement and achievement-related outcomes.

Figure 1 presents the causal links between specific teaching behaviours and student learning that some researchers have postulated (Murray, 1991, Perry, 1991). As seen in Figure 1, both physical movement and voice intonation are hypothesized to elicit students' selective attention. Visual and/or audible changes of stimuli in a learning environment tend to elicit student attention. Also, appropriate visual or audible changes associated with important lecture material are thought to provide students with learning cues as to what is considered important and to be learned. Thus, body movement and voice intonation may impact student learning.

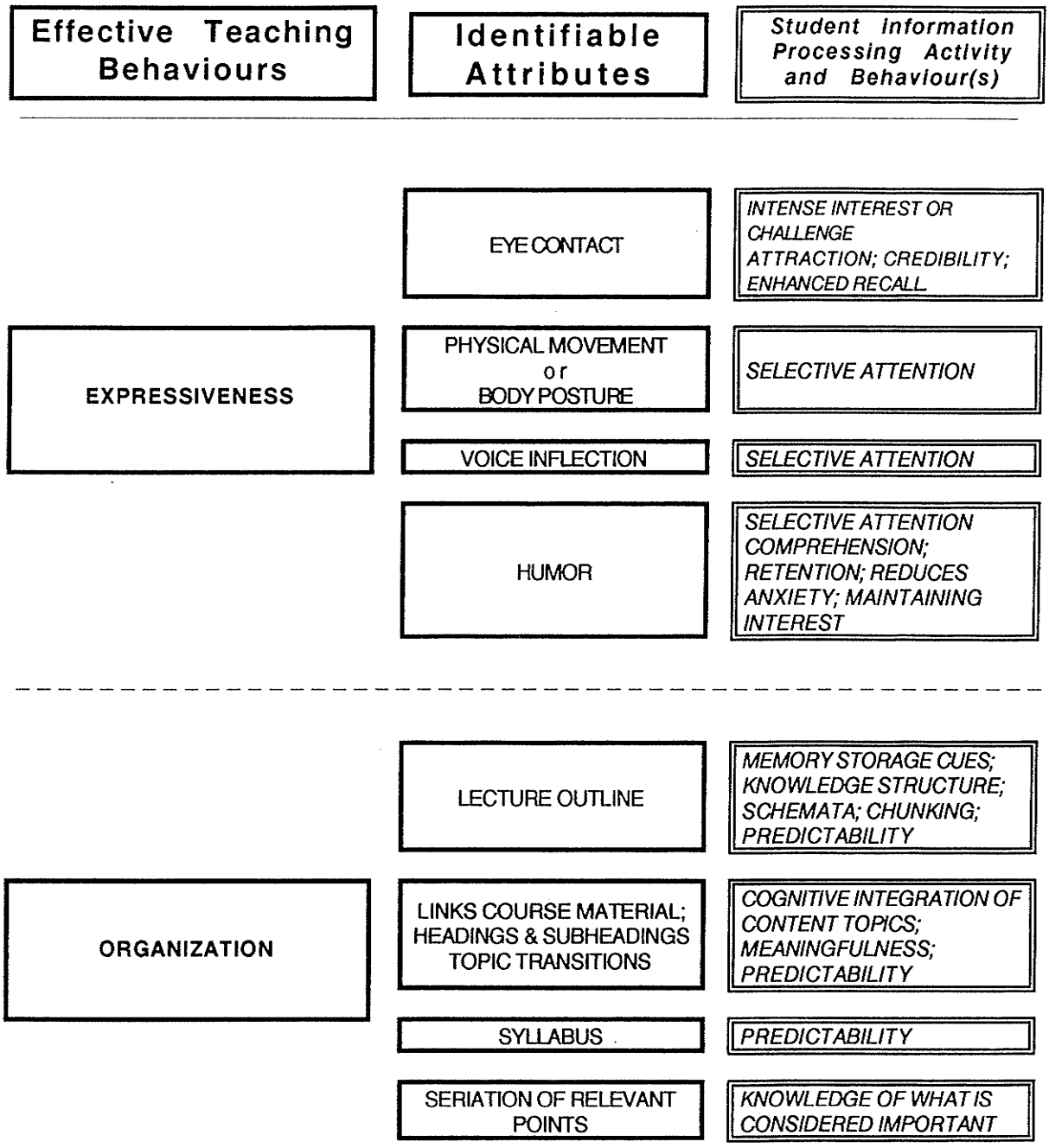


Figure 1. Effective teaching behaviours' influence on student learning and behaviour (adapted from Perry, 1991).

The effects of eye contact or eye gaze vary in the research literature. For instance, differential eye contact behaviour by an actor produced varied perceptions of attraction, credibility, and relational communication in a group of observers (Burgoon, Coker, & Coker, 1986). Also, eye contact by an instructor produced levels of compliance in students (Hamlet, Axelrod, & Kuerschner, 1984). Furthermore, students presented with eye contact, as compared to no eye contact during a verbal presentation, demonstrated higher recall scores of lecture material (Sherwood, 1987). A number of possible explanations have been provided for these outcomes. Perry (1991) for instance, views eye contact as creating intense interest or challenge of the recipient. Sherwood (1987) and Otteson and Otteson (1979) posit that it increases a sense of personal relationship or intimacy between the student and the speaker. Nevertheless, eye contact appears to play an important role in teaching/learning dynamics.

As can be seen in Figure 1, humor is also posited to influence learning. For instance, it has been instrumental in improving comprehension, enhancing retention (Johnson, 1990), and increasing learning of substantive facts and awareness of attitudes regarding sensitive issues such as death and dying (Safford, 1991). Exposure to humor, as compared to no humor lectures, lowered students anxiety and improved their test performance (Bryant & Zillman, 1988; Ziv, 1988). Moreover, the effectiveness of humor has been directly related to the extent that it is relevant to the material taught and the items tested are related to it (Kaplan & Pascoe, 1977). Humor also promotes a positive and cohesive class environment (Civikly, 1986). Perceived as a valuable teaching skill, humor has been thought of as maintaining student

interest and facilitating acquisition of information in a given topic area (Gentilhomme, 1992).

Sometimes referred to as "enthusiasm", expressiveness is thought to be vicariously transferred to the student in the form of increased motivation, such as studying outside of instruction time (Murray, 1991). Students are influenced by environmental variables, such as energetic instructors, modeling the high energy or interest of content material presented. For instance, students who perceive their music instructor as exhibiting more expressiveness also enjoyed their music lesson more, reported more positive affects, had a greater desire to learn, and demonstrated greater exploratory behaviour (Cameron, Enzle, & Hawkins, 1992). Thus, a student's tendency to model interest in a given lecture topic may be influenced by the "enthusiasm" or expressiveness of an instructor.

Overall, expressiveness is postulated to facilitate students' selective attention (Murray, 1983; Perry & Dickens, 1984; Williams & Ware, 1976). For instance, expressiveness may provide general stimuli for optimum arousal through the stimulus cueing qualities associated with physical movement, voice intonation, eye contact, and humor. As a general orienting stimulus, expressiveness indicates "pay attention", "this material is interesting and/or important," and enables students to process relevant information (Murray, 1991), thereby enhancing memory storage and retrieval (Perry, 1991). Selective attention, in turn, is crucial to most types of information processing (Kuhl, 1985; Mayer, 1987).

Stimulating and sustaining of students' interest in a stimulus item may dictate how much attention will be directed toward it. Anderson (1982) explains this phenomenon as follows. As learning occurs, incoming information is processed and evaluated for importance. The amount of attention focused

on the stimulus is directly related to the importance given to the stimulus. In other words, the more a stimulus is perceived as important, the more attention is directed toward it, the better it is processed (Anderson, 1982). Accordingly, an instructor who presents material in an interesting way, such as showing a keen interest in the material, may elevate the importance that students attribute to learning the material. In turn, the amount of selective attention directed toward the material may be enhanced. However, very little research has focused on how effective instruction enhances students' attention.

In general, research on instructor expressiveness tends to reveal a number of shortcomings. First, research has neglected the investigation of students' selective attention generated by expressive instruction. In response to this oversight, the present study explored this phenomenon. Students whose attention is optimally peaked by expressive instruction should demonstrate higher levels of attending to the lecture material and, in turn, process information more efficiently.

Second, previous research has failed to control for the influence of other teaching behaviours, while investigating expressiveness and lecture content. For instance, most studies documented in Abrami et al.'s (1982) meta-analysis manipulated the levels of expressiveness and lecture content, but mention little about controlling for other teaching behaviours. Other behaviours, such as organization or clarity, were not recorded as having been controlled. Thus, the present thesis extended this research by considering a teaching behaviour previously not investigated.

Organization. As seen in Figure 1, 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 may provide specific cues that alert students to attend to specific material presented. According to Figure 1, 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. Lecture material presented in the aforementioned ways has a higher probability of being entered in the form of class notes, 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).

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 is the process whereby distinct pieces of information are grouped together. 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) that influences comprehension (Meyer, 1975; 1977) and facilitates encoding and retrieval of learning material (Glynn & Di Vesta, 1977). For instance, information organized during learning enhanced students' memory of that information (Katona, 1940). Also, structured teaching produced significantly higher student achievement than less structured teaching (Guetzkow, Kelley, & McKeachie, 1954).

Overall, both expressiveness and organization appear to influence students' learning, specifically affecting their attention. However, as orienting stimuli, these teaching behaviours may differentially impact students' attentional processes. Expressiveness may be a general orienting stimulus related to general information processing. For instance, with low expressive instruction, students may perceive lecture material as irrelevant and thus, not attend to it. However, with an increase in expressive behaviour in the form of humor, body movement, etc., students' attention should continue to be engaged as long as expressiveness remains at a high level. Any lecture material presented during this time and for a short time following should be perceived as important and requiring students' full attention. In other words, the student may listen more intently as if the dynamics of the teaching behaviour denote something relevant and worth attending to. Therefore, most learning that occurs under expressive instruction may result as a function of associating the dynamic elements of expressiveness (i.e., voice variations) with the presentation of the lecture material. Thus, high expressiveness is hypothesized to act as a general stimulus cue, indicating that the material being presented is relevant.

Organization, on the other hand, may elicit attention to specific lecture material cued by outlines, headings, and seriation of relevant points once general orientation has been initiated. 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 may 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.

In summary, highly expressive and well organized instruction should produce an optimal learning environment when all other factors are held constant. Low levels of these teaching behaviours, on the other hand, should result in a related information processing deficit, reducing the amount of learning possible. Although Feldman (1989) has demonstrated organization to be more highly correlated with student achievement than expressiveness, a comparison of these two teaching behaviours has yet to be conducted experimentally. Thus, of critical concern to the present thesis is the influence that each of these teaching behaviours has on student learning outcomes.

Student Differences and Effective Teaching

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 et al., 1986). Of specific interest is the influence of effective teaching and student differences on student learning outcomes. Prior to investigating this phenomenon, a consideration of individual differences is necessary.

Recent educational literature (see McKeachie et al., 1986; Perry, 1991), describes some students 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 provided with 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 significance of student 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 their minds being "blank slates", but rather, they come with a variety of cognitive, motivational, and behavioural 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, 1991; Perry, Schonwetter, Magnusson, & Struthers, 1994; Schonwetter et al., 1994b). "At-risk" students are defined as those who consistently perform poorly on achievement tasks such as assignments, quizzes, and tests in the classroom and therefore are considered to be at a learning disadvantage. Finally, some individual differences are

thought to protect students from the debilitating effects of ineffective instruction (Perry, 1991), 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, locus of control and test anxiety were chosen to represent these differences for the following reasons. First, past research has demonstrated that students identified in the extreme categories of these constructs represent less adaptive and adaptive learning orientations, such as external locus of control or high test-anxious students and internal locus of control or low test-anxious students, respectively (Perry, 1991; Rotter, 1990; Tobias, 1985). Second, locus of control offers a generic measure of student performance in achievement settings, whereas test anxiety is more of a specific measure. Thus, an additional purpose of the thesis was to investigate how locus of control and test anxiety relate to different teaching behaviours, expressiveness and organization. The student differences are briefly reviewed below.

Locus of Control

Given its potential consequences for academic achievement, locus of control has received wide-spread attention in the educational and psychological research domains (Rotter, 1990). Labeled as locus of control in Rotter's social learning theory (1966; 1990), this construct is conceived of as either a personality disposition or as a generalized causal expectancy. Viewed as a continuum, locus of control is defined by two end-points, external and internal locus. Categorization of students as either external or internal has resulted in distinguishing differences in behaviours and cognition.

One of the most consistent differences between externals and internals is in the domain of achievement outcomes. In a review of 36 studies, internals

yielded higher levels of achievement performance than externals (Bar-Tal & Bar-Zohar, 1977). Also, internals sought more information, used it more effectively, were better at paying attention to information-relevant cues, and were more adept at discovering the principles necessary to solve problems than externals (Rotter, Chance, & Phares, 1972). Based on these findings, internals tend to be more active in finding resources that enhance the achievement of their personal goals (Prociuk & Breen, 1977). Clearly, internals, as compared to externals, have an advantage in scholastic achievement settings, however, these findings are somewhat dated. Unfortunately, recent research dealing with achievement differences between externals and internals, apart from the Manitoba laboratory studies (i.e., Perry, 1991), is minimal.

The different generalized causal expectancies associated with external and internal locus of control are thought to account for these achievement differences. External locus of control students have pervasive stable beliefs that outcomes are not determinable by their personal efforts, but rather by factors external to them (Rotter, 1990). These beliefs, in turn, may lead students to make inappropriate responses, such as giving up, procrastinating, and even dropping-out, to difficult or failure situations (Rotter, 1990). Also, exposure to failure in conjunction with an external locus of control thwarts students from fully benefiting scholastically in ideal learning environments (Perry, 1991). Thus, externals who lack an adaptive learning orientation are likely to suffer from the debilitating consequences of failure.

Internals, on the other hand, perceive outcomes as contingent upon personal actions (Rotter, 1966; 1990) and thus, are more motivated to control their academic performance (Feldman, Saletsky, Sullivan, & Theiss, 1983). Internals experiencing failure react and intensify their efforts to regain

control by exhibiting heightened psychological control in conjunction with overt manifestations of assertiveness, striving, and goal-directed behaviour (Rotter, 1990). Wortman and Brehm (1975) coined this phenomenon as "reactance": individuals experiencing loss of control intensify their efforts to regain control. Because of the adaptive responses associated with their control cognitions, internals seem to be protected (Perry, 1991) against the detrimental consequences of loss of control brought on by events such as failure of tests, homework assignments, and ineffective teaching. Furthermore, an internal locus orientation elevates expectations about future success, generates positive affect, and encourages greater responsibility for performance (Perry & Dickens, 1987). Therefore, it is not surprising that internals describe themselves as more active, striving, achieving, powerful, and independent than externals.

Provided with two different college instruction methods, internals did best under the contract-for-grade plan, whereas externals did best under conventional (i.e., lecture) instruction (Daniels & Stevens, 1976). These findings suggest that internals tend to rely on self-initiative, whereas externals tend to depend on a significant other for their learning. Finally, externals benefit from attributional retraining, whereas internals performed well with or without attributional retraining (Menec, Perry, Struthers, Schonwetter, Hechter, & Eichholz, 1994; Perry & Penner, 1990). Thus, general perceptions of internal control result in positive scholastic outcomes, while sustained perceptions of external control lead to negative outcomes.

Locus of control and effective teaching. One major benefit of effective teaching is its capacity to potentially compensate for less effective learning orientations that have been associated with low control perceptions (Perry, 1991). A compensatory effect refers to the propensity of one variable

to ameliorate the weak qualities of the other variable (Weinert & Helmke, 1987). In the case of effective instruction, compensation occurs when suitable performance has been achieved, despite the influence of less adaptive learning orientations. In other words, student deficits in information processing, motivation, and self-regulation of learning activities can be compensated for by the ameliorating influences of effective teaching.

Effective teaching can also have a compensatory influence by generating an internal attributional orientation or locus in students. In other words, students tend to take more ownership of their learning efforts after receiving effective teaching by attributing their achievement performance more to effort and less to luck. An internal orientation, in turn, may lead to greater perceived control, enhanced self-efficacy, and greater sensitivity to instructional benefits. For instance, repeated exposure to high expressive instruction counteracted the effects of loss of control by producing more of an internal attribution locus and a greater sense of responsibility. This occurred specifically in students displaying an external locus (Magnusson & Perry, 1989) and in students presented with failure (Perry & Magnusson, 1987). However, because of extreme motivation or intellectual deficits, some students may not benefit from an expressive instructor, but may require individualized intervention before effective teaching would have an impact (Perry & Penner, 1990).

For internal students, effective teaching provides an ideal learning environment. Because of their psychological makeup, these students have a major advantage over their counterparts. Internals are more likely to benefit from the achievement-enhancing qualities of effective teaching. Moreover, although exposure to noncontingent failure feedback reduces students' perception of control, internals, as compared to externals, are not thwarted by

the threat of loss of control. Rather, when subsequently presented with effective instruction, they benefit from its facilitative effects (Magnusson & Perry, 1989).

Given that internal orientations are potentially more adaptive and therefore more desirable for educational achievement, the influence of effective teaching in generating such a profile has special meaning for educational practices. In other words, exposure to effective teaching can have remedial effects on certain students whose psychological make-up would otherwise lead to poor scholastic outcomes. Effective teaching may induce an internal locus orientation, which in turn, may activate critical cognitive processes that are normally impaired. Thus, effective teaching may compensate for poorer learning orientations associated with an external locus of control, whereas it maximizes internals' learning experience.

Presented with ineffective teaching, such as low expressiveness, internal students feel loss of control (Perry & Magnusson, 1987). In their attempt to regain control, internals may seek ways to increase their opportunities to learn. One method involves a greater sensitivity or increased selective attention to relevant information presented during the ineffective teaching episode. Instead of being distracted by irrelevant lecture material, internals may focus on relevant lecture stimuli and thus process information necessary for learning. Internals may also request help from peers, tutors, or professors, or they may search for additional resources in libraries or other places. These efforts, in turn, enhance internals' learning in educationally impoverished environments. Although internals receiving ineffective as compared to effective teaching, perform lower on achievement outcomes, their efforts may enable them to perform better than externals provided with ineffective instruction.

External students also experience loss of control following ineffective teaching (Perry & Magnusson, 1987). However, they tend to do little to regain control over their learning environment. Entering the classroom with a low perception of control coupled with a teaching episode that increases their loss of control, it is no wonder that these students have little or no desire to regain control. They are more likely to manifest poor attending skills and an inability to filter out irrelevant information presented during poor instruction. Consequently, the necessary information is simply not processed and academic performance is negatively impacted (Perry, 1991). Thus, the cognitive orientation associated with internals may protect against ineffective teaching, whereas the cognitive orientation associated with externals, and ineffective teaching, thwarts learning. In an attempt to test these ideas, locus of control, instructor expressiveness, and instructor organization were explored.

Test Anxiety

Given that college learning experiences invariably involve evaluative processes, an investigation considering test anxiety was of interest. Test anxiety, in comparison to locus of control, is a more specific measure denoting control perceptions relating directly to college achievement. This construct not only enables one to address the relation between student differences and student learning outcomes, but may also help elucidate the issues surrounding effective teaching and student differences. Therefore, test anxiety was included as an independent variable. Below, test anxiety is defined, research literature on test anxiety is reviewed, the relationship between test anxiety and locus of control are discussed, and hypotheses involving test anxiety are generated.

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 cognitions that interfere 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 (Tobias, 1985).

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 presented with evaluative situations (see 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 (see Wittmaier, 1972) such as spending less time studying (see Allen, Lerner, & Hinrichsen, 1972), are more prone to procrastination (see Rothblum, Solomon, & Murakami, 1986), and demonstrate lower levels of achievement (see Gjesme, 1983) and high school GPAs (see 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 test anxiety is related to poor achievement outcomes, reduced mental ability, inadequate scholastic behaviours, and poor self-perceptions. In other words, low test anxiety may indicate adaptive learning orientations, whereas high test anxiety may be predictive of less adaptive learning orientations.

Locus of control and test anxiety relationship. Both locus of control and test anxiety are thought to measure different aspects of student perceptions of control. Locus of control is a general construct denoting students' perceptions of control as a result of different classroom situations, such as difficulty of the task, the instructor or the context, and student's effort or ability, whereas test anxiety is a more specific measure indicating students' anxiety proneness to academic evaluative situations. For instance, a student who is highly test-anxious tends to score high on items such as "panicky", "consequences of failing", "defeat myself", "the more confused I get", "thoughts of doing poorly", which are indicators of being out of control. In essence, test anxiety, in comparison to locus of control, may be a more specific measure of students' perceptions of control given that it is task or achievement specific, focusing on the evaluative situation.

In order to understand the relationship between locus of control and test anxiety, the personal threat reduction and reactance-helplessness theories have been offered. A number of researchers explain the link in terms of personal threat reduction. For instance, Rotter (1966) perceives external locus of control as an ego-defensive anxiety reducing measure for "defensive externals". Students who experience failure are more likely to avoid blame for their outcomes. By doing so, students free themselves from the personal threat or

anxiety associated with failure by attributing the control of the reinforcement to forces external to them. Defined as a self-serving bias (Ross & Fletcher, 1985), students take credit for success but avoid blame for failure. Thus, the connection between locus of control and anxiety is seen as "a means of evading the responsibility for anticipatory negative reinforcement" (Prociuk & Breen, 1975; p. 549). In other words, taking an external perception of control following failure is more likely to reduce the ensuing anxiety.

Another approach in explaining the link between locus of control and test anxiety focuses on the persistence-helplessness phenomenon. Loss of control perceptions, as denoted by helplessness and high test anxiety, are complex motivational states and traits that are generated from repeated exposure to stressful situations (Schwartzer, Jerusalem, & Stiksrud, 1984). Researchers have investigated the relationship between learned helplessness (feeling out of control), anxiety, and motivation for achievement. According to Dweck and Wortman (1982), highly motivated students are characterized by low test anxiety and low fear of failure. Failure may signal these students to try harder and to use different strategies. Perceiving failure as a result of lack of effort--an unstable, internal, controllable attribution--these students are more likely to persist (Weiner, 1986). On the other hand, students who manifest learned helplessness, high test anxiety, or fear of failure tend to view failure as a personal reflection. Failure becomes a self-evaluation, indicating lack of ability, rather than task-evaluation. Lack of ability--a stable, internal, and uncontrollable attribution--implies that any further effort is not worthwhile since failure is perceived as unchangeable (Weiner, 1986).

Research thus far is mixed in demonstrating a relationship between these two constructs. For instance, a number of studies have shown a negative

relationship between them. Students scoring low on test anxiety tend to be more internal, whereas high test-anxious students tend to feel less control for their performance (Butterfield, 1964; Mandler & Watson, 1966; Watson, 1967) and exhibit an external locus of control (Hembree, 1988). However, Prociuk and Breen (1973) and de Man, Hall, and Stout (1991) were unable to replicate these findings, suggesting that Levenson's Locus of Control scale (1981) and Rotter's I-E scale (1966) were inadequate in sampling aspects of personal control related to college learning. Thus, the relationship between locus of control and test anxiety remains inconclusive and requires further investigation.

Test anxiety and effective teaching. Although studies have investigated the effects of test anxiety in college students, little is known about test anxiety and college teaching. Extending previous studies, the thesis investigated the effects of instructor expressiveness, instructor organization, and test anxiety on student learning. This model sought to identify which types of students, and under what teaching conditions, learning is enhanced. Thus, two sets of hypotheses were examined, the first dealing with the differentiation of learning and related outcomes based on different levels of test anxiety, and the second, investigating the effects of test anxiety and teaching behaviours on student learning.

Research Questions

The thesis is divided into two major sections. The first section focused on how commonly recognized effective teaching behaviours compare with each other, and the second section focused on the student entry characteristics that benefit from and are potentially compensated for by effective teaching behaviours. Below, the research questions pertinent to each section are formalized and appropriate hypotheses are generated to address the issues.

Effective Teaching: An Analysis

A major purpose of the thesis is to examine the relationship between two teaching behaviours and their influence on student learning outcomes. Specifically, two research objectives were addressed. First, the extent to which expressiveness and organization affect student achievement was examined experimentally. According to Feldman (1989), organization is more highly correlated with student achievement (r = .57) than expressiveness (r = .35), suggesting perhaps that the former has a more powerful association with student learning than the latter. However, each behaviour was hypothesized to have some influence on student learning. In order to address this issue, the magnitude of the main effects, omega-squared values, were compared.

Second, it was hypothesized that a symbiotic/antagonistic relationship exists among different teaching behaviours, such that certain behaviour combinations are complementary, facilitating student learning (i.e., symbiotic), whereas others are distracting, thwarting student learning (i.e., antagonistic). In order to explore this idea, four teaching episodes were articulated: low expressiveness/low organization, low expressiveness/high organization, high expressiveness/low organization, and high expressiveness/high organization. Low expressiveness/low organization and high expressiveness/high organization were thought to reflect poor and excellent teaching, respectively, and low expressiveness/high organization and high expressiveness/low organization, were thought to represent other types of teaching conditions.

Given that organization has a more powerful association with student achievement than expressiveness (Feldman, 1989), the low expressiveness/high organization condition was thought to have a stronger influence on student learning than the high expressiveness/low organization condition. By combining

the magnitudes of the correlation coefficients associated with each teaching behaviour, the direction of this hypothesis becomes clearer. If low teaching behaviours are assigned half the value, given the fact that they are less effective than high teaching behaviours (this weight has been arbitrarily assigned for the sake of argument purposes only), then the combination of correlation coefficients of low expressiveness and high organization [((.5)(.35) + (1)(.57))/2 = .37] has a potentially higher association with student achievement than the combined correlation coefficient of high expressiveness and low organization [((1)(.35) + (.5)(.57))/2 = .32]. In order to test this hypothesis along with those previously mentioned, six a priori comparisons were conducted.

The independent variables included instructor expressiveness (low, high) and instructor organization (low, high) and the dependent variables included student attention and achievement. Attention was defined by a self-report of attending to the lecture. Achievement was denoted by a recall, recognition and an application test of the lecture material, and by a self-report of students' perception of their learning. In order to control for extraneous learning variables, such as seeking help, researching topics in a library, reading from a text, asking the instructor questions, etc., students were presented with a one-time instructional episode involving novel lecture material.

Student Differences and Effective Teaching

The second major purpose of the thesis was to explore the student entry characteristics that benefit from and are potentially compensated for by effective teaching behaviours. In order to reduce the complexity of the research questions associated with each individual difference variable, the following section is divided into subsections.

Locus of control and test anxiety main effects. The first research question focuses on identifiable differences distinguishing externals from internals and high test-anxious from either low or moderate test-anxious students. Based on previous research, locus of control and test anxiety should predict differences in learning orientations. Externals and high test-anxious students should demonstrate less adaptive learning orientations, as defined by lower lecture achievement scores, than internals and either low or moderate test-anxious students, respectively.

Benefiting from effective teaching behaviours. The second set of hypotheses deal with exploring student differences that benefit from effective teaching behaviours. Based on previous research (Perry, 1991), the effective teaching behaviors were expected to increase achievement in students with adaptive learning orientations, namely internals and low or moderate test-anxious students. In order to test this hypothesis, six a priori comparisons are proposed. Internals should have better achievement test scores than externals, when provided with either high expressiveness or high organization. Low and moderate test-anxious students should perform better than high test-anxious students when receiving either expressive or organized teaching.[1]

Being compensated for by effective teaching behaviours. The third set of hypotheses deals with exploring at-risk students that are potentially compensated for by effective teaching behaviours. According to Perry (1991), effective teaching behaviours may also have a compensatory effect for students with less adaptive learning orientations. However, past studies have not demonstrated this phenomenon when looking at expressive instruction and student achievement as measured by recognition tests (Perry & Dickens, 1984; 1987; Magnusson & Perry, 1989). Although expressiveness may

not provide compensation effects, this may not be the case for other teaching behaviors such as organization. Moreover, compensatory effects may not be demonstrated on recognition measures used in previous studies, but on other measures such as recall. Thus, in order to further explore the compensatory phenomenon of effective teaching, students with less adaptive learning orientations were provided with ineffective and effective instruction.

At-risk students may not achieve the same level of academic performance as students with adaptive learning orientations. If the compensatory phenomenon exists, then at-risk students should perform better with effective instruction. In other words, externals and high test-anxious students receiving effective teaching should perform higher academically than externals and high test-anxious students given ineffective teaching, respectively. Four a priori comparisons are used to test this hypothesis. For externals, high, as compared to low, expressiveness should produce higher learning outcomes, and, high, as compared to low, organization should produce higher learning outcomes. For high test-anxious students, high, as compared to low, expressiveness should produce higher learning outcomes, and high, as compared to low, organization should produce higher learning outcomes.[2]

In order to test the hypotheses, external and internal locus of control students and low, moderate, and high test-anxious students are presented with low and high levels of effective teaching behaviours, namely expressiveness and organization. The independent variables include locus of control, test anxiety, instructor expressiveness, and instructor organization. The dependent variables are defined by achievement measures involving recall and recognition.

In summary, the purpose of the present thesis is to help clarify the teaching-learning process. This is accomplished by first investigating the links between effective teaching and learning. More specifically, the amount of influence that expressiveness and organization have on student learning outcomes is explored. Second, the differentiation of learning as predicted by two student differences, locus of control and test anxiety, is conducted. Third, the influence of student entry characteristics and effective teaching as they affect learning outcomes are also examined. By achieving these three tasks, a better understanding of the contribution that effective teaching and student differences have on student learning outcomes is anticipated.

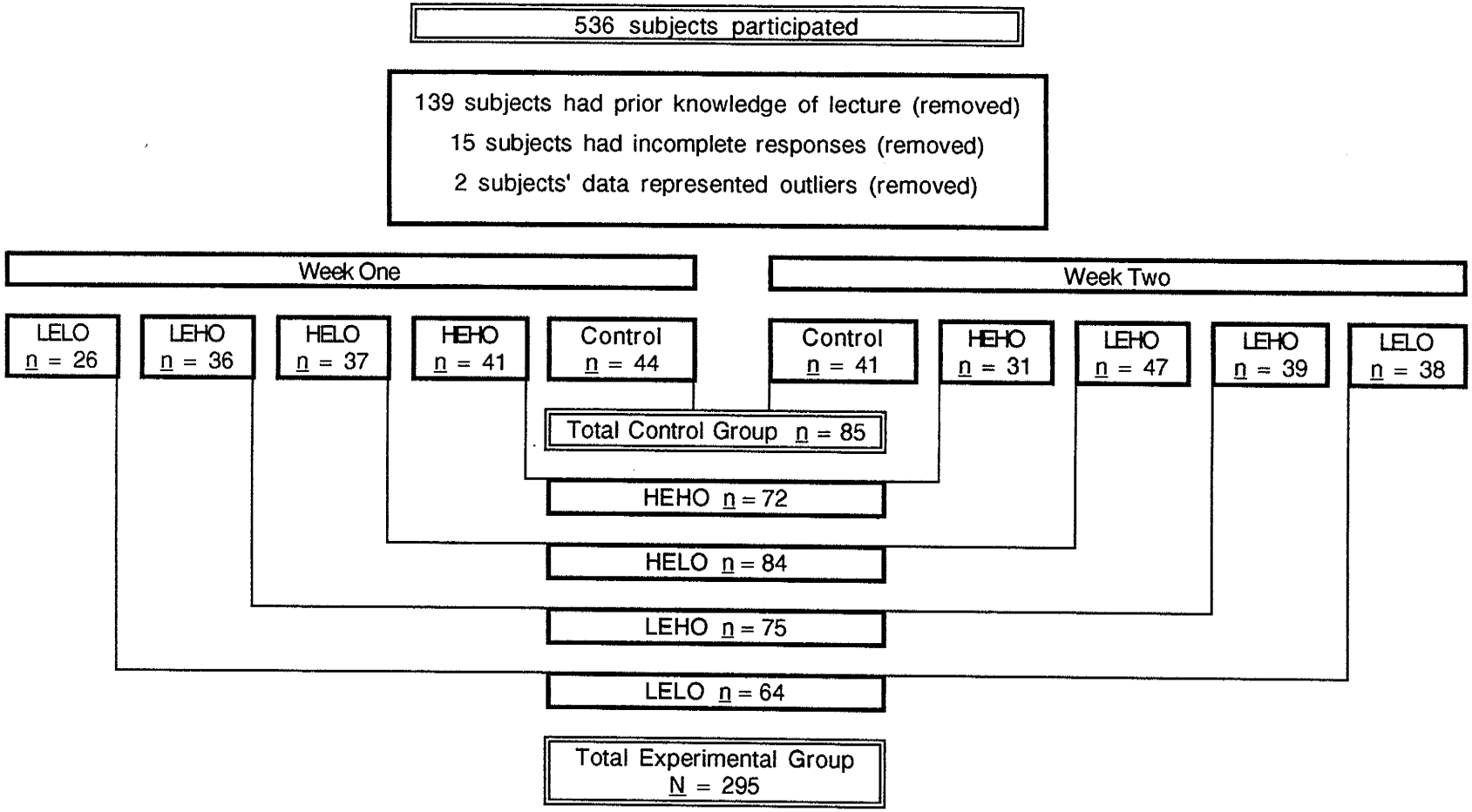
Method

Subjects

Figure 2 presents the progression of subject selection. From a subject pool of 3200 introductory psychology students, 536 volunteered for one of 10 two-hour time slots in order to fulfill a requirement for their Introduction to Psychology course. A number of student response forms were removed from analyses for the following reasons: 139 indicated previous lecture content knowledge, 15 because of incomplete responses, and two because of data representing outliers (see the Lecture achievement tests section). The final group consisted of 380 subjects: 85 in the control group (39 males; 46 females; ages: 18 - 45; $\underline{M}$ = 22.22 $\underline{SD}$ = 6.39) and 295 in the experimental groups (males = 118; females = 177; ages: 18 - 45; $\underline{M}$ = 20.87; $\underline{SD}$ = 4.65).

Materials

Instructional manipulation. Given their effect on student achievement in the college classroom, expressiveness and organization were selected to represent two teaching behaviours (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. Specifically, four color videotapes were developed: low expressiveness/low organization; low expressiveness/high organization; high expressiveness/low organization; and high expressiveness/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.



Note: LELO = Low expressive/low organization; LEHO = Low expressive/high organization; HELO = Low expressive/low organization; HEHO = High expressive/high organization.

Figure 2. The derivation of the final groups of subjects.

The videotape presentations varied according to expressiveness defined by: eye contact with the video camera; voice inflection in the delivery of the presentation; physical movement depicted by appropriate hand gestures; physical relocation of the presenter around the lectern; and humor. The organization manipulation included variation of the following behaviours: 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 video 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 was 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.

Videotaped lectures, rather than "live" presentations, were selected for a number of reasons. First, in order to investigate the causal nature of specific teaching behaviours, 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 et al., 1982; Perry, 1991; Perry, Abrami, & Leventhal, 1979). Third, videotaped instruction serves as an effective alternative to conventional instruction (Jamison, Suppes, & Wells, 1974).

Finally, training a confederate to provide multiple, yet consistent, in vivo teaching behaviours in the classroom laboratory would be difficult for a number of reasons. First, due to practice effects, there is a high probability that the last lectures presented would be better than the first lecture. Second, fatigue may influence an instructor's presentation, especially when having to present two sets of four teaching episodes. Third, "live" teaching would not permit the control of other teaching behaviours such as interaction, rapport, and lecture content, thereby confounding the effects of the teaching behaviours of interest. Fourth, videotaped lectures also control for teacher biases that are present in "live" teaching situations. Given the consistent teaching behaviours over multiple presentations, the reduction of possible practice effects as well as the control of experimenter bias, the videotape format was chosen.

Classroom analog. The simulated college classroom setting was designed to provide a realistic environment in which to study effective instruction and student differences on student learning outcomes. Behavioural, 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. Also, investigating instructor characteristics in the laboratory setting may "lead to more precise descriptions of effective teaching behaviours" (p. 461; Abrami et al., 1982).

Prelecture student questionnaire. A prelecture questionnaire included a number of demographic items: age, gender, high school GPA, and last introductory psychology test score (see Appendix A). The following measures

were also included: Survey of Work Styles, Locus of Control Scale, and the Test Anxiety Scale. Of specific interest were the latter two scales, which were used as control variables.

Subjects' **locus of control** was assessed using the Multidimensional Multiattributional Causality Scale (MMCS; Lefcourt, Von Bayer, Ware & Cox, 1979). (See Lefcourt, 1981 for a more complete description of its development.) This scale is more appropriate for use with college students than Rotter's (1975) Internal-External scale, because it relates specifically to academic achievement in college. Also, it distinguishes among different kinds of attributions (e.g., ability, task difficulty, effort, and luck) and between different outcomes (e.g., success or failure). Kuder-Richardson formula 20 reliability estimates have been calculated for the total locus of control scale (KR20 = .75), and for each of the subscales: effort (KR20 = .66), ability (KR20 = .64), task difficulty (KR20 = .53), and luck (KR20 = .71; Powers & Rossman, 1983). According to Powers and Rossman (1983), these reliability estimates are reasonable for a scale measuring this type of construct. Finally, Lefcourt et al. (1979) reported a split-half reliability of the scale to be .77.

According to Weiner (1986) and Rothbaum, Weisz, and Snyder (1982), negative or failure events are the primary determinants of loss of control and thus were used to differentiate locus of control groups. Whereas previous research (Menec et al., 1994; Perry & Penner, 1990) has categorized externals and internals on the basis of the ability and effort attributions to the six failure items of the MMCS, the present study included all twelve failure items relating to academic achievement. Each item was scored on a 5-point Likert-type scale (i.e., 1 = "strongly disagree"; 5 = "strongly agree"; see Appendix A, questions 97-108). Dichotomization was based on Lefcourt's original scoring procedure.

A total internality score for each subject "consisted of agreement with internal attributions and denial of external attributions" (Lefcourt et al., 1979; p. 289). For instance, the external attributes related to luck (range = 3 - 15) and context (range = 3 - 15) were subtracted from the internal attributes, ability (range = 3 - 15) and effort (range = 3 - 15), resulting in a total score ranging from -24 to 24. Then a median split based on the distribution of the participants (Md = 3) was employed. The median found in the present study was similar to those of other studies (i.e., Md = 2 for Menec et al., 1994). Students scoring three or less were classified as External (n = 164; M = -0.28; SD = 2.73) and four or more as Internal (n = 131; M = 7.47; SD = 2.99) respectively, ensuring a suitable definition of locus of control, while maintaining acceptable sample sizes.

To assess the effectiveness of the dichotomization procedure, a t test was conducted on a prelecture achievement outcome. Internals reported better high school GPAs (MS_e = 4.30, M = 6.05, SD = 2.02 ≈ "C+", n = 131; note: lower scores are equal to higher grades; see Appendix E, Item #41) as compared to externals (M = 6.67, SD = 2.14, ≈ "C", n = 164), $t(294) = 2.54$, ps < .05. Thus, the median split procedure seems to represent a suitable dichotomization of locus of control.

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 for intervals of several weeks [see Wagaman, Cormier, & Cormier (1975) who report 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).

Although the research norm typically relies on dichotomizing test anxiety scores based on a median split (Hembree, 1988), a more refined delineation was used in which students were categorized into low, moderate, and high test-anxious groups. 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 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) over the three groups. Students scoring 16 or less, between 17 and 23, and 24 or more were classified as low (n = 105; 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. This classification was 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 t test on a prelecture achievement outcome. Moderate test-anxious students had better high school GPAs (MS_e = 4.30, M = 6.80, SD = 1.91, n = 89, ≈ "B+"; note: lower scores are equal to higher grades; see Appendix E, Item 41) than high test-anxious students (M = 6.04, SD = 2.15, n = 97; ≈ "B"), $t_B(291) = 2.50$, $p < .05$. Although not significant, low test-anxious students scored between the moderate and high test-anxious students (M = 6.38, SD = 2.17, n = 105).

Finally, in order to ensure that test anxiety was not confounded with, but orthogonal to, locus of control, a Pearson Correlation Coefficient was computed. The results indicated a negative relationship between test anxiety and locus of control, however, a relationship that is negligible (r = -.07, p = .21). Thus, test anxiety is not linearly correlated with locus of control and consequently, any findings related to test anxiety should provide additional information to that already found with the locus of control construct.

Selective attention. Most research assessing students' attention has inferred attention effects from physiological measures, such as phasic changes in heart rate, evoked brain potentials, and reflex startle blinks (Graham, 1992; Hirschhorn & Michie, 1990) and perceptual measures, such as the Stroop Color-Word Test (Lazarus, Ludwig, & Abersonor, 1984). Although these measures adequately denote selective attention, they are not commonly used in the college classroom, and therefore, would be considered, at best, intrusive and distracting to the learning experience of the students. In other words, the use of these measures would not provide a realistic environment in which to study effective instruction and student differences on student learning outcomes. Based on the difficulty of measuring student attention during learning in a simulated college classroom, the administration of a student lecture attention self-report was hypothesized to provide an alternative method of denoting selective attention. On a single-item, ten-point scale, students identified the extent to which they attended to the lecture (i.e., 1 = "0%"; 10 = "100%"; see Appendix E, Item 25).

Studies investigating the teaching-learning phenomenon have indirectly inferred deficits in attention from decrements in student performance. For example, 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, inferring student attention from achievement performance has its limitations. For instance, the achievement measure used in these studies relied on the multiple choice format (e.g., Perry & Dickens, 1984; 1987; Perry & Magnusson, 1987; Perry et al., 1986; Schonwetter et al., 1994b). Multiple choice tests provide cues that enhance students' memory of information processed during the lecture presentation. Thus, to define selective attention on the basis of recognition measures is problematic because student performance may not only be the result of selective attending during lecture presentation, but also the result of cues provided by the test items.

Although not a direct measure of attention, recall may give greater confidence in concluding that attention is affected than recognition. A recall test does not provide stimulus cues. Students are provided with a piece of paper that contains no words related to the lecture and are required to write down all the lecture unit ideas presented. Thus, selective attention was directly measured by a self-report item and indirectly by inferring student attention performance from lecture achievement test outcomes.

Lecture achievement tests. Most studies dealing with effective teaching-student learning have relied almost exclusively on student final examinations as outcome measures (see Murray, 1991). According to McKeachie et al. (1986), final examinations may not be 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 effects. In order to avoid this problem, an empirical

investigation of teaching behaviours 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 provided with a "one-time" lecture presentation and were then required to write an achievement test based on that material.

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 provided with an economics lecture, containing material not directly related to their discipline. Second, in order to control for prior knowledge effects, students who self-reported experience in the economics course were deleted from the initial sample (I asked "Have you ever had this material before?": "Yes" or "No").

Given that the removal of 139 students with economics experience might result in a unique subsample of remaining students (n = 295) and therefore make generalization a potential problem, student differences were examined. A number of t tests were conducted on student differences variables. No significant effects were demonstrated on Type A Behaviour Pattern, Locus of Control, Test Anxiety, or Age. However, economics-experienced students performed much better (M = 20.28, MS_e = 26.75, n = 139 vs. M = 15.77, n = 295), $t_B(433) = 8.47$, $p < .0001$, and felt that it was more important to do well than their counterparts (M = 5.50, MS_e = 5.73, n = 133 vs. M = 4.90, n = 295), $t_B(427) = 2.38$, $p < .01$. Since the purpose of the study was to examine the effects of teaching behaviours using novel lecture material, these subjects

were removed from further analyses. Obviously, this presents certain limitations for the generalizability of the results.

Furthermore, past studies relying on achievement tests have almost exclusively depended on recognition tests such as multiple-choice items (i.e., Perry & Dickens, 1987, Perry & Magnusson, 1987; 1989; Perry & Penner, 1990; Schonwetter et al., 1994b). Although recognition is a measure of student learning, it generally represents the knowledge and comprehension dimensions of learning (Bloom, Engelhart, Furst, Hill, & Krathwohl, 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 the ability to apply them to new situations. Compared to previous studies, the present study incorporated recall, recognition, and application items to create a more comprehensive definition of learning.

During the five-minute recall test, students were provided 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.; see Appendix B). Of the possible 42 lecture unit ideas (see Appendix C) consistently presented across all four teaching episodes, most students recalled less than 50% ($\underline{M}$ = 11.87; $\underline{SD}$ = 3.91; $\underline{n}$ = 294; range = 4 - 23). One student scored 0 on the recall test, representing an outlier (i.e., $\underline{z}$ = 3.0) and was therefore removed from further analyses.

The achievement test derived from the lecture was composed of 30 multiple-choice items, each item having four choices (see Appendix D). Ten

items represented the knowledge and comprehension dimensions of learning and twenty items measured the application of knowledge. 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 had a moderate influence on their performance (M = 6.37; SD = 2.33; see Appendix E, Item #6). One student scored 0 on the recognition and application tests, representing an outlier (i.e., z = 3.1) and was removed from analyses. Given that perceived versus actual learning was of interest to the present study, students rated the amount that they perceived they had learned (i.e., 1 = "very little"; 10 = "very much"; see Appendix E, Item 34).

Procedure

Figure 3 presents the chronological sequence of events for the study. Of the 3200 students in a multisection introductory psychology course, 536 volunteered for one of five sessions in either Week 1 or Week 2. In order to counterbalance the sequence in which each condition was presented during each week, the four experimental conditions and one control condition were randomly assigned to each of the sessions, once in each week. Students in groups of 40-50 came to the simulated college classroom. Students in the experimental sessions completed the prelecture questionnaire, viewed one of four videotaped lectures (low expressive/low organization, low expressive/high organization, high expressive/low organization, and high expressive/high organization), wrote the recall and achievement tests, and completed the post-achievement questionnaire. Students who were in the control group completed the

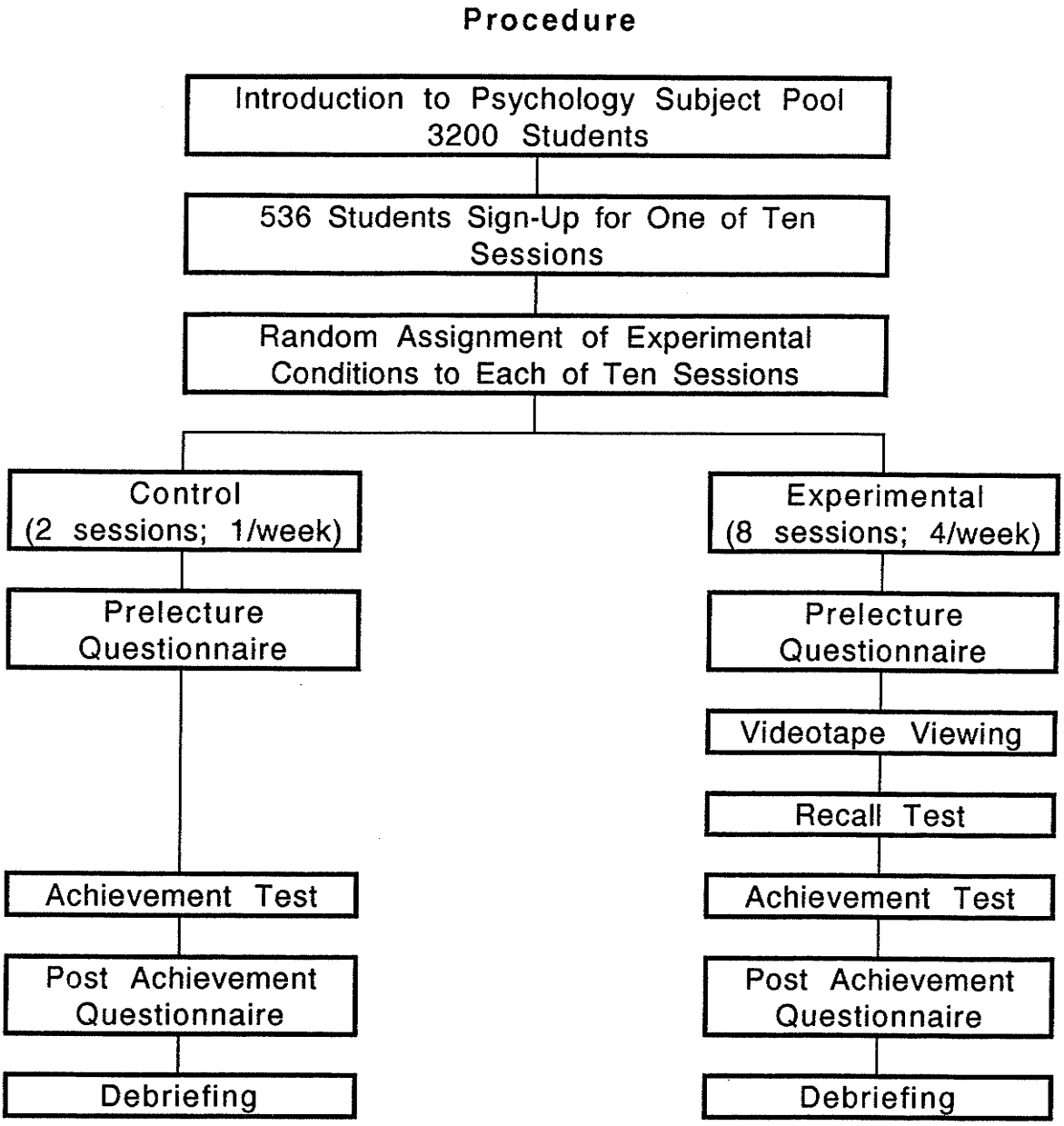


Figure 3. Experimental procedures of the control and experimental groups.

prelecture questionnaire, the achievement test, and the post-achievement questionnaire. Finally, to ensure an educational learning experience, all students were debriefed.

Rationale for Design and Statistical Analysis

In order to test the research questions, an Expressive Instruction (low, high) by Organized Instruction (low, high) by Locus of Control (external, internal) x Test Anxiety (low, moderate, high) 2 x 2 x 2 x 3 design was implemented. Before examining the research questions, a Bartlett-Box statistic from SPSS-X MANOVA procedure was employed on all dependent variables. This was done in order to test for heterogeneity of variance because sample sizes were unequal. The alpha level was set at .05. The results demonstrated no significant effects on any of the dependent variables, thereby indicating that heterogeneity of variance was not confirmed.

Effective Teaching: An Analysis

The first two research questions focused on the main effects of expressiveness and organization. The third question dealt with distinguishing the effect sizes of these behaviours. In order to address these questions, Expressive Instruction (low, high) by Organized Instruction (low, high), by Locus of Control (external, internal) x Test Anxiety (low, moderate, high) 2 x 2 x 2 x 3 an ANOVA was conducted and the main effects were investigated. Each significant effect was followed up by a measure of the magnitude of the experimental effect using omega-squared (ω^2; Hays, 1973; Tabachnik & Fidell, 1992). Values less than .03 (i.e., accounting for less than 3% of the variance) were viewed as too small to be practically significant.

The combined effects of both teaching behaviours were also explored. Four types of teaching episodes were investigated: low expressive/low

organization, low expressive/high organization, high expressive/low organization, and high expressive/high organization. The following specific comparisons were of interest. First, the low expressive/low organization condition was thought to reflect poor teaching and thus produce lower learning outcomes than the low expressiveness/high organization, the high expressiveness/low organization, or the high expressive/high organization conditions. Second, high expressiveness/high organization was expected to be optimal teaching and therefore, hypothesized to yield better learning outcomes than any of the other three teaching episodes. Finally, the other two teaching conditions, low expressive/high organization and high expressive/low organization, were thought to reflect intermediate quality teaching conditions.

Given that organization, in comparison to expressiveness, demonstrated a stronger correlation with student achievement (Feldman, 1989), the low expressiveness/high organization condition was anticipated to be more effective than high expressiveness/low organization. Based on the exploratory nature of this research question, the familywise alpha level was set at .10. Thus, one-tailed Bonferroni t tests with alpha set at .0167 per contrast (i.e., six comparisons) were used with an interpolated critical $t_B(271) = 2.16$. The dependent variables included measures of attention and achievement.

Student Differences and Effective Teaching

The purpose of this section on individual differences is two fold. Students with more adaptive learning orientations (i.e., internal, low and moderate test-anxious students), as compared to less (i.e., external and high test-anxious students), are identified. Both Locus of Control (external, internal) and Test Anxiety (low, moderate, high) main effects were investigated, using one-tailed Bonferroni t tests. Given that the locus of control (Rotter, 1990) and test

anxiety (Hembree, 1988) effects are well-established, the alpha level for locus of control and the familywise alpha level for test anxiety were set at .05. Thus, one-tailed Bonferroni t tests with alpha set at .0167 for each test anxiety contrast were used with an interpolated critical $t_B(271) = 2.163$ (i.e., 3 comparisons).

The impact of the teaching behaviours and the two individual differences between students was also investigated. Four research hypotheses were generated, each using a set of a priori comparisons. However, the paucity of literature regarding familywise error for the planning and analysis of a factorial, in comparison to the single factor design (Keppel, 1991), made it challenging to establish the appropriate analysis to use. According to Keppel (1991), "current practice in psychological research favors analyses without correction for the Family Wise rate" (p. 248). Nevertheless, in keeping with the scientific rigor of controlling the probability of making a Type I error, the familywise error rate was put into practice.

Part of the present challenge involved defining which a priori comparisons in the multifactorial design constituted the familywise error rate. According to Keselman, Keselman, and Games (1990), the familywise error rate includes a "family of conclusions about comparisons among a set of group means" (p. 3). Furthermore, "significance tests involving different factors are usually regarded as constituting different families" (Maxwell & Delaney, 1990; p. 172). For less complex designs, such as a 2-way design, the two main effects and the interaction qualify as three separate families. However, the present research questions did not focus on the 4-way or 3-way interactions. Rather, four specific sets of group means were identified, one from each of the four, 2-way interactions. In other words, each research question incorporated a meaningful

set of comparisons designed to address a specific issue that was different from any of the other three research questions. Thus, four conceptually distinct sets of group means were explored, each involving a different set of comparisons, and each requiring a familywise error rate.

In order to test whether externals and internals would benefit from expressive instruction, two a priori comparisons were conducted (i.e., two simple main effect tests). Given that the expressiveness effect is well-established for both state and trait control (Magnusson & Perry, 1989; Perry & Dickens, 1987; Perry & Magnusson, 1987; Schonwetter et al., 1994b), the familywise alpha level was set at .05. Thus, using the Bonferroni adjustment procedure (Keppel, 1991; Maxwell & Delaney, 1990), one-tailed Bonferroni t tests with alpha set at .025 for each contrast were used with a critical $t_B(271) = 1.960$.

Two a priori comparisons were conducted to test whether externals and internals would benefit from organized instruction (i.e., two simple main effect tests). However, given the exploratory nature of this research question, the familywise alpha level was set at .10. Thus, using the Bonferroni adjustment procedure, one-tailed Bonferroni t tests with alpha set at .05 for each contrast were used with a critical $t_B(271) = 1.645$.

Three a priori comparisons were conducted to test whether low, moderate, and high test-anxious students would benefit from expressive instruction (i.e., three simple main effect tests). Given the exploratory nature of this research question, the familywise alpha level was set at .10. Thus, using the Bonferroni adjustment procedure, one-tailed Bonferroni t tests with alpha set at .033 for each contrast were used with an interpolated critical $t_B(271) = 1.855$.

Three a priori comparisons were conducted to test whether low, moderate, and high test-anxious students would benefit from organized instruction (i.e., three simple main effect tests). Because of the exploratory nature of this research question, the familywise alpha level was also set at .10. Thus, using the Bonferroni adjustment procedure, one-tailed Bonferroni t tests with alpha set at .033 for each contrast were used with an interpolated critical $t_B(271) = 1.855$.

Manipulation Checks

Instructional Manipulation

Researchers have compiled persuasive evidence regarding the validity of student ratings (Centra, 1979; Cohen, 1987; Feldman, 1989; Marsh, 1984; McKeachie, 1979; Murray, 1987). Thus, in order to ensure that the teaching manipulations were accurately portraying the teaching behaviours of interest, students who participated in the study (n = 295) also rated the teaching behaviours. Students rated the videotaped lectures on 14 low and 3 high inference teaching behaviours using a 5-point Likert-type scale for both items (i.e., 1 = "poor"; 5 = "outstanding"; see Appendix E, Items 43-59). The 14 low inference items denoting the three lecturing behaviours of interest were extracted from Murray's (1983; 1987) Teacher Behaviours Inventory. The three high-inference items were added because they represent the global items found in many instructor evaluation questionnaires. Principle factors extraction with varimax rotation was performed using SAS (SAS Institute, 1989) on these 17 items. Three factors were extracted: organization, expressiveness, and clarity. Table 2 presents the factor loadings and eigenvalues (or variances explained). The largest amount of variance (4.97) was accounted for by factors loading on organization, followed by expressiveness (2.94) and clarity

Table 2

Factor Loadings of Student Ratings of Effective Teaching

Low Inference Teaching Behaviours	Factor 1	Factor 2	Factor 3
Used outline	0.87660		
Used preliminary overview	0.87655		
Headings & subheadings	0.84053		
Signaled transitions	0.71878		
Wrote key terms on overhead	0.69368		
Was organized*	0.59380		
Facilitated note-taking	0.58652		
Gestured with hands & arms		0.80115	
Moved while lecturing		0.78039	
Varied speech & tone of voice		0.62970	
Made eye contact		0.62289	
Enhanced presentation with humor		0.58975	
Was expressive*		0.56393	
Used multiple examples			0.68598
Used concrete examples			0.68499
Repeated difficult terms			0.55899
Was clear*			0.47451
Eigenvalues	***4.9732***	***2.9356***	***2.1208***

Note. High inference items = *. All other items represent low inference items. Factor 1 represents organization; Factor 2 represents expressiveness; Factor 3 represents clarity.

(2.12). These findings tend to reflect the relative importance of the organization-expressiveness relation described earlier. Organization demonstrated eigenvalues almost twice that of expressiveness. Moreover, a similar pattern of differences, albeit using a different statistical indice, is reported in Feldman's (1989) study. He found the organization correlation coefficient (r = .57) to be almost twice that of expressiveness (r = .35).

In order to ensure that the teaching behaviours were effectively manipulated using the videotapes, the following procedure was conducted. The items loading under each factor were summed and the means computed (i.e., item score/number of items), thereby creating three mean scores, one for each teaching behaviour: expressiveness, organization, and clarity (range, 1 = "poor"; 5 = "excellent"). Each of these measures was used as a dependent variable in order to test the effectiveness of the manipulations. The independent variables included the four teaching videotapes: low expressiveness/low organization, low expressiveness/high organization, high expressiveness/low organization, and high expressiveness/high organization. Thus, an Expressive Instruction (low, high) x Organized Instruction (low, high) 2 x 2 ANOVA was conducted on the three mean scores. The two-way ANOVA demonstrated two significant main effects on the three dependent variables. First, a significant Expressive Instruction main effect was demonstrated on the expressiveness dependent variable, $F(1, 270) = 128.99$, $MS_e = 0.61$, $p < .0001$, $\omega^2 = .30$ ($M = 2.97$; $SD = .83$; $n = 156$ vs. $M = 1.94$; $SD = .72$; $n = 138$). Second, a significant Organized Instruction main effect was demonstrated on the organization dependent variable, $F(1, 270) = 439.66$, $MS_e = 0.56$, $p < .0001$, $\omega^2 = .60$ ($M = 4.06$; $SD = .58$; $n = 147$ vs. $M = 2.24$; $SD = .90$; $n = 147$).

Finally, no significant effects were found for the clarity dependent variable, $F(1, 270) = 0.01$, $MS_e = 0.76$, $p = .98$. Based on these results, it was concluded that the teaching behaviours were effectively manipulated using the videotapes. In other words, the type of teaching condition that students viewed was consistent with the intended manipulation of the teaching behaviours. Students provided with low expressiveness rated the teaching episode as low in expressiveness. This was the case for all four conditions.

Although the student rating means for the two ineffective teaching conditions, low expressiveness ($M = 1.94$) and low organization ($M = 2.24$), were quite similar, this was not the case for the two effective teaching conditions, high expressiveness ($M = 2.97$) and high organization ($M = 4.06$). In other words, students rated the organization teaching manipulation as higher than expressiveness. Moreover, the organization main effect size was twice that of expressiveness ($\omega^2 = .60$ vs. $\omega^2 = .30$), suggesting that the difference between effective and ineffective teaching in the organization manipulation was twice as strong as that of the expressiveness manipulation. These experimental findings indirectly reflect Feldman's (1989) correlational findings. The association between organization and student achievement ($r = .57$) was almost twice that of expressiveness and student achievement ($r = .35$). However, the extent to which these manipulations adequately portray the real college lecture was of concern.

To ensure that the lecture manipulations bore some relation to the actual college setting, the four teaching conditions were compared to Murray's (1983) field study distribution of effective teaching behaviours conducted on 54 university instructors. The means for each of the lecturing behaviours, expressiveness and organization, in each lecture episode (i.e., low

expressiveness/low organization, low expressiveness/high organization, high expressiveness/low organization, high expressiveness/high organization) were compared to the means generated from Murray's data (anchors: 1 = "almost never"; 5 = "almost always"). The behaviours denoting each of the teaching conditions deviated somewhat from the distribution found in Murray's field study. For instance, the low expressiveness/low organization and low expressiveness/high organization conditions ($\underline{M}$ = 1.85; $\underline{M}$ = 2.03) were lower than Murray's low expressiveness rating ($\underline{M}$ = 2.67). Similarly, the high expressiveness/low organization and high expressiveness/high organization conditions ($\underline{M}$ = 2.95; $\underline{M}$ = 3.02) were also lower than Murray's high expressiveness rating ($\underline{M}$ = 3.94). However, the differences between the lowest and highest ratings ($\underline{M}$ = 1.85 vs. $\underline{M}$ = 3.02; difference = 1.17) was similar to the difference observed in Murray's data ($\underline{M}$ = 2.67 vs. $\underline{M}$ = 3.94; difference = 1.25). Based on these comparisons, the expressiveness manipulations were lower than the range of expressiveness ratings found in the actual college classroom, but the difference between the low and high conditions were fairly similar.

The findings for the organization manipulation were somewhat different. Low expressiveness/low organization and high expressiveness/low organization ratings ($\underline{M}$ = 2.09; $\underline{M}$ = 2.46) were lower than Murray's low organization rating ($\underline{M}$ = 3.01), whereas low expressiveness/high organization and high expressiveness/high organization means ($\underline{M}$ = 4.05; $\underline{M}$ = 3.90) were somewhat higher than Murray's high organization rating ($\underline{M}$ = 3.45). Moreover, the differences between the lowest and highest ratings ($\underline{M}$ = 2.09 vs. $\underline{M}$ = 4.05; difference = 1.96) was greater than the difference observed in Murray's data ($\underline{M}$ = 3.01 vs. $\underline{M}$ = 3.45; difference = 0.44). Thus, both low and high

expressiveness and low organization manipulations were lower than the field setting, whereas the high organization manipulation was higher than Murray's (1983) field study. These findings provide further evidence that the high organization manipulation may be stronger than the high expressiveness manipulation. Although the comparison may not adequately address the extent to which the teaching manipulations represent actual teaching episodes in the college classroom, the differences observed between the expressiveness and organization manipulations in the present study should be kept in mind when interpreting the results.

Presentation Sequence

In order to ensure that the achievement outcomes were not due to the time of experimentation (i.e., Monday through to Friday), each condition was run twice, once in week one and once in week two. As illustrated in Table 3, each of the four experimental conditions was randomly assigned to one of each of the sessions, for each of two weeks. This resulted in a Week (week one, week two) x Teaching Condition (low expressive/low organization, low expressive/high organization, high expressive/low organization, high expressive/high organization) 2 X 4 design. A 2 x 4 ANOVA produced no significant interaction, $F(3, 287) = 0.39$, $MS_e = 4.98$, $p = .76$ or a Week main effect $F(1, 287) = 2.72$, $MS_e = 4.98$, $p = .10$, on achievement, suggesting that the presentation sequence was counterbalanced. Table 3 displays the means and standard deviations for the teaching manipulations by time of week.

Instruction Effects

In order to ensure that the teaching manipulations had an effect on student learning, the achievement scores were collapsed across all four experimental conditions and compared to the achievement scores of a control

Table 3

Achievement Outcome Means and Standard Deviations of the Effective Teaching Manipulations by Time of Week

Week	Low expressive		High expressive		Week means and totals
	Low organization	High organization	Low organization	High organization	
Week one					
M	14.23	16.39	13.84	16.54	15.36
SD	4.44	4.26	5.15	5.71	5.09
n	26	36	37	41	140
Presentation day*	4	1	2	3	
Week two					
M	15.95	17.21	15.17	16.55	16.15
SD	4.69	5.50	4.66	4.83	4.94
n	38	39	47	31	155
Presentation day*	1	3	2	4	

Note. * = conditions were randomly assigned to one of four days for each of two consecutive weeks.

group who wrote the achievement test without having viewed the lecture. Figure 2 presents the experimental procedures of the control and experimental groups. A one-way Group (control, experimental) ANOVA shows that the control group ($\underline{M}$ = 8.35; $\underline{SD}$ = 3.82; $\underline{n}$ = 85) had a lower achievement score than the experimental group ($\underline{M}$ = 15.75; $\underline{SD}$ = 5.02; $\underline{n}$ = 295), $\underline{F}(1, 378)$ = 158.42, $\underline{MS}_e$ = 22.88, $\underline{p} < .0001$, $\omega^2 = .29$. Thus, the teaching conditions affect student learning.

Results

The results are divided into two sections. In section one, the influence of commonly occurring teaching behaviours are investigated. In section two, the impact that teaching behaviours and student differences have on student learning are examined.

Effective Teaching: An Analysis

To examine the influence of expressiveness and organization on student learning, attention and achievement effects and their associated omega-squared values were determined for each teaching behaviour. Based on the initial hypothesis, both teaching behaviours should have main effects on student learning. Collapsing across the Locus of Control and Test Anxiety independent variables, Table 4 presents the means and standard deviations of the attention and achievement dependent variables.

Instructor Expressiveness (low, high) x Instructor Organization (low, high) x Locus of Control (internal, external) x Test Anxiety (low, moderate, high) 2 x 2 x 2 x 3 between subjects ANOVAs were performed on attention and achievement outcomes to determine the effects associated with each teaching behaviour. Given the unequal number of observations in the cells, as seen in Table 4, a nonorthogonal solution was employed. The Type III sum of squares was selected as the most appropriate test of unweighted marginal means for this type of design (Maxwell & Delaney, 1990).

Table 5 illustrates that high, as compared to low, organization yielded higher levels of attention, as defined by a self-report item, and achievement, as denoted by a recall test, a recognition test and perceived amount learned. Also, three of the four significant main effects demonstrated practical effects (i.e., $\omega^2 > .03$), indicating that the strength of the association between the

Table 4

Means and Standard Deviations for Student Attention and Achievement Outcomes

	Low expressive		High expressive		Bonferroni t tests (t = 2.16)					
	Low organization (A)	High organization (B)	Low organization (C)	High organization (D)	A-B	A-C	A-D	B-C	B-D	C-D
Attention indicator										
Self-reported*1										
M	6.65	7.48	6.87	7.51						
STD	2.28	1.80	2.21	1.77	2.40	0.65	2.45	1.90	0.09	1.96
n	63	75	84	71						
Achievement performance indicators										
Recall*2										
M	11.09	12.27	10.82	13.39						
STD	3.72	4.16	3.28	4.01	1.83	0.43	3.53	2.41	1.79	4.22
Recognition*3										
M	5.48	6.57	5.37	6.42						
STD	1.80	1.90	1.91	1.96	3.38	0.35	2.85	3.98	0.51	3.41
Application*4										
M	9.77	10.24	9.21	10.13						
STD	3.34	3.51	3.57	3.85	0.77	0.94	0.59	1.81	0.19	1.60
n	64	75	84	72						
Perceived learned*5										
M	4.05	4.75	4.18	5.56						
STD	2.18	2.34	2.34	2.44	1.82	0.35	3.89	1.59	2.15	3.82
n	63	75	84	72						

Note. *1"Expressed in terms of percentages, how would you describe your attention to the lecture" (i.e., 1 = 10%; 10 = 100%). *2Five minute free recall of lecture key words (maximum of 42 lecture unit ideas). *3 Ten multiple choice recognition items based on lecture. *4Twenty multiple choice application items based on lecture. *5 "How much did you learn from the lecture" (1 = "not at all"; 10 = "very much so"). Boxed numbers indicate statistically significant t tests.

Table 5

Expressiveness (low, high) By Organization (low, high) By Locus of Control (external, internal) By Test Anxiety (low, moderate, high) 2 x 2 x 2 x 3 ANOVA's Summary Table: Expressiveness and Organization Main Effects

Dependent variables	Statistical summaries	ω^2
Attention indicator		
Self-reported attention		
Expressiveness main effect	$F(1, 269) = 0.18$, $MS_e = 4.04$, $p = .68$	
Organization main effect	$F(1, 269) = 9.14$, $MS_e = 4.04$, $p < .003$	0.020
Achievement performance indicators		
Recall		
Expressiveness main effect	$F(1, 271) = 0.73$, $MS_e = 13.87$, $p = .39$	
Organization main effect	$F(1, 271) = 19.91$, $MS_e = 13.87$, $p < .0001$	0.052*
Recognition		
Expressiveness main effect	$F(1, 271) = 0.02$, $MS_e = 3.59$, $p = .88$	
Organization main effect	$F(1, 271) = 19.11$, $MS_e = 3.59$, $p < .0001$	0.051*
Application		
Expressiveness main effect	$F(1, 271) = 0.02$, $MS_e = 12.17$, $p = .89$	
Organization main effect	$F(1, 271) = 2.04$, $MS_e = 12.17$, $p = .15$	
Perceived learning		
Expressiveness main effect	$F(1, 270) = 1.02$, $MS_e = 5.07$, $p = .31$	
Organization main effect	$F(1, 270) = 17.88$, $MS_e = 5.07$, $p < .0001$	0.045*

Note. * = practically significant ($\omega^2 > 0.03$); Type III sum of squares are listed above.

independent and dependent variables is large enough to be considered "realistically meaningful" (Tabachnik & Fidell, 1992; p. 54). However, contrary to initial hypotheses, significant expressiveness main effects were not found for attention or achievement outcomes. Moreover, neither expressiveness nor organization main effects were demonstrated on the application dependent variable.

In order to investigate the relationship between different teaching behaviours, attention and achievement effects were determined for each teaching condition. Six a priori comparisons were performed to test the effectiveness of each teaching episode. In other words, the four teaching conditions were compared to each other.

As displayed in Table 4, combinations of expressiveness and organization differentially influenced student learning. According to Columns A-B and A-D in Table 4, the low expressiveness/low organization teaching condition had less of an impact on students' self-reported attention ratings than either the low expressiveness/high organization or high expressiveness/high organization teaching conditions. The high expressiveness/high organization teaching condition yielded better recall and recognition scores, and perceptions of amount learned than either the low expressiveness/low organization (see Column A-D) or high expressiveness/low organization teaching conditions (see Column C-D). Also, the low expressiveness/high organization teaching condition produced greater recall and recognition scores than the high expressiveness/low organization teaching condition (see Column B-C). Moreover, the low expressiveness/high organization teaching condition yielded greater recognition scores than the low expressiveness/low organization (see Column A-B). Finally, the high expressiveness/high organization teaching

condition demonstrated higher perceptions of amount learned than the low expressiveness/high organization teaching condition. Contrary to initial hypotheses, no significant differences were seen for the application measure.

In summary, Table 4 demonstrates several patterns. First, and consistently on a number of dependent variables, the low expressiveness/low organization teaching condition is less effective than the high expressiveness/high organization teaching condition (i.e., comparison A-D). Second, simple organization main effects were observed in the low and high expressiveness teaching conditions (i.e., A-B, C-D), whereas no simple expressiveness main effects were observed in the low and high organization teaching conditions (i.e., A-C, B-D). In other words, the effects associated with organization tend to be more consistent than the effects associated with expressiveness. Third, the low expressiveness/high organization teaching condition was more effective than the high expressiveness/low organization teaching condition (i.e., B-C). These patterns demonstrate that low expressiveness/low organization and high expressiveness/low organization are both less effective teaching conditions, whereas low expressiveness/high organization and high expressiveness/high organization are both effective teaching conditions. These results extend the Manitoba studies in that attention, recall, and, perceptions of achievement are also influenced by effective teaching. Surprisingly, no differences were found in application.

Student Differences and Effective Teaching

Two dependent variables were analyzed in order to explore a number of simple main effects of student differences and teaching behaviours on student learning outcomes. The dependent variables included student achievement, as measured by a recall and recognition test. Independent variables included

instructor expressiveness, instructor organization, locus of control, and test anxiety. Table 6 presents the descriptive statistics bearing on the locus of control and effective teaching behaviours, collapsing across the Test Anxiety independent variable, whereas Table 7 displays the descriptive statistics bearing on the test anxiety and effective teaching behaviours, collapsing across the Locus of Control independent variable. Given that the research questions focused specifically on which student differences benefit from which effective teaching behaviours, specific a priori comparisons were explored. These comparisons are reported below, beginning with the main effects of locus of control and test anxiety.

Locus of control main effects. In order to reveal the learning orientations hypothesized to differentiate externals from internals, one-tailed t tests were conducted on the two achievement measures: recall and recognition. Contrary to the initial hypotheses, locus of control main effects were not found for recall (M = 11.64, SD = 3.89, n = 164, vs. M = 12.16, SD = 3.93, n = 131; externals and internals, respectively), or recognition (M = 5.85, SD = 2.01, n = 164, vs. M = 6.09, SD = 1.90, n = 131), t_Bs(271) = 1.17, 1.13, ps > .05. However, the means are in the predicted direction. Thus, a one-time lecture episode does not distinguish any differences in learning orientations between externals and internals in terms of main effects.

Test anxiety main effects. In order to examine the learning orientations hypothesized to differentiate low and moderate from high test-anxious students, two achievement variables, recall and recognition, were assessed. Test anxiety main effects were anticipated such that low and moderate test-anxious students would demonstrate higher levels of achievement than high test-anxious students. As hypothesized, high test-

Table 6.

Locus of Control by Expressiveness by Organization Means and Standard Deviations of Student Learning Outcomes

	External locus				Internal locus			
	Low exp		High exp		Low exp		High exp	
	Lo	Ho	Lo	Ho	Lo	Ho	Lo	Ho
Recall*1								
M	11.30	12.77	10.22	12.82	10.75	11.83	11.71	14.06
STD	3.82	4.51	2.99	3.83	3.59	3.83	3.51	4.17
n	40	35	50	39	24	40	34	33
Recognition*2								
M	5.50	6.49	5.48	6.10	5.46	6.65	5.21	6.79
STD	1.99	2.05	1.89	2.05	1.47	1.79	1.95	1.82
n	40	35	50	39	24	40	34	33

Note: exp = Expressiveness; Lo = Low Organization; Ho = High Organization; *1Five minute free recall of key words presented during the lecture (range 2 - 23 words).

*2Recognition test scores (total = 10).

Table 7.

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

	Low test anxious				Moderate test anxious				High test anxious			
	Low exp		High exp		Low exp		High exp		Low exp		High exp	
	Lo	Ho	Lo	Ho	Lo	Ho	Lo	Ho	Lo	Ho	Lo	Ho
Recall*1												
M	11.55	12.66	10.71	13.71	12.32	12.92	10.39	13.35	9.45	10.95	11.21	13.04
STD	3.72	4.46	3.47	4.74	3.75	4.02	3.53	3.28	3.22	3.76	2.97	3.75
n	20	29	28	28	22	25	23	20	22	21	33	24
Recognition*2												
M	5.30	7.03	5.43	6.71	5.68	6.76	5.48	6.85	5.45	5.71	5.24	5.71
STD	2.00	2.13	2.23	1.96	1.78	1.74	1.93	1.84	1.68	1.52	1.62	1.94
n	20	29	28	28	22	25	23	20	22	21	33	24

Note. exp = Expressiveness; 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.

anxious students displayed lower recognition scores (MS_e = 3.59; M = 5.50, SD = 1.68, n = 100)than either low (M = 6.19, SD = 2.20, n = 105) or moderate test-anxious students (M = 6.19, SD = 1.90, n = 90), t_Bs(271) = 2.61, 2.51, ps < .033. However, recall differences were not observed (MS_e = 13.87, M = 12.21, SD = 4.27, n = 105; M = 12.22, SD = 3.79, n = 90; M = 11.21, SD = 3.56, n = 100; low, moderate, and high test anxiety, respectively), t_Bs(271) = 0.02, 1.92, 1.87, ps > .033. Although not statistically significant, the means were in the predicted direction. Thus, the one-time lecture exposure distinguished adaptiveness in learning orientations among low, moderate, and high test-anxiety on measures of recognition, and not recall as initially hypothesized.

Benefiting from effective teaching behaviours. The next set of hypotheses dealt with exploring student differences that benefit from effective teaching behaviours. According to Perry (1991), students with adaptive learning orientations should benefit scholastically from effective teaching behaviours. The initial hypothesis indicated that internals should perform better academically than externals and low or moderate test-anxious students should perform better academically than high test-anxious students. Six a priori comparisons were used to test this hypothesis on the recall and recognition dependent variables. The first three focused on high expressive teaching, whereas the next three dealt with high organized teaching.

Figure 4 shows that internals scored higher on the recall test than externals when receiving high expressive instruction, $t_B(271) = 2.51$, $p < .025$. However, as seen in Figure 5, these differences were not observed on the recognition test, $t_B(271) = 0.78$, $p > .025$. As seen in Figure 6, high expressiveness did not produce significant differences between low and high test-anxious students, nor between moderate and high test-anxious students

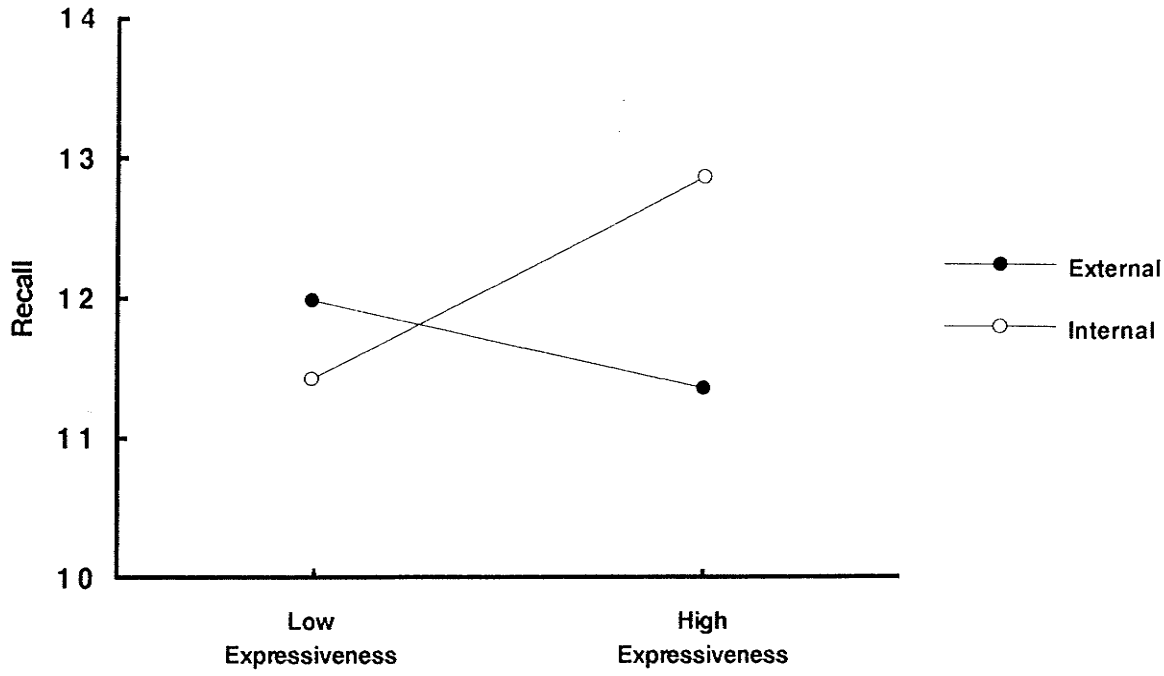


Figure 4. The locus of control and expressiveness simple main effects for the recall test.

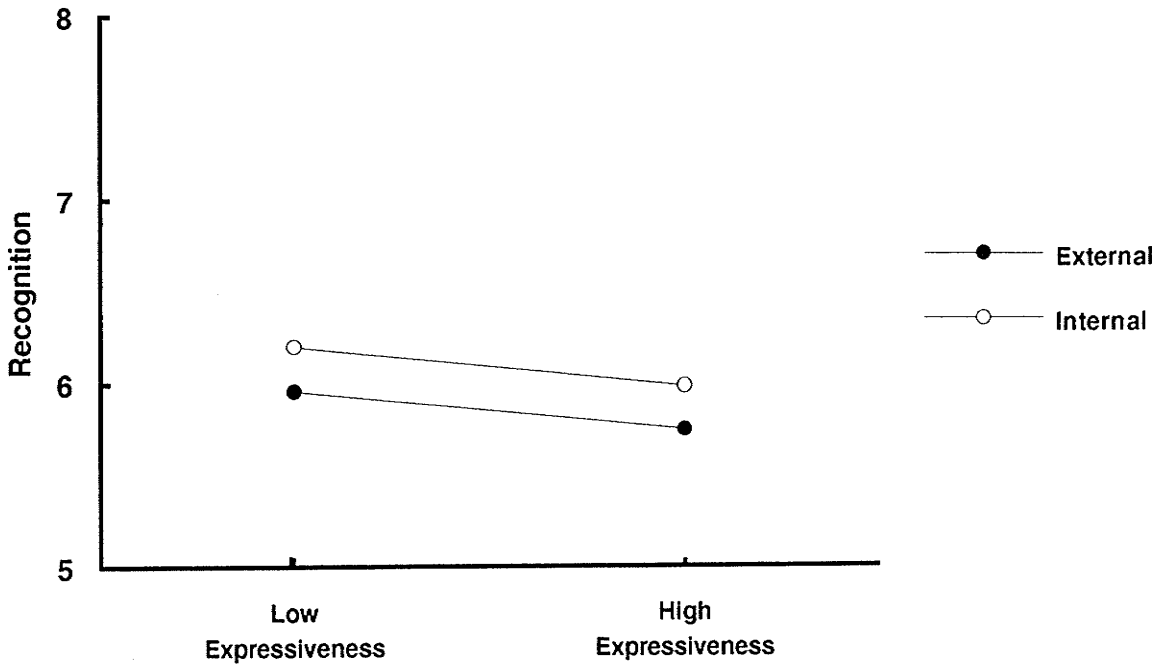


Figure 5. The locus of control and expressiveness simple main effects for the recognition test.

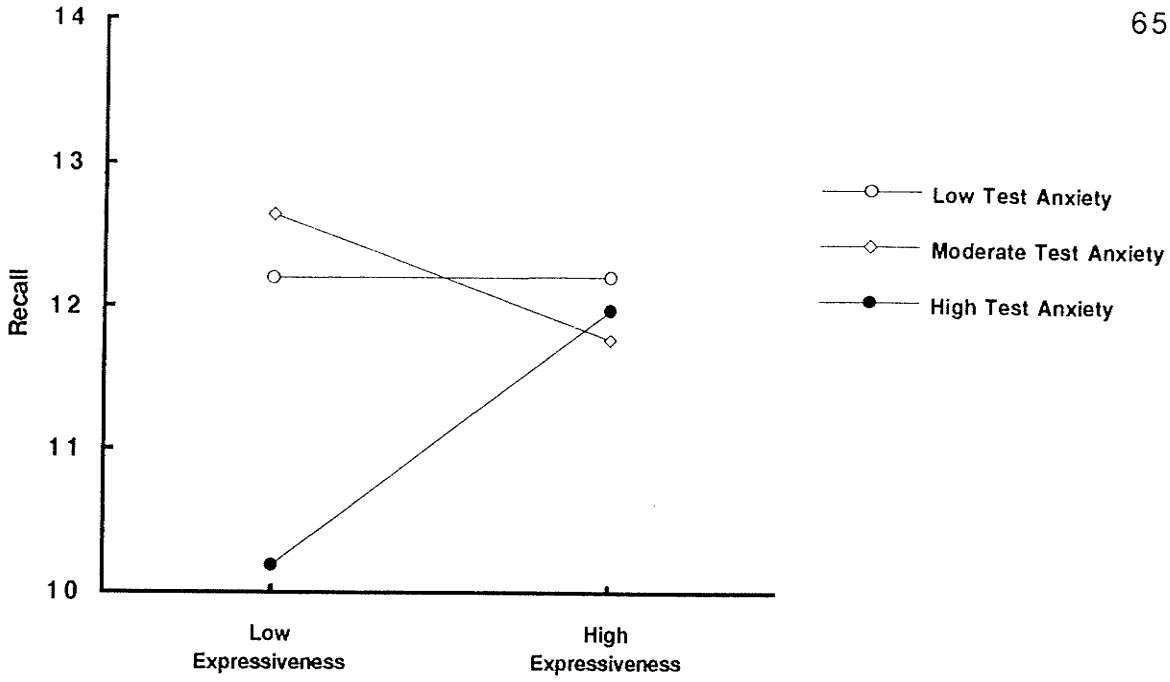


Figure 6. The test anxiety and expressiveness simple main effects for the recall test.

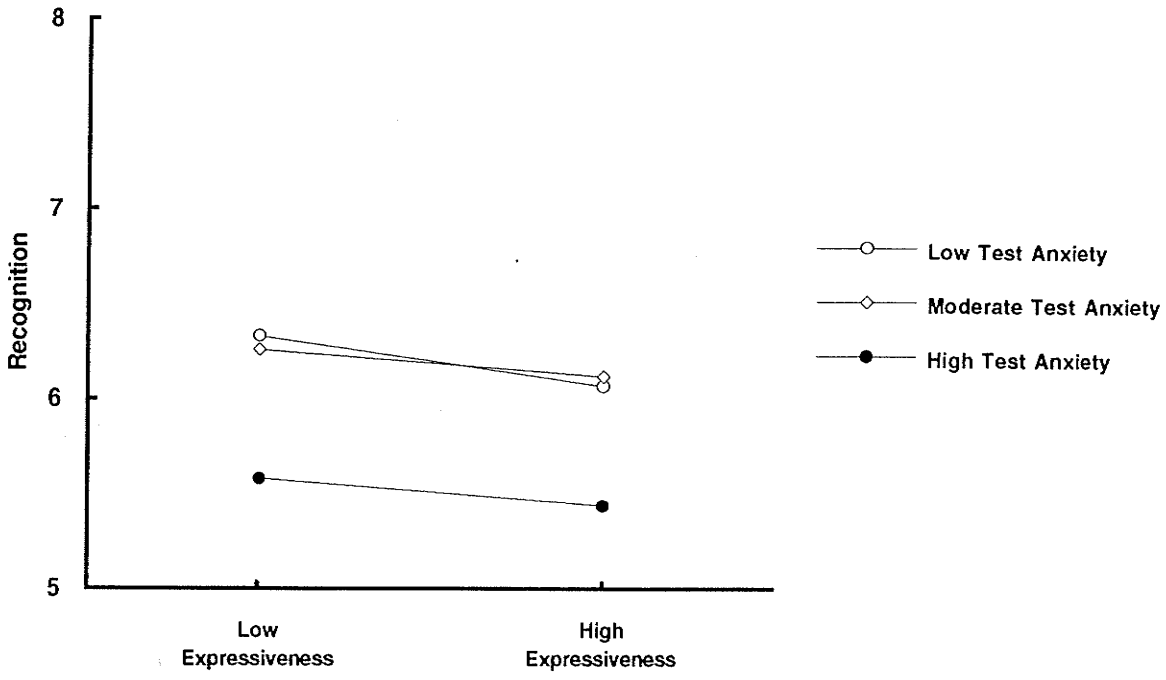


Figure 7. The test anxiety and expressiveness simple main effects for the recognition test.

on the recall measure, t_Bs(271) = 0.33, 0.28, ps > .033. Moreover, Figure 7 displays no significant differences between low and high test-anxious students, nor between moderate and high test-anxious students on the recognition measure, t_Bs(271) = 1.77, 1.78, ps > .033. Thus, only internal locus of control students are able to benefit from high expressiveness, specifically on measures of recall and not recognition.

For the next three comparisons, high organization denoted the effective teaching behaviour. Contrary to the initial hypothesis, high organization did not produce significant differences between internals and externals on the recall or recognition tests, t_Bs(271) = 0.07, 1.38, ps > .05. Figures 8 and 9 display these findings, respectively. As seen in Figure 10, no significant differences were observed between low and high test-anxious students, nor between moderate and high test-anxious students on the recall measure, t_Bs(271) = 1.49, 1.32, ps > .02. However, as initially hypothesized, high organization produced higher recognition scores for low, as compared to high test-anxious students, $t_B(271) = 3.10$, $p < .02$, and for moderate, as compared to high test-anxious students $t_B(271) = 2.73$, $p < .02$. These latter differences are presented in Figure 11. Thus, low and moderate test-anxious students are able to benefit from high organized instruction.

Being compensated for by effective teaching behaviours. The final set of hypotheses dealt with exploring student differences that are potentially compensated for by effective teaching behaviours. According to Perry (1991), effective teaching behaviours may also have a compensatory effect for students with less adaptive learning orientations. Although past studies have not demonstrated this phenomenon when looking at expressive instruction and student achievement as measured by recognition tests (Perry &

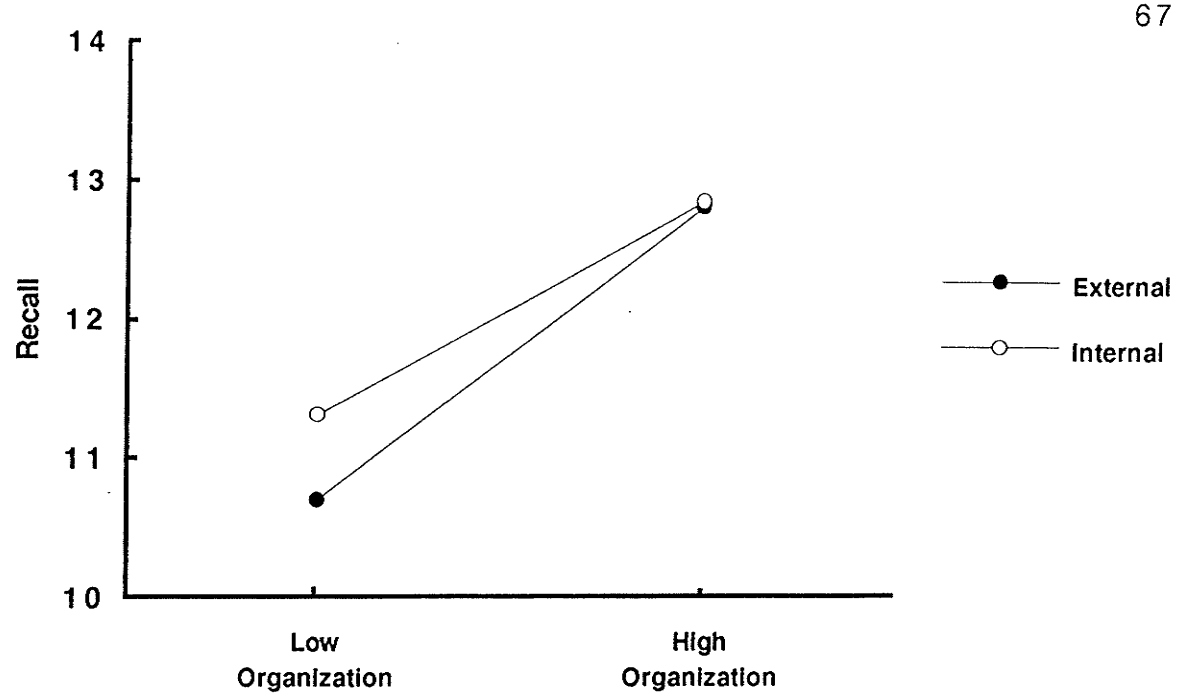


Figure 8. The locus of control and organization simple main effects for the recall test.

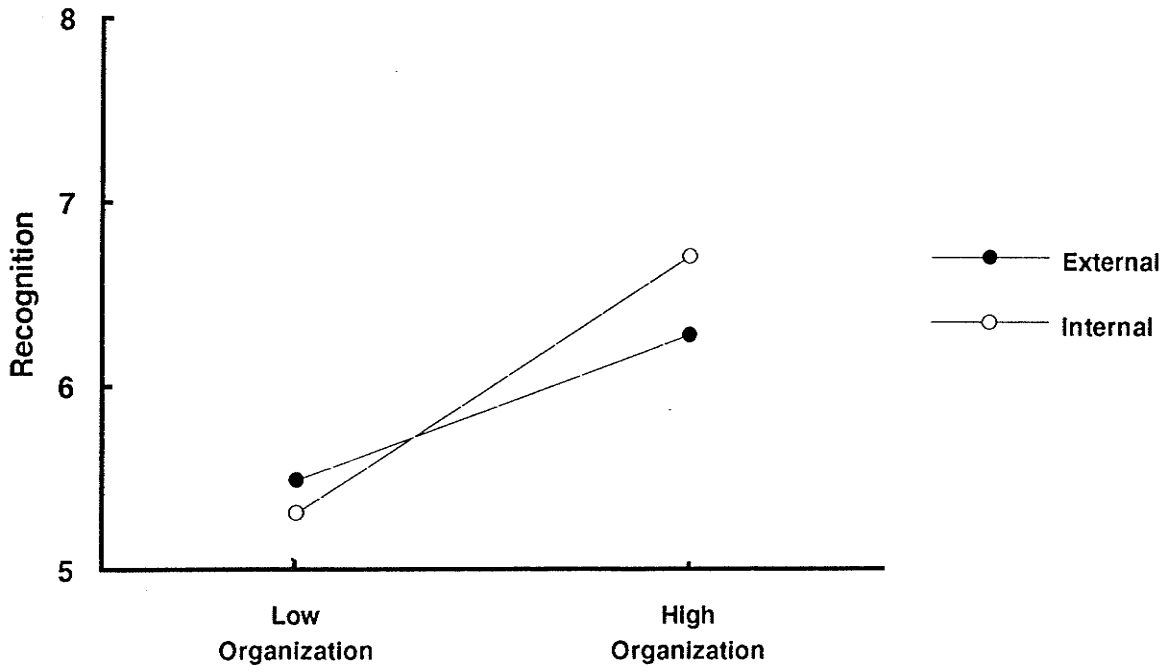


Figure 9. The locus of control and organization simple main effects for the recognition test.

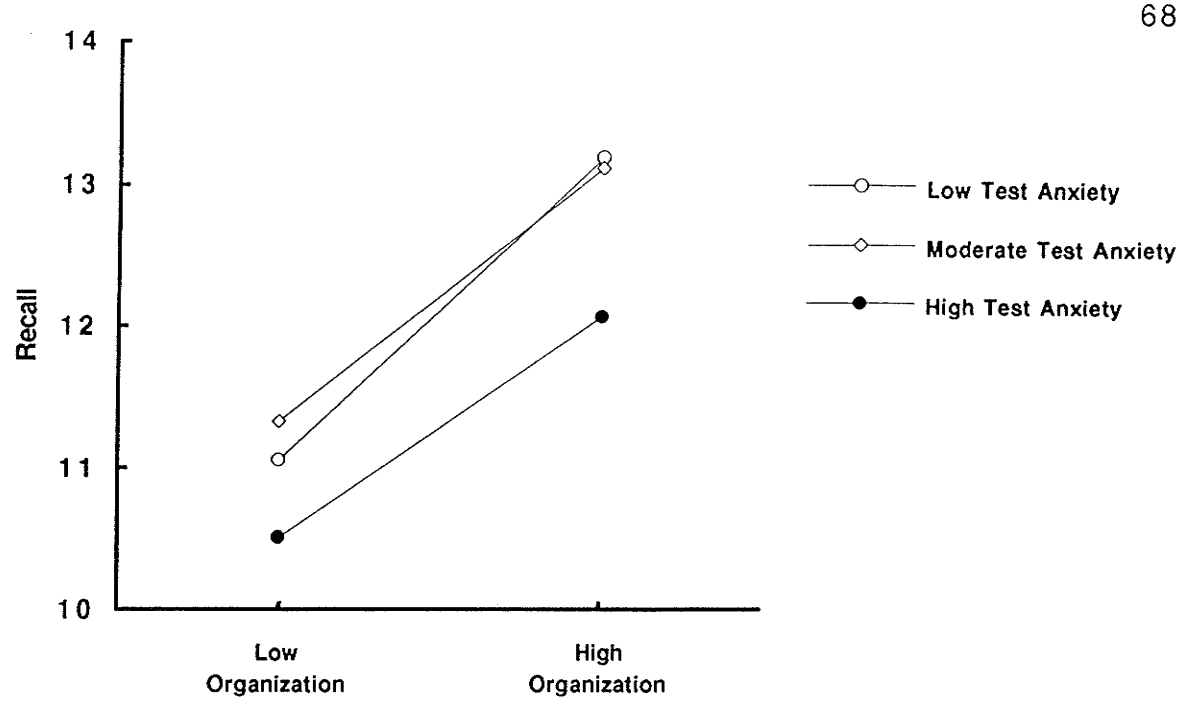


Figure 10. The test anxiety and organization simple main effects for the recall test.

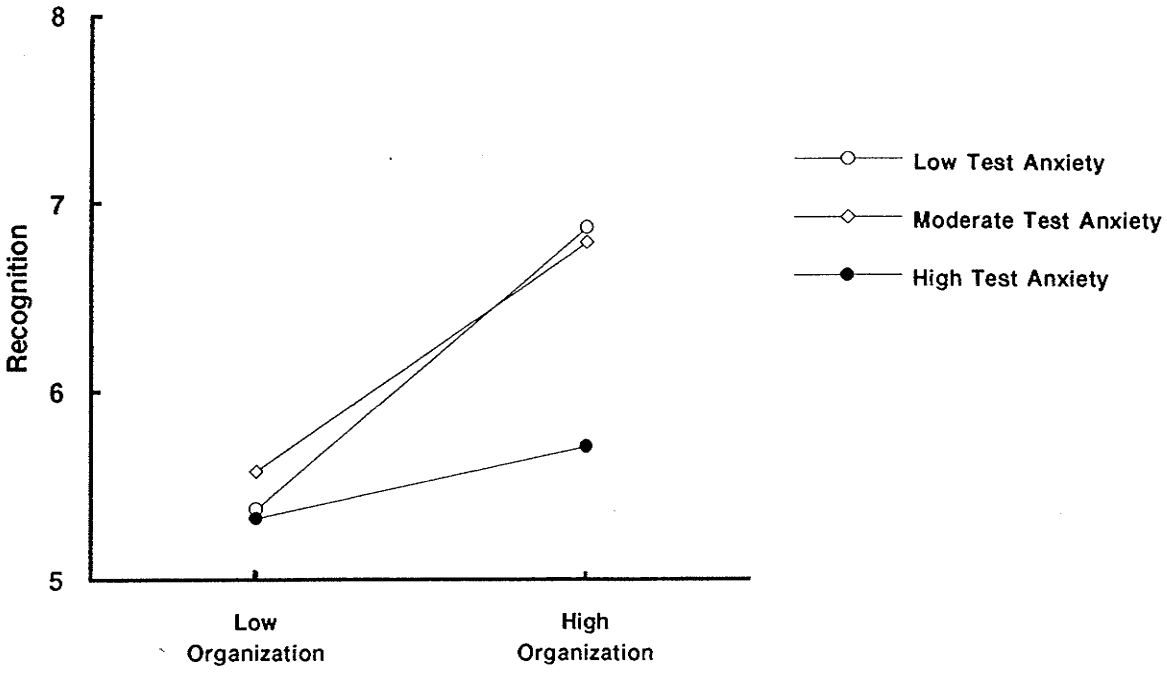


Figure 11. The test anxiety and organization simple main effects for the recognition test.

Dickens, 1984; 1987; Magnusson & Perry, 1989), teaching behaviors such as organization and achievement measures such as recall may provide evidence for this phenomenon.

Although these students may not achieve the same level of academic performance as students with adaptive learning orientations, students with less adaptive learning orientations receiving effective teaching may nonetheless perform better than students with less adaptive learning orientations receiving less effective teaching. The initial hypothesis indicated that effective, as compared to ineffective teaching behaviours, should produce better achievement performance for externals and high test-anxious students, respectively. Four a priori comparisons were used to test this hypothesis. The first two deal with expressiveness, whereas the next two deal with organization.

Figures 4 and 5 show that externals receiving high expressiveness did not perform better on recall or recognition than externals receiving low expressiveness t_Bs(271) = 1.08, 0.71, ps > .025. Moreover, Figure 7 demonstrates that high test-anxious students receiving high expressiveness did not perform better on recognition than high test-anxious students receiving low expressiveness t_B (271) = 0.37, p > .033. These findings replicate previous studies (Perry & Dickens, 1987; Perry & Magnusson, 1989) in that at-risk students are unlikely to benefit from effective teaching. However, high test-anxious students receiving high expressiveness displayed better recall scores, as seen in Figure 6, than high test-anxious students receiving low expressiveness t_B(271) = 2.38, p < .033. Thus, high expressiveness on the part of instructors influences high test-anxious students' recall performance.

The organization teaching conditions yielded somewhat different findings. As initially predicted, and as seen in Figures 8 and 9, externals receiving high organization had better recall and recognition scores than externals receiving low organization t_Bs(271) = 3.59, 2.66, ps < .025. Furthermore, Figure 10 demonstrated that high test-anxious students receiving high organization performed better on recall test than high test-anxious students receiving low organization $t_B(271) = 2.08$, $p < .033$. However, no differences between high test-anxious students were demonstrated in Figure 11, on the measure of recognition, $t_B(271) = 1.00$, $p < .033$. Thus, instructors with high organization influence externals' recall and recognition performance, as well as high test-anxious students' recognition outcomes.

In summary, the above findings indicate a number of patterns. First, the one-time lecture exposure distinguished adaptiveness in learning orientations among low, moderate, and high test-anxiety, but not between externals and internals. However, the former finding was limited to only one measure of student learning: recognition. Second, internal students were able to benefit from high expressive instruction, demonstrating higher recall scores, whereas both low and moderate test-anxious students were able to benefit from high organized instruction, displaying higher recognition scores. Third, high expressiveness influences high test-anxious students' recall performance, whereas high organization influences externals' recall and recognition performance, as well as high test-anxious students' recognition outcomes.

Discussion

The purpose of this dissertation was to examine the relationship between teaching behaviours and student learning. This was accomplished by first investigating how commonly recognized teaching behaviours compare to each other, and second, by exploring student differences that benefit from effective teaching behaviours. The relevant findings related to each section are discussed below.

Effective Teaching: An Analysis

The present findings indirectly support Feldman's (1989) ordering of expressiveness and organization. In his list of effective teaching behaviours, organization shows a higher correlation to student achievement (r = .57) than expressiveness (r = .35). In the present study, organization influenced student learning. Below, these findings are explained in more detail.

Expressiveness effects explained. Expressiveness results did not replicate previous studies (Coats & Smidchens, 1966; Feldman, 1989; Perry, 1991; McKeachie et al., 1986; Ware & Williams, 1975). Numerous arguments may account for this finding. The most obvious explanation would indicate that the threshold at which expressiveness influences student learning may not have been achieved. Ideally, both student ratings and achievement should have been affected (Abrami et al., 1982; Feldman, 1989). In the present study, only student ratings revealed that the high, as compared to the low, expressive manipulation was an effective teaching behaviour. Student achievement was not influenced. Moreover, the correlation between student achievement and student ratings of expressiveness was not statistically significant (r = .051, p = .40), whereas it was for organization (r = .224, p < .0001). This finding indicates that expressiveness had little, if any, impact on student learning. Moreover,

both correlations were lower than that found in Feldman's (1989) study. Thus, the manipulations in the present study may not adequately reflect those found in previous studies.

The comparison between the teaching manipulation effect sizes indicates an anomaly. Student ratings of the organization manipulation revealed an effect size (ω^2 = 0.60) twice that of expressiveness (ω^2 = 0.30; see p. 49). In other words, the difference between the low and high teaching manipulations was greater for organization ($\underline{M}$ = 2.24 vs. $\underline{M}$ = 4.06; see p. 49) than for expressiveness ($\underline{M}$ = 1.94 vs. $\underline{M}$ = 2.97; see p. 49). Moreover, the present manipulations were not quite representative of Murray's (1983) university teaching norms. These findings are not surprising given that Murray's norms are based on "live" instruction, whereas the present study relied on videotaped teaching conditions. An important component of expressive teaching may include a "live" three-dimensional instructor that has the freedom to move in the classroom and not a two-dimensional instructor that is limited to the confines of the projected image on a 2.2 meter diagonal screen. Given that the teaching manipulation effect sizes were not initially equal, organization may have had an advantage over the expressiveness in affecting students' learning. Moreover, the videotape format may be more conducive to the veridical depiction of organization as a teaching behavior as compared to expressiveness.

The present study was experimental in nature, and therefore, a comparison to a field study, such as Murray's (1983), may not adequately address the effectiveness of the teaching manipulations. Rather, a comparison to another experimental study might provide a better validation of the teaching manipulations. However, it is unclear whether or not previous experimental studies controlled for other teaching behaviours, such as organization and

clarity, during the expressiveness manipulation (with the exception of lecture content; Perry, 1991). Thus, a direct comparison of the expressiveness ratings between the present study and the Manitoba studies may be problematic.

Although a number of reasons may account for the lack of expressiveness findings, the most evident is the weak experimental manipulation of expressiveness. In other words, the expressiveness teaching manipulation probably did not have a similar impact on student learning as the experimental manipulation of organization. Thus, the results, specifically those related to expressiveness, should be viewed with caution.

Organization effects explained. Organization affected the student learning outcomes of attention and achievement. In order to clarify the causal links between organization and student learning, explanations are provided for the learning outcomes affected. Finally, three hypotheses are presented that illustrate how organization might causally affect learning.

Organized teaching influenced students' perceived (i.e., self-reported) and actual (i.e., recall and recognition) achievement outcomes. According to Jacoby (1983), a direct association exists between selective attention and learning, such that higher levels of attending produce better learning outcomes. Thus, students with higher levels of attention, such as self-reported attention, demonstrated higher perceived and actual achievement outcomes.

Without a doubt, organized lecture material significantly improves student learning (Guetzkow et al., 1954; Hartley & Cameron, 1967; Hartley & Fuller, 1971; Maddox & Hoole, 1975; Katona, 1940). According to cognitive researchers, the low-inference behaviours that denote organization play an important role in student learning. The use of embedded headings and intact outlines optimizes both immediate and delayed learning by guiding note-taking,

depicting the organization of the important ideas of a presentation (Frank et al., 1989). An outline represents a knowledge structure, serving as an advance organizer (Glynn & Di Vesta, 1977) and providing students with "chunking" strategies (Perry, 1991). As such, it enhances students' integration of content topics by providing a quick and logical method of structuring lecture material for linking new to preexisting knowledge (Perry, 1991). In turn, comprehension (Meyer, 1975; 1977) and the encoding and retrieval of learning material are facilitated (Glynn & Di Vesta, 1977).

Of the actual achievement outcomes, organization influenced recognition and recall, and not application. According to Bloom's taxonomy (1956), different types of achievement tests represent different levels of in-depth information processing. For instance, recognition tests involve the correct identification of content from a large array of content with cues. A recall test requires a more thorough learning by the student because it involves remembering content without any cues at all. Application tests require the ability to use the general principles presented during the lecture in new or novel situations (Bloom, 1956). Only lower level processing, such as recall and recognition, and not the deeper or more critical thinking tasks, such as application, were influenced by organized instruction. This finding may be expected. Both recognition and recall share similar cognitive functions: knowledge and comprehension (Bloom, 1956). These cognitive functions were more than likely elicited during the one-time lecture episode. However, in order to apply the material, students need to have a working knowledge of it. In other words, students require an opportunity to apply what they have learned. Unlike the real classroom, students did not have a chance to practice or to apply the material during or outside the classroom situation. Rather, students

received a "one-time" only presentation of the stimulus material. As a result, organization may not have had an influence on students' application.

In order to understand how organization influences student learning outcomes, the following three interpretations are presented: the frustration hypothesis, the specific/general orienting stimulus hypothesis, and the control hypothesis. According to the frustration hypothesis, exposure to communication that is poorly organized and chaotic may result in listener or audience frustration. For instance, students listening to a poorly organized lecture may become perplexed in trying to derive meaning from it. In an attempt to gain understanding, they may resort to skills of organizing the material. But, this behaviour may persist for only a short duration, before students yield to the distraction of environmental stimuli, such as the behaviour of other students. In other words, frustrated by the low organized instruction and distracted by classroom stimuli, these students probably perform poorly, scholastically. Presented with organized lectures, students are provided with more cognitive structure and are thus more likely to focus on relevant stimulus material. Thus, well-organized teaching may be crucial for student learning.

Alternatively, the specific/general orienting stimulus hypothesis suggests that a more specific, as compared to general, orienting stimulus may be responsible for the effectiveness of organization. For instance, organization can be thought of as a specific orienting stimulus, directing students' attention to specific stimuli. Expressiveness, on the other hand, is more of a general orienting stimulus, encouraging students to pay attention to all stimuli. Each, then, would be necessary in captivating students' attention. In other words, organization, independent of expressiveness (and vice versa), should be able to elicit student attention. Selective attention, in turn, is crucial for information

processing (Meyer, 1975, 1977). However, enhancing attention to specific, as compared to general stimulus material, may be more advantageous for learning. For example, helping students to focus on specific elements of the presentation, rather than on general elements, would seem more conducive for information processing. Thus, a boring, but well-organized lecture, may not result in high levels of general attention to the whole lecture, but rather high levels of specific attention to chunks of the lecture that have been organized.

The effectiveness of organization can also be viewed in terms of increasing students' control. In other words, lectures presented in logical and organized chunks enhance students' processing of information, which, in turn, may enhance their feelings of control in the learning environment. Organized lectures, which provide clear outlines of the lecture presentation, may instill in the students thoughts such as "I know where we are going, even if the teacher is boring". Poorly organized teaching, on the other-hand, makes information processing more difficult. In so far as greater allocation of cognitive resources is required for students to process poorly organized presentations, students may be more easily distracted by irrelevant stimuli. The inability to process information may translate into feelings of loss of control over the learning environment. Loss of control, in turn, produces cognitive deficits and poor scholastic outcomes (Perry, 1991). Thus, organization may work on the principle of influencing students' perception of control.

The symbiotic/antagonistic teaching phenomenon. The results of the four teaching conditions demonstrated that effective and ineffective teaching behaviours differentially influence student attention and achievement. The high expressiveness/high organization teaching condition was significantly superior to the low expressiveness/low organization and high

expressiveness/low organization teaching conditions. The most parsimonious and reasonable explanation for these differences in teaching conditions suggests the following.

Expressiveness and organization may operate at different levels. According to Feldman (1989), organization has the largest correlation with student learning, followed by expressiveness. The present study extends this finding, demonstrating in a causal fashion that organization has an effect on student learning. However, these findings may be due to an inadequate manipulation of the teaching behaviours as described earlier and not necessarily based on actual teaching behaviour characteristics.

More significant to the present study is the symbiotic/antagonistic relationship hypothesized to exist among combinations of teaching behaviours. In other words, various combinations of effective and ineffective teaching behaviours have different influences on student learning. The symbiotic relationship is portrayed by teaching behaviours that complement each other and, in turn, facilitate or enhance learning. Theoretically, the high expressiveness/high organization teaching condition best describes this relationship. The antagonistic relationship is illustrated by the facilitative effects of one teaching behaviour being eliminated by the distracting influence of another. According to this definition, teaching combinations such as low expressiveness/high organization and high expressiveness/low organization should best exemplify this relationship. The low expressiveness/low organization condition is neither symbiotic nor antagonistic, describing a teaching condition that has no facilitative effects for the student.

In the present study, high expressiveness/high organized instruction produced higher recall, recognition, and perceptions of amount learned than

either low expressiveness/low organized or high expressiveness/low organized instruction. Based on these findings, the combined influence of high levels of effective instruction, such as high expressiveness and high organization, complement each other to produce higher levels of scholastic outcomes and therefore, tends to illustrate the symbiotic relationship. The antagonistic relationship is only partially illustrated. The high expressiveness/low organization combination produced no better learning outcomes than low expressiveness/low organization. Based on these findings, poorly organized lectures may distract from or be antagonistic towards the facilitative effects of high expressiveness.

Of interest is the low expressiveness/high organization condition. Instead of illustrating the antagonistic definition as initially predicted, the low expressiveness/high organization condition demonstrated similar learning outcomes as the symbiotic teaching condition, namely the high expressiveness/high organization condition. A possible explanation for this phenomenon might be found in a logical exception to the antagonistic definition. It may be possible that the facilitative effects of some teaching behaviours may not be thwarted by the distracting effects of others. In other words, the facilitative effects of certain effective teaching behaviours may be "buffered" from the potential antagonistic effects of certain ineffective teaching behaviours. For instance, the low expressiveness/high organization combination does not seem to thwart student learning, but rather, it seems to produce similar outcomes as the high expressiveness/high organization condition. The facilitative effects of organized instruction are not eliminated by the presence of low expressiveness, the latter which normally thwarts student learning (Perry, 1991). Thus, the influence of the instructor's organization on

student learning may not be thwarted by other poor teaching behaviours, such as low expressiveness.

In summary, both teaching behaviours are important for student learning, albeit for different reasons. Depending on the combination of teaching behaviours, student learning can be either facilitated or thwarted. More research is needed to address the extent to which these teaching behaviours are either symbiotic or antagonistic to other teaching behaviours. Moreover, in order to understand the phenomenon of effective teaching, behaviours such as clarity, rapport, and knowledge of subject need to be explored as well.

Student Differences

Individual differences play an important role in a college student's learning experience. The present data supports the hypothesis that student differences on both locus of control and test anxiety influence student learning. Below, the results associated with locus of control and test anxiety are discussed.

Locus of control main effects. Based on the dichotomization check (see page 35), locus of control successfully predicted high school GPAs. These results replicate previous findings. For instance, Bar-Tal and Bar-Zohar (1977) and Findley and Cooper (1983) found locus of control to be positively correlated with student achievement. Although the present effect size for GPA variable was small (i.e., $\omega^2 < .03$), the GPA differences may be crucial for students. For example, a difference of one letter grade, as shown in the present study, has implications for being awarded scholarships, bursaries, and entrance into graduate or medical schools. Thus, the cumulative effects of such minimal differences in achievement scores over a period of time could have substantial implications.

Both in the present and past studies, external locus college students are characterized by lower levels of scholastic achievement than their internal counterparts. According to Perry (1991), externals may be endowed with less adaptive learning orientations that place them "at-risk" academically. Internals, on the other hand, display somewhat higher levels of scholastic achievement, and thus, are thought to have an adaptive learning orientation. Therefore, locus of control appears to be a potential indicator of scholastic performance, identifying students with less and more adaptive learning orientations.

Although an adequate indicator of past academic performance, locus of control was not sensitive in predicting student outcomes in the present classroom analog. Comparable differences in achievement did not distinguish externals from internals as hypothesized. A number of explanations may account for this. The "one-time" experimental teaching exposure may not have been conducive to separating the achievement outcomes according to locus of control differences. Internals are known to seek help from instructors, peers, and books, and are also more active in finding resources that enhance the achievement of their personal goals (Prochiuk & Breen, 1977). Given the "one-time" teaching exposure, these adaptive learning behaviours could not have been exercised and thus, student differences may not have been found. Future studies should track students over a longer teaching period, such as the duration of a course and rely on student achievement outcomes that have been the product of longer teaching periods such as midterm exams, final exams, or final grades (Bar-Tal & Bar-Zohar, 1977; Findley & Cooper, 1983).

Given the stringent entrance requirements at most colleges and universities, the distribution of student locus of control may favor internals, in comparison to externals, thereby limiting any differences between them. In other words, low

externals are less likely to go on to university because of their less adaptive learning orientations. A distribution plot of the locus of control scores reveals that the distribution approximates normality (i.e., W: Normal = 0.983, very close to 1.00; skewness = 0.085, very close to 0.00; kurtosis = 0.326, above 0.00 and therefore somewhat peaked, indicating a very small potential of too few cases in the tails; Tabachnick & Fidell, 1989). However, the mid-point of the distribution (Median = 3.00) was 3 points from the mid-point of the scale (0.00; range = -24 to 24), demonstrating a shift toward the internality end of the locus of control scale. Thus, the distribution of locus of control in the college classroom may not generalize to the student population in elementary or secondary schools.

Finally, the items used in the MMCS locus of control scale dealt with a number of general events in the achievement domain. These include "grades", "marks", "expected achievement outcomes", and "academic low points". Thus, locus of control may be too general a measure for the classroom analog and therefore, differences were not observed. A more refined measure of control that is achievement specific, such as test anxiety, may provide a more adequate identification of "at-risk" students.

Test anxiety main effects. Based on the trichotomization check (see page 36), moderate demonstrated better high school GPAs than high test-anxious students. Moreover, low and moderate test-anxious students showed better lecture achievement scores than high test-anxious students. These results replicated previous findings. For instance, Prociuk and Breen (1973) reported low, in comparison to high, test-anxious students as having better high school GPAs. Other researchers have found low test-anxious students to have better lecture achievement scores than high test-anxious students

(Galassi, Frierson & Sharer, 1981). Thus, differences in learning orientation are associated with test anxiety.

As mentioned above, high test-anxious students are characterized by poorer learning outcomes. Their attention may be reduced, due to what researchers have labeled as 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 lectures. Disadvantaged because of the cognitive interference associated with high test anxiety, their less adaptive learning orientations "cripples" them academically. In contrast to high test anxiety, low and moderate test anxiety is associated 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 ego-involving (Schwarzer, 1981), substantially reduces learning. In such cases, the task is 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).

In summary, the one-time lecture exposure distinguished adaptiveness in learning orientations among low, moderate, and high test anxiety, but not between externals and internals. Based on these findings, high test anxiety tends to represent a less adaptive learning orientation for students. It interferes with achievement performance. Students with low and moderate test anxiety display adaptive learning orientations conducive to learning.

Student Differences and Effective Teaching

Student differences, as defined by locus of control and test anxiety, and effective teaching, as defined in terms of expressiveness and organization, influence student learning. In this context, the student differences that benefit scholastically from effective teaching behaviours and those that are potentially compensated for by effective teaching behaviours were of great interest. The findings associated with these research issues are discussed below.

Benefiting from effective teaching behaviours. Two types of effective teaching behaviours, high expressiveness and high organization, were introduced to students with different learning orientations. Of interest to the present study were the student differences that would benefit from effective instruction. Below, the specific main effects involving each effective teaching behaviour with each student difference variable are discussed.

Expressive instruction and locus of control produced results only partially replicating those of Magnusson and Perry (1989). Consistent with the initial hypothesis, internals were able to benefit from expressive instruction, but only on measures of recall and not recognition. Magnusson and Perry (1989), however, found differences in recognition (i.e., multiple-choice achievement test). This inconsistency between past and present findings may indicate that the expressiveness manipulation is strong enough to distinguish student differences

on measures of recall, but too weak to show differences in recognition. Recall measures might be more difficult measures and therefore able to get at individual difference variables such as locus of control, whereas recognition measures may be not as challenging and thus less sensitive to student differences. Further research is needed to explore the impact that varying levels of expressive instruction has on students' recall and recognition outcomes. Whatever the reason for these differences, one thing remains clear; the dysfunctional component of external students' learning orientation interferes with the facilitative influence of expressive instruction, placing these students "at-risk" academically (Perry, 1991).

Consistent with past research (Perry & Dickens, 1987), differences attributable to expressive instruction and test anxiety were not found. For instance, high expressive instruction produced no statistically significant recall or recognition differences between low, as compared to high, and moderate, as compared to high, test-anxious students. However, as seen in Figure 6, the trend is in the predicted direction, such that low and moderate test-anxious students' recognition scores are somewhat higher than the high test-anxious students' scores. Given that the expressive manipulation may not have been influential enough to produce the expected outcomes, these findings are not surprising. A stronger expressiveness manipulation may have produced the predicted outcomes, such that low and moderate test-anxious students may have scored higher on recall and recognition scores than high test-anxious students.

Organized lectures and locus of control produced simple main effect results that are contrary to the expressiveness and locus of control results of Magnusson and Perry (1989). No learning related differences were found

between internal and external students receiving well-organized instruction. Given their adaptive learning orientations, internals were expected to benefit from well-organized instruction. Externals were expected to perform poorly, because of their less adaptive learning strategies. As illustrated in Figures 8 and 9, organized instruction produced similar achievement results for internals and externals. Moreover, these figures show higher learning outcomes for these two groups of students in comparison to internals or externals receiving less organized instruction (i.e., an organization main effect). Thus, organization not only facilitates the learning of students with adaptive learning orientations, but also facilitates those who are "at-risk".

Organized lectures and test anxiety produced results that extend those of Magnusson and Perry (1989). For instance, both low and moderate test-anxious students were able to benefit from high organized instruction, but only on measures of recognition, and not recall. This is rather strange, given that organization demonstrated main effects on recall and recognition. However, the explanation may illustrate high test-anxious students' inability to deal with recognition tests. Given that most college tests involve the multiple-choice format (i.e., recognition), this form of testing may be associated with the stimuli that cause test anxiety for these students. This phenomenon needs further testing. Thus, low and moderate test-anxious students are able to benefit from high organization, whereas high test anxiety reduces learning.

Being compensated for by effective teaching behaviours. The last set of hypotheses dealt with exploring student differences that are potentially compensated for by effective teaching behaviours. According to some researchers, effective teaching may potentially compensate for "at-risk" students' less adaptive learning orientation by enhancing their achievement

performance (Perry, 1991; Perry et al., 1994; Schonwetter et al., 1994b). However, previous studies have not been able to demonstrate this phenomenon (Perry & Dickens, 1984; 1987; Magnusson & Perry, 1989). In order to test this hypothesis, the specific main effects involving each effective teaching behaviour with externals and high test-anxious students were tested.

External students were unable to benefit from expressive instruction. These findings replicate previous studies. External students perform no better with high, as compared to low, expressive instruction (Magnusson & Perry, 1989). Either instructor expressiveness fails to provide any compensatory influence for externals, or a dysfunctional component of the external's learning orientation may interfere with the compensatory influence of expressive instruction. If the latter were true, then external students should not be able to benefit from other effective teaching behaviours. However, externals did benefit from organized instruction, so this explanation is ruled out.

High test-anxious students benefited from high, as compared to low, expressive instruction, but only on measures of recall. Similar findings were reported for expressiveness' influence on internals' learning. Differences in recall were found, but not for recognition. Thus, the premise that the expressiveness manipulation was strong enough to distinguish differences in recall, but too weak to show differences in recognition, may be supported. However, high test-anxious students still benefited from expressive instruction. Although external's learning orientation interferes with the facilitative influence of expressive instruction (Perry, 1991), expressive instruction does compensate for these students' less adaptive learning orientations.

Externals provided with organized, as compared to less organized instruction, showed better recall and recognition scores. These findings

support the compensation theory of effective teaching (i.e., Perry, 1991) in that the less adaptive learning strategies associated with externals is counterbalanced by the facilitative effects of organized instruction. In other words, the low-inference teaching behaviors denoting organization may have remedial effects on external students whose psychological make-up would otherwise lead to poor scholastic outcomes. Thus, organization may compensate for students with less adaptive learning orientations to enhance their achievement.

High test-anxious students also benefited from organized instruction on the recall measure, and not recognition. These findings replicate those found for the high test anxiety and expressive instruction simple main effects. In both cases, only recall is impacted, and not recognition. As mentioned previously, this may reflect high test-anxious students' inability to deal with recognition tests. Most examinations given at the college level consist of the multiple-choice format (i.e., recognition). Therefore, it is possible that high test-anxious students have associated this form of testing with stimuli that cause anxiety. Further research is required to explore this phenomenon.

Research Implications

Of greatest interest would be those conditions in which the teaching behaviours complement each other (i.e., symbiotic) to produce optimal learning conditions or compensatory effects (Perry, 1991) and those conditions in which they interfere with each other to create less than optimal conditions. In the present study, the high expressiveness/high organization teaching condition demonstrates the former, whereas the high expressiveness/low organization condition exemplifies the latter. However, more research is needed to explain why these teaching behaviour combinations are symbiotic or antagonistic

toward each other and why low expressiveness/high organization still facilitates student learning.

Moreover, a number of other research issues have been generated by this dissertation. Future research should investigate the information processing activities and learning behaviours associated with the specific attributes of expressive and organized instruction. Figure 1 presents a number of these links that have been hypothesized by Murray (1991), Perry (1991), and Schonwetter (1993). These links require more empirical investigation in order to provide further rationale as to why these teaching behaviours have such an influence on student learning. Research should focus specifically on how each of the attributes of these teaching behaviours influences student learning. Also, research needs to identify the specific cognitive processes that lead to the observed differences in student outcomes.

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 the internals and low and moderate test-anxious, are sometimes able to endure ineffective instruction and still maintain academic excellence may provide keys for modification programs for external and high test-anxious students.

More field studies are also needed. The present thesis represents learning in a classroom analog, an environment created to simulate the actual college

classroom. Also, students were exposed to a "one-time" lecture episode without the chance of studying for the test. Exposure to a one 30-minute effective lecture episode may not be enough to enhance the learning experience of students. A better measure of the lecture manipulations would be to provide students with consistent lecture behaviours over a longer duration.

A real classroom may also provide students with the incentives to learn the material and thus increase their ego-involvement. Research attention should also be directed to other teaching behaviours that denote the lecture method and other teaching methods, such as group discussions, personalized instruction, seminars, and media (Dunkin & Barnes, 1986). By doing so, other teaching behaviours may be discovered that enhance learning.

Future research may also rely on the complete variation of all independent variables instead of dichotomizing or trichotomizing variables as done traditionally (Perry, 1991) and in the present study. By applying continuous independent variables in regression analysis, a clearer picture may emerge regarding the teaching-learning phenomenon. For instance, structural equation modeling (Schonwetter, Clifton, & Perry, 1994) reveals that expressiveness is directly related to students' perceptions of amount learned, whereas organization is directly related to actual achievement outcomes.

Educational Implications

Students seeking potentially effective instructors and administrators searching for potentially facilitative teaching should not only focus on elocutionary skills, but also on the organization skills of instructors. Most importantly, 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. Ambiguous and unclear expectations may cause anxiety, whereas well-organized instruction, may provide students with what is to be expected, reducing anxiety. Also, rewards should be provided for instructors modeling effective teaching through high levels of organized lecture presentations. Attributes to be valued or rewarded should include: the instructor plans the activities of each class period in great detail, gives preliminary overview of lecture, puts outline of lecture on board, uses headings and subheadings, and signals transitions to a new topic (Feldman, 1989; Murray, 1991). Workshops, seminars, and conferences on improving teaching through organizational skills, should be made available for instructors.

Students with adaptive learning orientations perform well, clearly benefiting from effective teaching. However, effective lecturing behaviours 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 et al., 1994; Perry & Penner, 1990). Moreover, 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.

Summary

In essence, major advances in the understanding of the characteristics of effective instruction, student differences, and student learning were addressed. This was accomplished by investigating the causal links between effective instruction and student learning of novel lecture material. Organized teaching shows consistent differences in student attention and achievement, whereas expressiveness has little impact on students' scholastic performance. Although these findings are meaningful in understanding effective teaching behaviours, they exclude important components in the learning environment, namely the influence of teaching behaviours and student differences on student learning outcomes.

When certain theoretically relevant student differences, such as perceived control or test anxiety, are included in the research design, the present teaching behaviours have differential effects on students exhibiting more extreme dispositions on such variables. For instance, high organization facilitates the learning of students with adaptive learning orientations, while providing compensation for both external locus of control and high test-anxious students. As a facilitator of learning, organization may 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, cueing students to relevant stimuli that is to be learned. As a compensatory mechanism, the low-inference behaviors that denote organization, may activate critical cognitive processes that are normally impaired in students with less adaptive learning orientations. For instance, organization may direct these students' attention to specific and important lecture material. Moreover, it may compensate for students' lack of integrating content topics by providing a

"chunking" strategy for linking new to preexisting knowledge (Perry, 1991). Thus, organized instruction facilitates and compensates student learning, demonstrating effective teaching qualities. As McKeachie (1994) stated, "teaching that helps students find a framework within which to fit new facts is likely to be more effective than teaching that simply communicates masses of material in which the student can see no organization" (p. 229).

High expressiveness, on the other hand, provides an optimal learning condition for internals and compensates for high test-anxious students' less adaptive learning orientations. As an effective teaching behaviour, expressiveness may provide optimum arousal through the stimulus cueing qualities associated with physical movement, voice intonation, eye contact, and humor. As a compensatory mechanism, these low-inference behaviors denoting expressiveness may direct high test-anxious students' attention to relevant information, thereby enhancing their information processing and learning outcomes (Perry, 1991). Stimulating and sustaining of students' interest in a stimulus item may also dictate how much attention will be directed toward and how much information is learned. Thus, expressive instruction facilitates and compensates student learning, and therefore, it is an effective teaching behavior.

Moreover, these results extend correlation research. Feldman (1989) shows a strong correlation between organization and student achievement ($\underline{r}$ = 0.57). According to Table 5, the present study reveals a clear causal, though weak relationship on student recall ($\underline{\omega}^2 > .052$), recognition ($\underline{\omega}^2 > .051$), and perceived amount learned ($\underline{\omega}^2 > .045$). Expressiveness, on the other hand, not only demonstrates a lower correlation, but also no measurable relationship on student achievement outcomes. The key in understanding the teaching/learning

phenomenon most likely lies in the differential impact of Feldman's teaching behaviours 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.

Finally, readers are cautioned when applying these results directly to the college classroom. First, for this study, learning occurred in a simulated, not actual college classroom. Second, students were exposed to a "one-time" 30-minute lecture episode, and tested immediately without the chance of seeking additional resources. Third, video-taped lectures, as compared to live teaching, were used to present the stimulus material. Fourth, novel lecture material was presented in order to control for any extraneous variables influencing student learning, such as previous knowledge. Thus, the limitations of this study would suggest that the results must be used with caution.

References

Abrami, P. C., Leventhal, L., & Perry, R. P. (1982). Educational seduction. Review of Educational Research, 52, 446-464.

Abramson, L. Y., Garber, J., & Seligman, M. E. P. (1980). Learned helplessness in humans: An attributional analysis. In J. Garber and M. Seligman (Eds.), Learned helplessness: Theory and application. New York: Academic.

Allen, G. J., Lerner, W. M., & Hinrichsen, J. J. (1972). Study behaviors and their relationships to test anxiety and academic performance. Psychological Reports, 30, 407-410.

Anderson, R. C. (1982). Allocation of attention during reading. In A. Flammer & W. Kintsch (Eds.), Discourse processing (pp. 292-305). New York: North Holland Publishing Company.

Arkin, R. M., Detchon, C. S., & Maruyama, G. M. (1982). Roles of attribution, affect, and cognitive interference in test anxiety. Journal of Personality and Social Psychology, 43, 1111-1124.

Bar-Tal, D., & Bar-Zohar, D. (1977). The relationship between perceptions of Locus of Control and academic achievement: Review and some educational implications. Contemporary Educational Psychology, 2, 181-199.

Beck, A. T., & Emery, G. (1985). Anxiety disorders and phobias: A cognitive perspective. New York: Basic Books.

Blankstein, K. R., Flett, G. L., & Batten, I. (1989). Test anxiety and problem-solving self-appraisals of college students. Journal of Social Behavior and Personality, 4, 531-540.

Blankstein, K. R., Flett, G. L., Boase, P., & Toner, B. B. (1990). Thought listening and endorsement of self-referential thinking in test anxiety. Anxiety Research, 2, 103-112.

Bloom, B. S., Engelhart, E. J., Hill, W. H., & Krathwohl, D.R. (Eds.). (1956). Taxonomy of educational objectives. Handbook 1: Cognitive domain. New York: McKay.

Bryant, J., & Zillman, D. (1988). Using humor to promote learning in the classroom. Journal of Children in Contemporary Society, 20, 49-78.

Burgoon, J. K., Coker, D. A., & Coker, R. A. (1986). Communicative effects of gaze behavior: A test of two contrasting explanations. Human Communication Research, 12, 495-524.

Butterfield, E. C. (1964). Locus of control, test anxiety, reactions to frustration and achievement attitudes. Journal of Personality, 32, 355-370.

Cameron, W. T., Enzle, M. E., & Hawkins, W. L. (1992). Effects of extrinsic versus intrinsic teacher motivation on student reactions to skill acquisition. Personality and Social Psychology Bulletin, 18, 245-251.

Centra, J. A. (1979). Determining faculty effectiveness. San Francisco: Jossey-Bass.

Civikly, J. M. (1986). Humor and the enjoyment of college teaching. Communicating in the college classroom: New Directions for Teaching and Learning, 26, 61-70.

Coats, W., & Smidchens, U. (1966). Audience recall as a function of speaker dynamism. Journal of Educational Psychology, 57, 189-191.

Cohen, P. A. (1981). Student ratings of instruction and student achievement. Review of Educational Research, 51, 281-309.

Cohen, P. A. (1987). A critical analysis and reanalysis of the multisection validity meta-analysis. Paper presented at the annual meeting of the American Educational Research Association, Boston.

Corno, L., & Snow, R. E. (1986). Adapting teaching to individual differences among learners. In M. Wittrock (Ed.), Handbook of research on teaching. New York: Macmillan.

Crocker, L., & Schmitt, A. (1987). Improving multiple-choice test performance for examinees with different levels of test anxiety. Journal of Experimental Education, 55, 201-205.

Cullar, R. E., & Holahan, C. (1980). Test taking and academic performance: The effects of study-related behaviors. Journal of Educational Psychology, 72, 16-20.

Daniels, R. L., & Stevens, J. P. (1976). The interaction between the internal-external locus of control and two methods of college instruction. American Educational Research Journal, 13, 103-113.

Darke, S. (1988). Anxiety and working memory. Cognition and Emotion, 2, 145-154.

Decker, T. W. (1987). Multi-component treatment for academic underachievers. Journal of College Student Psychotherapy, 1, 29-37.

de Man, A. F., Hall, V., & Stout, D. (1991). Neurotic nucleus and test anxiety. The Journal of Psychology, 125, 671-675.

Domino, G. (1971). Interactive effects of achievement orientation and teaching style on academic achievement. Journal of Educational Psychology, 62, 427-431.

Domino, G. (1975). Let the punishment fit the crime: Teacher-student interactions. The Journal of Educational Research, 69, 8-11.

Dunkin, M. J., & Barnes, J. (1986). Research on teaching in higher education. In M. Wittrock (ed.), Handbook of research on teaching (3rd ed.,), (pp. 754-777). New York: Macmillan.

Dweck, C. S., & Wortman, C. B. (1982). Learned helplessness, anxiety, and achievement motivation. In H. Krohne & L. Laux (Eds.) Achievement, stress, and anxiety (pp. 93-125). New York: Hemisphere Publishing.

Educational Testing Service (1979). Student instructional report: Comparative data guide for four year colleges and universities. Princeton, New Jersey.

Epstein, J. (1981). Masters: Portraits of Great Teachers. New York: Basic Books.

Feldman, K. A. (1984). Class size and college students' evaluations of teachers and courses: A closer look. Research in Higher Education, 21, 45-116.

Feldman, K. A. (1989). The association between student ratings of specific instructional dimensions and student achievement: Refining and extending the synthesis of data from multisection validity studies. Research in Higher Education, 30, 583-645.

Feldman, K. A. (1994). Indentifying exemplary teaching: Evidence from course and teacher evaluations. Unpublished manuscript.

Feldman, R. S., Saletsky, R. D., Sullivan, J., & Theiss, A. (1983). Student locus of control and response to expectations about self and teacher. Journal of Educational Psychology, 75, 27-32.

Findley, M., & Cooper, H. (1983). Locus of control and academic achievement: A review of the literature. Journal of Personality and Social Psychology, 44, 419-427.

Frank, B. M., Garlinger, D. K., & Kiewra, K. A. (1989). Use of embedded headings and intact outline with videotaped instruction. Journal of Educational Research, 82, 277-281.

Frey, P. W. (1978). A two-dimensional analysis of student ratings of instruction. Research in Higher Education, 9, 60-91.

Furio, B. J. (1987). The relationship between instructor behaviors and student perceptions of control in the classroom. (ERIC Document Reproduction Service No ED 291 124).

Galassi, J. P., Frierson, H. T., & Sharer, R. (1981). Behavior of high, moderate, and low test anxious students during an actual test situation. Journal of Consulting and Clinical Psychology, 49, 51-62.

Gentilhomme, Y. (1992). Humor: A didactic adjuvant. International Journal of Humor Research, 5, 69-89.

Gjesme, T. (1983). Worry and emotionality components in test anxiety in relation to situational and personality determinants. Psychological Reports, 52, 267-280.

Glynn, S. M., & Di Vesta, F. J. (1977). Outline and hierarchial organization as aids for study and retrieval. Journal of Educational Psychology, 69, 89-95.

Graham, F. K. (1992). Attention: The heartbeat, the blink, and the brain. In B. A. Campbell, H. Hayne, & R. Richardson (Eds.), Attention and information processing in infants and adults: Perspective from human and animal research. Hillsdale, NJ: Lawrence Erlbaum Associates.

Guetzkow, H. S., Kelley, E. L., & McKeachie, W. J. (1954). An experimental comparison of recitation, discussion, and tutorial methods in college teaching. Journal of Educational Psychology, 45, 193-209.

Hamlet, C. C., Axelrod, S., & Kuerschner, S. (1984). Eye contact as an antecedent to compliant behavior. Journal of Applied Behavior Analysis, 17, 553-557.

Hartley, J. & Camerson, A. (1967). Some observations on the efficiency of lecturing. Educational Review, 20, 30-37.

Hartley, J., & Fuller, H. (1971). The use of slides in a lecture: An exploratory study. Visual Education, August/September, 39-41.

Hays, W. L. (1973). Statistics for the social sciences (2nd ed.). New York: Holt, Rinehart, & Winston.

Hembree, R. (1988). Correlates, causes, effects, and treatment of test anxiety. Review of Educational Research, 58, 47-77.

Hildebrand, M., Wilson, R. C., & Dienst, E. R. (1971). Evaluating University Teaching. Berkeley: Center for Research and Development in Higher Education, University of California.

Jacoby, L. L. (1983). Remembering the data: Analyzing interactive processes in reading. Journal of Verbal Learning and Verbal Behavior, 22, 485-508.

Jamison, D., Suppes, P., & Wells, S. (1974). The effectiveness of alternative instructional media: A survey. Review of Educational Research, 44, 1-68.

Johnson, H. A. (1990). Humor as an innovative method for teaching sensitive topics. Educational Gerontology, 16, 547-559.

Kallison, J. M., Jr. (1986). Effects of lesson organization on achievement. American Educational Research Journal, 23, 337-347.

Kaplan, R. K., & Pascoe, G. C. (1977). Humorous lectures and humorous examples: Some effects upon comprehension and retention. Journal of Educational Psychology, 89, 61-65.

Katona, G. (1940). Organizing and memorizing. New York: Columbia University Press.

Keppel, G. (1991). Design and analysis: A researcher's handbook (3rd ed.). Englewood Cliffs, New Jersey: Prentice Hall.

Keselman, H. J., & Keselman, J. C., & Games, P. A. (1990). The maximum familwise Type I Error Rate: The LSD, Newman-Keuls and other multiple comparison procedures. Unpublished manuscript. The University of Manitoba, Winnipeg: Manitoba.

Kuhl, J. (1985). Volitional mediators of cognitive-behavioral consistency: Self-regulatory processes and action versus state orientation. In J. Kuhl & J. Beckmann (Eds.), Action Control: From Cognition to Behavior (pp. 101-128). New York: Springer-Verlag.

Lazarus, P. J., Ludwig, R. P., & Abersonor, B. (1984). Stroop Color-Word Test: A screening measure of selective attention to differentiate LD from non LD children. Psychology in the Schools, 21, 53-60.

Lazarus, R. S., & Launier, R. (1978). Stress related transactions between person and environment. In L. A. Pervin & M. Lewis (Eds.), Perspectives in international psychology, (pp. 287-327). New York: Plenum.

Lefcourt, H. M. (1981). The construction and development of the Multidimensional-multiattributional causality scales. In H.M. Lefcourt (Ed.), Research with the locus of control construct (pp. 245-277). New York: Academic.

Lefcourt, H. M., Von Baeyer, C. L., Ware, E. E., & Cox, D. T. (1979). The Multidimensional-multiattributional causality scale: The development of a good specific locus of control scale. Canadian Journal of Behavioral Science, 11, 286-304.

Levenson, H. (1981). Differentiating among internality, powerful others, and chance. In H. M. Lefcourt (Ed.), Research with the locus of control construct (Vol. 1). New York: Academic Press.

Lowman, J. (1984). Mastering the techniques of teaching. San Francisco: Jossey-Bass.

Maddox, H., & Hoole, E. (1975). Performance decrements in the lecture. Educational Review, 28, 17-30.

Magnusson, J-L., & Perry, R. P. (1989). Stable and transient determinants of students' perceived control: Consequences for instruction in the college classroom. Journal of Educational Psychology, 81, 362-370.

Mandler, G., & Watson, D. L. (1966). Anxiety and the interruption of behavior. In C. D. Spielberger (Ed.), Anxiety and behavior (pp. 263-288). New York: Academic Press.

Marsh, H. (1984). Students' evaluations of university teaching: Dimensionality, reliability, validity, potential biases, and utility. Journal of Educational Psychology, 76, 707-754.

Marsh, H. W., & Dunkin, M. J. (1992). Students' evaluations of university teaching: A multidimensional perspective. In J. Smart (Ed.), Higher education: Handbook of theory and research, (Vol. 9), New York: Agathon.

Mastin, V. E. (1963). Teacher enthusiasm. Journal of Educational Research, 56, 385-386.

Maxwell, S. E., & Delaney, H. D. (1990). Designing experiments and analyzing data: A model comparison perspective. Belmont, California: Wadsworth Publishing Company.

Mayer, R. E. (1987). Educational Psychology: A cognitive approach. Boston: Little, Brown.

McCann, S. J. H., Short, R. H., & Stewin, L. L. (1986). Perceived teacher directiveness, student variables, grades, and satisfaction: aptitude x treatment interactions? Instructional Science, 15, 131-164.

McKeachie, W. J. (1979). Student ratings of faculty: A reprise. Academe, 62, 384-397.

McKeachie, W. J. (1994). Teaching tips: A guidebook for the beginning college teacher. Toronto: D.C. Heath & Company.

McKeachie, W. J. (1990). Research on college teaching: The historical background. Journal of Educational Psychology, 82, 189-200.

McKeachie, W. J., Pintrich, P. R., Lin, Y-G., & Smith, D. A. F. (1986). Teaching and learning in the classroom: A review of the literature (NCRIPTAL Report OERI-86-0010). Ann Arbor: University of Michigan, School of Education.

McKeachie, W. J., Pollie, D., & Spiesman, J. (1985). Relieving anxiety in classroom examinations. Journal of Personality and Social Psychology, 50, 93-98.

Menec, V. H., Perry, R. P., Struthers, C. W., Schonwetter, D. J., Hechter, F. J., & Eichholz, B. L. (1994). Assisting at risk college students with attributional retraining and effective teaching. Journal of Applied Social Psychology, 24, 675-701.

Messick, S. (1979). Potential uses of noncognitive measurement in education. Journal of Educational Psychology, 75, 138-149.

Meyer, B. J. F. (1975). The organization of prose and its effects on memory. Amsterdam: North-Holland Publishing.

Meyer, B. J. F. (1977). The structure of prose: Effects on learning and memory and implications for educational practice. In R. C. Anderson, R. J. Spiro, & W. E. Montage (Eds.), Schooling and acquisition of knowledge (pp. 179-200). Hillsdale: Lawrence Erlbaum Associates, Inc.

Murray, H. G. (1983). Low-inference classroom teaching behaviors and student ratings of college teaching effectiveness. Journal of Educational Psychology, 75, 138-149.

Murray, H. G. (1987). Acquiring student feedback that improves instruction. In M. G. Weimer (Ed.), Teaching large classes well: New directions for teaching and learning (Vol 32, pp. 85-96). San Francisco: Jossey-Bass.

Murray, H. G. (1991). Effective teaching behaviors in the college classroom. In J. Smart (Ed.), Higher education: A Handbook of Theory and Research (Vol. 7, pp. 135-172). New York: Agathon Press.

Otteson, J. P., & Otteson, C. R. (1979). Effect of teacher gaze on children's story recall. Perceptual and Motor Skills, 50, 35-42.

Perry, R. P. (1991). Perceived control in college students: Implications for instruction in higher education. In J. Smart (Ed.), Higher Education: A Handbook of Theory and Research (Vol. 7, pp. 1-56). New York: Agathon.

Perry, R. P., Abrami, P. C., & Leventhal, L. (1979). Educational seduction: The effect of instructor expressiveness and lecture content on student ratings and achievement. Journal of Educational Psychology, 71, 109-116.

Perry, R. P., & Dickens, W. J. (1984). Perceived control in the college classroom: Response-outcome contingency training and instructor expressiveness effects on student achievement and causal attributions. Journal of Educational Psychology, 76, 966-981.

Perry, R. P., & Dickens, W. J. (1987). Perceived control and instruction in the college classroom: Some implications for student achievement. Research in Higher Education, 27, 291-310.

Perry, R. P., & Magnusson, J-L. (1987). Effective instruction and students' perceptions of control in the college classroom: Multiple-lectures effects. Journal of Educational Psychology, 79, 453-460.

Perry, R. P., & Magnusson, J-L. (1989). Causal attributions and perceived performance: Consequences for college students' achievement and perceived control in different instructional conditions. Journal of Educational Psychology, 81, 164-172.

Perry, R. P., Magnusson, J-L, Parsonson, K. L., & Dickens, W. J. (1986). Perceived control in the college classroom: Limitations in instructor expressiveness due to noncontingent feedback and lecture content. Journal of Educational Psychology, 78, 96-107.

Perry, R. P., & Penner, K. S. (1990). Enhancing academic achievement in college students through attributional retraining and instruction. Journal of Educational Psychology, 82, 262-271.

Perry, R. P., Schonwetter, D. J., Magnusson, J.-L., & Struthers, C. W. (1994). Students' explanatory schemas and the quality of college instruction: Some evidence for buffer and compensation effects. Research in Higher Education, 35, 349-371.

Pintrich, P. R., Cross, D. R., Kozma, R. B., & McKeachie, W. J. (1986). Instructional psychology. Annual Review of Psychology, 37, 611-651.

Plutchik, R. (1980). Emotion: A psychoevolutionary synthesis. New York: Harper & Row.

Powers, S., & Rossman, M. H. (1983). The reliability and construct validity of the multidimensional-multiattributional causality scale. Educational and Psychological Measurement, 43, 1227-1231.

Prociuk, T. J., & Breen, L. J. (1973). Internal-external control, test anxiety, and academic achievement: Additional data. Psychological Reports, 33, 563-566.

Prociuk, T. J., & Breen, L. J. (1975). Defensive Externality and its relation to academic performance. Journal of Personality and Social Psychology, 31, 549-556.

Prociuk, T. J., & Breen, L. J. (1977). Internal-External Locus of Control and information-seeking in a college academic situation. The Journal of Social Psychology, 101, 309-310.

Ross, M., & Fletcher, G. (1985). Attribution and social perception. In G. Lindzey & R. Aronson (Eds.), Handbook of Social Psychology (pp. 73-122). New York: Random House.

Rothbaum, F., Weisz, J. R., & Snyder, S. S. (1982). Changing the world and changing the self: A two-process model of perceived control. Journal of Personality and Social Psychology, 42, 5-37.

Rothblum, E. D., Solomon, L. J., & Murakami, J. (1986). Affective, cognitive, and behavioral differences between high and low procrastinators. Journal of Counseling Psychology, 33, 387-394.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control or reinforcement. Psychological Monographs, 1, (Whole No. 609).

Rotter, J. B. (1975). Some problems and misconceptions related to the construct of internal versus external control of reinforcement. Journal of Consulting and Clinical Psychology, 43, 56-67.

Rotter, J. B. (1990). Internal versus external control of reinforcement: A case history of a variable. American Psychologist, 45, 489-493.

Rotter, J. B., Chance, J. E., & Phares, E. J. (1972). An introduction to social learning theory. In J. B. Rotter, J. E. Chance, & E. J. Phares (Eds.), Applications of social learning theory of personality (pp. 1-44). New York: Holt, Rinehart & Winston.

Rumelhart, D. E., & Ortony, A. (1977). The representation of knowledge in memory. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale: Lawrence Erlbaum Associates.

Safford, F. (1991). Humor as an aid in gerontological education. Gerontology and Geriatrics Education, 11(3), 27-37.

Sarason, I. G. (1975). Anxiety and self-preoccupation. In I. G. Sarason & C. D. Spielberger (Eds.), Stress and anxiety (Vol. 2, pp. 27-44). Washington: Hemisphere.

Sarason, I. G. (1980). Test anxiety: Theory, research, and appliation. Hillsdale, N.J.: Erlbaum.

Sarason, I. G. (1984). Stress, anxiety, and cognitive interference: Reactance to tests. Journal of Personality and Social Psychology, 46, 929-938.

Sarason, S. B. (1959). What research says about test anxiety in elementary school children. NEA Journal, 48, 26-27.

SAS Institute. (1989). SAS User's Guide: Statistics (6th ed.). Cary, NC: Author.

Schonwetter, D. J. (1993). Attributes of effective lecturing in the college classroom. Canadian Journal of Higher Education, 23, 1-18.

Schonwetter, D. J., Clifton, R. A., Perry, R. P. (1994a, April). Implications for higher education in the linkages of student differences and effective teaching. Paper presented at the meeting of the American Educational Research Association, New Orleans, Louisiana, USA.

Schonwetter, D. J., Perry, R. P., Menec, V. H., Struthers, C. W., & Hechter, F J., (1993, April). Key factors for college student achievement, cognition, affects, and motivation: Student locus of control and quality of instruction. Paper presented at the meeting of the American Educational Research Association, Atlanta, Georgia, USA.

Schonwetter, D. J., Perry, R. P., & Struthers, C. W. (1994b). Students' perceptions of control and success in the college classroom: Affects and achievement in different instructional conditions. Journal of Experimental Education, 61, 227-246.

Schwarzer, R. (1981). Stress, angst und hilflosigkeit. Stuttgard: Kohlhammer.

Schwarzer, R., Jerusalem, M., & Stiksrud, A. (1984). The developmental relationship between test anxiety and helplessness. In H. M. Van Der Ploeg, R. Scharzer, & C.D. Spielberger (Eds.), Advances in Test Anxiety Research (Vol 3, pp. 73-79). Hillsdale: Lawrence Erlbaum Associates.

Sherwood, J. V. (1987). Facilitative effects of gaze upon learning. Perceptual and Motor Skills, 64, 1275-1278.

Snow, R. E., & Lohman, D. F. (1984). Toward a theory of cognitive aptitude for learning from instruction. Journal of Educational Psychology, 76, 347-376.

Solomon, D., Rosenberg, L., & Bezdek, W.E. (1964). Teacher behavior and student learning. Journal of Educational Psychology, 55, 23-30.

Spielberger, C. D. (1972). Current trends in theory and research on anxiety. In C. D. Spielberger (Ed.), Anxiety: Current trends in theory and research (Vol. 1). New York: Academic.

Spielberger, C. D., Anton, W. D., & Bedell, J. (1976). The nature and treatment of test anxiety. In M. Zuckerman & C. D. Spielberger (Eds.), Emotions and anxiety: New concepts, methods, and applications. New York: LEA-Wiley.

Spielberger, C. D., Gonzalez, H. P., & Fletcher, T. (1979). Test anxiety reduction, learning strategies, and academic performance. In H. F. O'Neil & C. D. Spielberger, C. D. (Eds.), Cognitive and affective learning strategies (pp. 111-131). New York: Academic Press.

Tabachnik, B. G., & Fidel, L. S. (1992). Using multivariate statistics (2nd ed.). Northridge: Harper Collins.

Tobias, S. (1985). Test anxiety: Interference, defective skills, and cognitive capacity. Educational Psychology, 20, 135-142.

Uranowitz, S. W., & Doyle, K. O. (1978). Being liked and teaching: The effects and bases of personal likability in college instruction. Research in Higher Education, 9, 15-41.

Wagaman, G. L., & Cormier, W. H., & Cormier, L. S. (1975). Cognitive modification of test-anxious students. Paper presented at the American Educational Research Association, Washington, D.C.

Ware, J.E., & Williams, R.G. (1975). The Dr. Fox effect: A study of lecturer effectiveness and the validity of student ratings of instruction. Journal of Medical Education, 50, 149-156.

Watson, D. (1967). Relationship between locus of control and anxiety. Journal of Personality and Social Psychology, 6, 91-92.

Weiner, B. (1986). An attributional theory of motivation and emotion. New York: Springer-Verlag.

Weinert, F. E., & Helmke, A. (1987). Compensating effects of student self-concept and instructional quality on academic achievement. In F. Halisch & J. Kuhl (Eds.), Motivation, intention, and volition (pp. 233-247). Berlin: Springer-Verlag.

Williams, R. G., & Ware, J. E. (1976). Validity of student ratings of instruction under different incentive conditions: A further study of the Dr. Fox effect. Journal of Educational Psychology, 68, 48-56.

Wine, J. (1971). Test anxiety and direction of attention. Psychological Bulletin, 76, 92-104.

Wine, J. (1982). Evaluation anxiety: A cognitive-attentional construct. In H. W. Krohne & L. C. Laux (Eds.), Achievement, stress, and anxiety. Washington, D.C.: Hemisphere.

Wittmaier, B. C. (1972). Test anxiety and study habits. Journal of Educational Research, 65, 352-354.

Wortman, C. B., & Brehm, J. W. (1975). Responses to uncontrollable outcomes: An integration of reactance theory and the learned helplessness model. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 8, pp. 277-336). New York: Academic Press.

Ziv, A. (1988). Teaching and learning with humor: Experiment and replication. Journal of Experimental Education, 57, 5-15.

Appendixes

Description of Appendixes

The questionnaires and tests that comprise the appendixes are listed in the order in which they were administered to the students during the study. Appendix A presents the Student Learning Questionnaire, which was given to all students at the beginning of the experimental session. It consists of the following surveys: the Survey of Work Styles, the Locus of Control Scale, the Multidimensional Multiattributional Causality Scale, and the Test Anxiety Scale. Appendix B presents the Recall Test, the first of two tests given to students following the lecture presentation. No presentation cues are provided on this test in order to ensure that students' recall of information presented during the lecture was strictly based on their memory and not on presentation cues. Appendix C lists the Lecture Unit Ideas or Key Terms that were repeated in all four teaching conditions. Students' recall of any of these ideas or terms denoted a point toward their recall score. Appendix D provides the Achievement Test that was given to the students following the lecture presentation and Appendix E presents the Post Achievement Questionnaire that followed students' completion of the achievement test. This questionnaire consists of a number of items that denote their perceptions on relevant issues to the present study, such as attention and amount learned, as well as an evaluation of the instruction that students received. The relevant items from each Appendix are highlighted in the thesis manuscript, particularly in the Method Section.

Appendix A

Student Learning Questionnaire

STUDENT LEARNING QUESTIONNAIRE

Before you begin, fill in you student number on each of the IBM sheets. In order to ensure confidentiality, do not write down your name.

We are interested in students thoughts, feelings, and actions regarding learning in a university setting. Please treat each item separately from every other item. There are no right or wrong answers to these items, we are simply interested in your first response. Do not spend too much time on any one statement.

On the IBM sheet provided, please blacken the bubble that best indicates how uncharacteristic or characteristic each statement is for you.

For example:

I always drink orange juice in the morning.

Extremely Uncharacteristic									Extremely Characteristic
1	2	3	4	5	6	7	8	9	10

(If you felt that this was extremely uncharacteristic of you, you would blacken in the number 1 on your IBM sheet. However, if you felt that this was a moderately high characteristic of you, you would blacken in the number 8 on your IBM sheet.

DO NOT WRITE IN THIS BOOKLET

NOW PLEASE TURN THE PAGE

Survey of Work Styles

These statements describe work-related activities. You are asked to rate yourself by filling in the number best describing how uncharacteristic or characteristic each activity is of your work-related behavior.

Although many of these statements describe activities at work or on the job, please consider your studies as a form of work and interpret the statements as describing activities related to your work as a student.

1	2	3	4	5
extremely uncharacteristic	moderately uncharacteristic	neutral	moderately characteristic	extremely characteristic

1. I often have to hurry to finish a project because there are so many other things to do.

2. I believe that organizations work best when employees do not compete with each other.

3. Often, I work under so much pressure that I find it very difficult to stop during the day.

4. When I have a project to complete, I become impatient with the slightest interruption.

5. I frequently find myself wishing that other workers would complete their work more quickly.

6. I rarely engage in two or more activities at the same time, like eating and reading.

7. I would rather have my work evaluated as a team member rather than as an individual.

8. I usually leave sufficient time to complete a job so that I don't have to rush through it.

9. Part of the satisfaction of doing a good job is showing that I am better than other employees.

10. I do not become annoyed if a driver reacts too slowly when a stoplight changes to green.

11. I got as much satisfaction from seeing a friend succeed as I would from succeeding myself.

12. I would find it frustrating to have to explain the same thing over again to a new employee.

13. If I could, I would prefer to retire now, rather than to continue working at my present job.

14. It does not usually aggravate me to have to wait for information needed to do my job.

15. If I were to become angry at work, I would remain "keyed up" for the rest of the day.

1	2	3	4	5
extremely uncharacteristic	moderately uncharacteristic	neutral	moderately characteristic	extremely characteristic

16. It does not bother me to have to repeat myself several-times in order to be understood.
17. Coworkers and friends would agree that I "live, eat, and breathe" my job.
18. Even when work accumulates, I still take time for a lunch break.
19. There are many things in my life more important to me than my job.
20. It would not bother me if other workers had experienced more success than I.
21. I find it difficult to relax on weekends because I am thinking about work.
22. Supervisors impose unrealistic standards on my performance.
23. I would help a slow coworker, even if it delayed progress on my own work.
24. I would leave a project or assignment unfinished if my work shift was over.
25. There are many sources of personal satisfaction in my work.
26. My conversations are usually centred around work-related activities.
27. I am dissatisfied with the way my supervisor treats subordinates.
28. I have no problem with people who talk a lot and have little to say.
29. When things go wrong at work, I sometimes lose my temper.
30. Because of deadlines, I have little time to take breaks at work.
31. I feel that the quality of my work is recognized by my supervisors.
32. At work, I find it irritating when people cannot come to a decision quickly.
33. I would remain calm, even if people at work were making fun of me.
34. I rarely take so much work that I have too little time to finish it.
35. My work schedule allows me a good deal of time for recreation.
36. I hate to lose in a competition, even when the stakes are not high.
37. I find it quite annoying when coworkers are not on time for a meeting.
38. All of my thoughts during a work day are related to my job.
39. I rarely find myself working on a number of urgent tasks at the same time.
40. I would like to have more freedom to decide how to do my work.
41. I have no interest in comparing my salary or position to those of my peers.

1	2	3	4	5
extremely uncharacteristic	moderately uncharacteristic	neutral	moderately characteristic	extremely characteristic

42. I am patient with other employees who do not complete a job on time.

43. I would rarely cancel a social engagement in order to work.

44. I often must rush at the end of the day to finish accumulated work.

45. I become very annoyed when I cannot do a job better than someone else.

46. Coworkers would describe me as an even-tempered person.

47. I sometimes rush through meals so that I can return to work.

48. Sometimes I get into such heated arguments that I find myself shouting.

49. I work in an environment where people cooperate rather than compete.

50. I frequently find myself rushing, even when there is plenty of time.

51. If asked, I am sure people would describe me as competitive.

52. At work, I avoid heated discussions and disagreements with coworkers.

53. I rarely feel the urge to go back to work on a weekend or holiday.

54. Even when I have urgent tasks to complete, I still take "breaks" from work.

55. I prefer to play a game for fun rather than competitively.

56. At work, annoying people sometimes "make my blood boil."

57. In sports, as in life, the only thing that matters to me is winning.

58. I become quite irritated when I have to wait in line.

59. I sometimes slam the door because I am angry.

60. I rarely get praise for a well-done job.

61. I do not get upset if I am interrupted while working.

62. I tend to lose my temper easily at work.

63. I enjoy my job and like most of my coworkers.

64. I would never let someone win a game.

65. At work, I often feel grouchy.

66. Slow moving film plots bore me.

67. My coworkers would agree that I get angry frequently.

68. I try to seize every opportunity for advancement at work.

69. I seldom take my work home with me.

1	2	3	4	5
extremely uncharacteristic	moderately uncharacteristic	neutral	moderately characteristic	extremely characteristic

70. I seldom raise my voice when arguing.

71. I often become extremely involved in my work.

72. I often feel concerned that my job has very little future.

73. Competition rarely brings out the best in me.

74. I am patient with less competent coworkers.

75. I would react strongly if I were unfairly criticized at work.

76. I often must work faster than most people.

77. I am tolerant of coworkers who try to annoy me.

78. I find it easy to talk with my supervisor on the job.

79. I would not retaliate if someone insulted me.

80. I seldom feel that my actions are misunderstood at work.

81. Dull-witted, slow employees make me very impatient.

82. I usually show up to work early to prepare things.

83. I often wish I had a different supervisor.

84. I rarely work more than eight hours a day.

85. I seldom feel frustrated at work.

86. I often compare my work to that of coworkers.

87. I would never hit anyone, even if I was hit first.

88. I rarely find time for hobbies or other recreational activities.

89. I can usually finish my work on time without rushing.

90. Work is a major part of my life.

91. I am quite satisfied with my working conditions.

92. My work schedule leaves me no time to relax.

93. I often wish for a totally different job.

94. During my leisure time, I rarely think about my job.

95. I rarely have a time deadline to complete a work task.

96. I feel that my job is quite satisfying.

Make sure you have completed all 96 statements.

Please treat each item separately from every other item. There are no right or wrong answers to these items, we are simply interested in your first response. Do not spend too much time on any one statement. Use the following scale for the following 12 items.

Strongly Disagree				Strongly Agree
1	2	3	4	5

97. In my experience, once a professor gets the idea you're a poor student, your work is much more likely to receive poor grades than if someone else handed it in.

98. Often my poorer grades are obtained in courses that the professor has failed to make interesting.

99. When I receive a poor grade, I usually feel that the main reason is that I haven't studied enough for that course.

100. If I were to receive a low mark it would cause me to question my academic ability.

101. Some of my lower grades have been partially due to bad breaks.

102. When I fail to do as well as I expected in school, it is often due to a lack of effort on my part.

103. If I were to fail a course, it would probably be because I lacked skill in that area.

104. My academic low points sometimes make me think I was just unlucky.

105. Poor grades inform me that I haven't worked hard enough.

106. If I were to get poor grades, I would assume that I lacked ability to succeed in those courses.

107. Some of the low grades I've received seem to me to reflect the fact that some teachers are just stingy with marks.

108. Some of my bad grades may have been a function of bad luck, being in the wrong course at the wrong time.

109. Is English the language you use more than 50% of the time?

1 = yes 2 = no, less than 50% of the time.

110. Gender: 1 = Female 2 = Male

Please indicate whether or not the following statements apply to you by marking the true or false bubble on the IBM sheet.

1 = TRUE 2 = FALSE

111. While taking an important exam I find myself thinking of how much brighter the other students are than I am.

112. If I were to take an intelligence test, I would worry a great deal before taking it.

113. If I knew I was going to take an intelligence test, I would feel confident and relaxed, beforehand.

114. While taking an important examination I perspire a great deal.

115. During course examinations I find myself thinking of things unrelated to the actual course material.

116. I get to feel very panicky when I have to take a surprise exam.

117. During tests I find myself thinking of the consequences of failing.

118. After important tests I am frequently so tense that my stomach gets upset.

119. I freeze up on things like intelligence tests and final exams.

120. Getting a good grade on one test doesn't seem to increase my confidence on the second.

121. I sometimes feel my heart beating very fast during important tests.

122. After taking a test I always feel I could have done better than I actually did.

123. I usually get depressed after taking a test.

124. I have an uneasy, upset feeling before taking a final examination.

125. When taking a test my emotional feelings do not interfere with my performance.

126. During a course examination I frequently get so nervous that I forget facts I really know.

127. I seem to defeat myself while working on important tests.

1 = TRUE 2 = FALSE

128. The harder I work at taking a test or studying for one, the more confused I get.

129. As soon as an exam is over I try to stop worrying about it, but I just can't.

130. During exams I sometimes wonder if I'll ever get through college.

131. I would rather write a paper than take an examination for my grade in a course.

132. I wish examinations did not bother me so much.

133. I think I could do much better on tests if I could take them alone and not feel pressured by a time limit.

134. Thinking about the grade I may get in a course interferes with my studying and my performance on tests.

135. If examinations could be done away with I think I would actually learn more.

136. On exams I take the attitude "If I don't know it now there's no point worrying about it."

137. I really don't see why some people get so upset about tests.

138. Thoughts of doing poorly interfere with my performance on tests.

139. I don't study any harder for final exams than for the rest of my course work.

140. Even when I'm well prepared for a test, I feel very anxious about it.

141. I don't enjoy eating before an important test.

142. Before an important examination I find my hands or arms trembling.

143. I seldom feel the need for "cramming" before an exam.

144. The University ought to recognize that some students are more nervous than others about tests and that this affects their performance.

145. It seems to me that examination periods ought not to be made the tense situations which they are.

146. I start feeling very uneasy just before getting a test paper back.

147. I dread courses where the professor has the habit of giving "pop" quizzes.

SECTION II

To what extent do the following statements generally describe your attitudes and behavior regarding school and studying: Please rate yourself on the 1 to 5 scale given below.

1	2	3	4	5
Not very true of me				Very true of me

1. When I see a problem I prefer to do something about it rather than sit by and let it continue.
2. When it comes to orders, I would rather give them than receive them.
3. I wish I could push many of life's daily decisions off on someone else.
4. When driving, I try to avoid putting myself in a situation where I could be hurt by someone else's mistake.
5. I prefer to avoid situations where someone else has to tell me what it is I should be doing.
6. There are many situations in which I would prefer only one choice rather than having to make a decision.
7. I like to wait and see if someone else is going to solve a problem so that I don't have to be bothered by it.
8. I give up outside extracurricular activities whenever I fall behind in my studies.
9. I think more about getting a good grade than I worry about getting a poor grade.
10. I feel that very hard problems are not worth the effort of trying to solve.
11. I have little time to enjoy my successes because there are always so many other things to study.
12. I seem to blame myself when things go wrong in school.
13. I think less of myself as a person, if I do not do the best possible job.
14. I try to look at my failures as an opportunity to learn.
15. For me personal growth in college is worth more than economic or career benefits.
16. Whenever I do poorly at something, I worry what others might think.
17. Even though I may not like a class, I still work hard to make a good grade.

1	2	3	4	5
Not very true of me				Very true of me

18. For me the joy of success in school outweighs the humiliation of failure.

19. When something I am studying in school is difficult, I keep trying harder.

20. I keep up my confidence by acknowledging any successes I have.

21. I have a lot of worthwhile qualities as a student.

22. Unless I do something very well, it gives me little satisfaction.

23. My standards are just about right given my level of knowledge and ability.

24. Even though I am not equally good at everything, I keep trying because I know I can improve.

25. I am confident of my ability to do well in school.

26. For me the pain of failure in school is greater than the pleasure of success.

27. I worry more about others criticizing my performance than about their praising it.

28. I would rather do a school assignment for which I feel confident than one I find challenging, but difficult.

29. I feel that no matter how hard I work, I can never do really well, so why bother trying?

30. My feelings of confidence and self-esteem are easily lowered by a poor performance.

31. When I fail at something, generally I still am able to feel good about myself.

32. I tend to demand less of myself in school than I know I am capable of.

33. The knowledge I gain in school is more important than the grades I get.

34. Whenever I do poorly at something, I worry that I don't have the ability.

35. When I fail to understand something, I become discouraged to the point of wanting to give up.

1	2	3	4	5
Not very true of me				Very true of me

36. I am good in judging how much work I can realistically handle.

37. If I didn't criticize myself, I would continue to do things poorly forever.

38. I have such high standards for myself in school that I rarely meet them.

39. Working hard is worthwhile, even if success does not follow immediately.

40. If I failed a test I would think I had insufficient ability and stop trying.

41. Knowing that I did my best is more important than whether I get a high grade.

42. In my experience, hard work brings good results on tests.

43. There is no point in worrying about grades since so much depends on luck.

44. I think that a main reason for student cheating is the difficult assignments teachers make.

45. I feel it might be best for me to drop out of school and get a job.

46. I am not sure how to get good grades.

47. It seems teachers often allow their personal feelings about students to influence their grading.

48. I wonder if going to college is really in my best long-term interest.

49. The way I achieve my goals is by rewarding myself along the way.

50. I think teachers often make courses too difficult for the average student.

51. I am taking courses that are of little value to me.

52. It seems students really can't succeed unless they are bright, even if they study a lot.

53. When I do something right, I take time to enjoy the feeling.

54. I think that a main reason for student failure is unfair tests.

55. I feel confused and unexcited about my vocational and educational goals.

FOR EACH OF THE NEXT TWELVE (12) ITEMS CHOOSE ONE AND ONLY ONE OF THE TWO ALTERNATIVES.
Choose one of the possible answers (A or B) that is most like you and give an answer for every question on the supplied IBM sheet.

56. When I have lost something that is very valuable to me and I can't find it anywhere:

A. I have a hard time concentrating on something else.
B. I put it out of my mind after a little while.

57. When I have to solve a difficult problem:

A. It takes me a long time to adjust myself to it.
B. It bothers me for a while, but then I don't think about it anymore.

58. When I'm in a competition and have lost every time:

A. I can soon put losing out of my mind.
B. The thought that I lost keeps running through my mind.

59. If I had just bought a new piece of equipment (for example, a tape deck) and it accidentally fell on the floor and was damaged beyond repair:

A. I would manage to get over it quickly.
B. It would take me a long time to get over it.

60. If I have to talk to someone about something important and, repeatedly, can't find her/him at home:

A. I can't stop thinking about it, even while I'm doing something else.
B. I easily forget about it until I can see the person again.

61. When I've bought a lot of stuff at a store and realize when I get home that I paid too much -- but I can't get my money back:

A. I can't concentrate on anything else.
B. I easily forget about it.

62. When I am told that my work has been completely unsatisfactory:

A. I don't let it bother me for too long.
B. I feel paralyzed.

63. If I'm stuck in traffic and miss an important appointment:

A. At first, it's difficult for me to start doing anything else at all.
B. I quickly forget about it and do something else.

64. When something is very important to me, but I can't seem to get it right:

    A. I gradually lose heart.
    B. I just forget about it and go do something else.

65. When something really gets me down:

    A. I have trouble doing anything at all.
    B. I find it easy to distract myself by doing other things.

66. When several things go wrong on the same day:

    A. I usually don't know how to deal with it.
    B. I just keep on going as though nothing has happened.

67. When I have put all my effort into doing a really good job on something and the whole thing doesn't work out:

    A. I don't have too much difficulty starting something else.
    B. I have trouble doing anything else at all.

Make sure you have completed all 67 items.

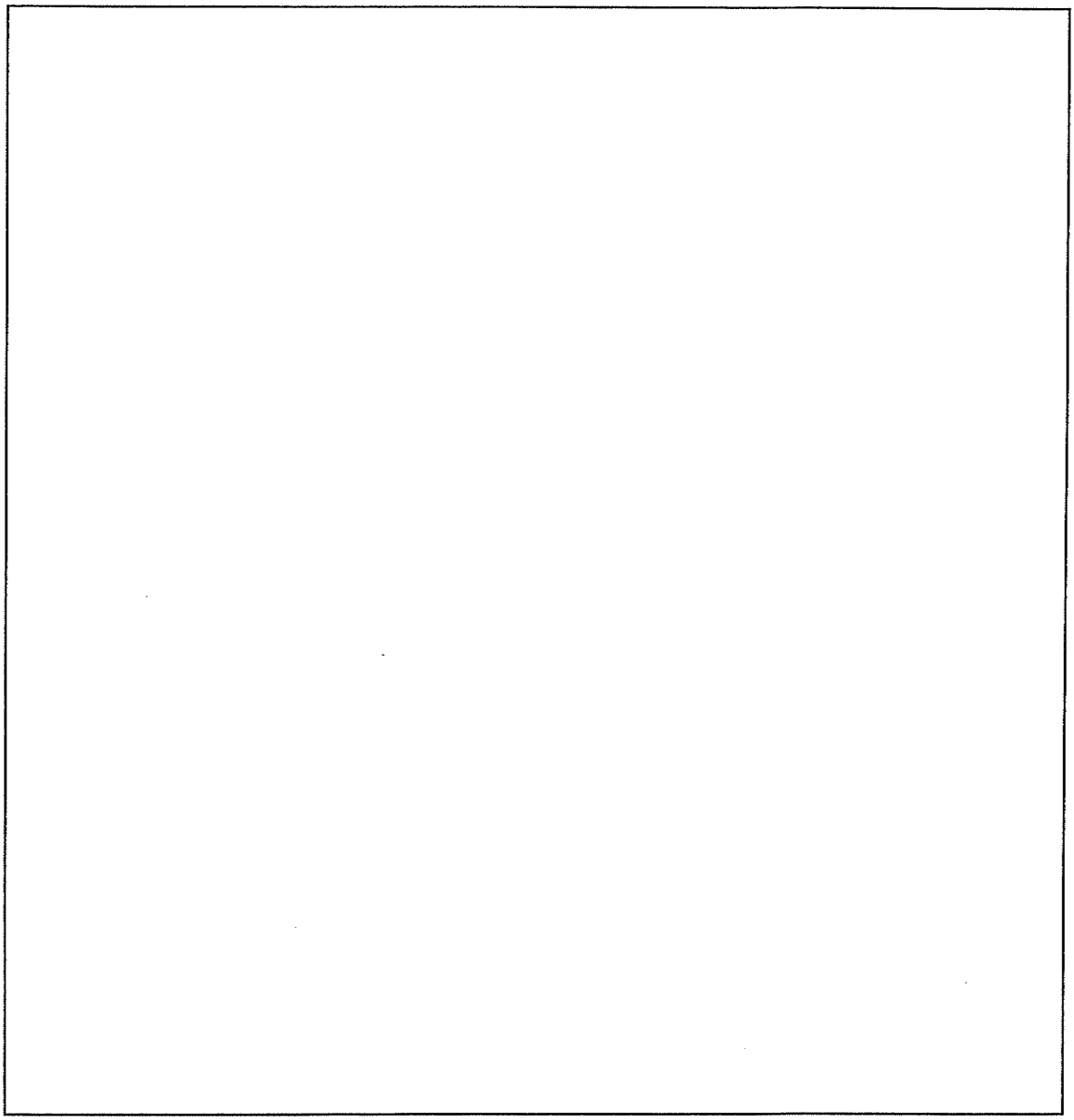
STOP! WAIT FOR FURTHER INSTRUCTIONS.

Appendix B

Recall Test

Student Number: _____

Recall Test



Department of Psychology

The University of Manitoba

Appendix C

Lecture Unit Ideas or Key Terms

all things being equal
artesian well
availability
axis
cause
change
compliments
concepts
curve
demand
diminishing
downward
economics
effective
examples
free
goods
graph
higher
hockey tickets
horizontal
humphrey bogart
income
laws
line
list
lower
move (on)
movies
numbers
other
point
preference
price
quantity
relationship
rentals
schedule
services
slope
substitute
vertical
water

Appendix D

Achievement Test

Achievement Test

This next section is a test on the Demand Lecture. Please answer the questions to the best of your ability. All responses must be made using the pencil provided. Choose the one best answer for each item.

Place your answers on the computer-scored answer sheet which has been provided. Please do not mark the test booklet.

Record your responses to the following questions in items 121-150 on the computer form.

PLEASE, DO NOT WRITE IN THE BOOKLET

121. The law of demand is illustrated by a demand curve that is
   a. horizontal.
   b. downward-sloping.
   c. vertical.
   d. upward-sloping.

122. If the demand curve for product G is downward-sloping, this means that an increase in the price of G will result in
   a. an increase in the demand for G.
   b. a decrease in the demand for G.
   c. no change in the quantity demanded for G.
   d. a smaller quantity demanded for G.

123. The law of demand tells us what will happen to the quantity demanded of a good, other things being equal, when
   a. the price of the good changes.
   b. consumers' incomes change.
   c. the prices of other goods change.
   d. the quantities of other goods purchased change.

124. Demand can be defined as
   a. prices and quantities.
   b. a curve that slopes downward and to the right.
   c. a list or schedule of the quantities that will be bought at various prices.
   d. a list of preferences and tastes a consumer has for various goods.

125. A demand curve for railroad commuter tickets would show
   a. the number of tickets the railroad is willing to sell at each price.
   b. the number of people who need to travel by rail in order to get to work.
   c. the quality of service that commuters demand when they buy a ticket.
   d. the number of tickets that will be purchased at each price.

126. The law of demand refers to the
   a. tendency of prices to increase as more units of a product are demanded.
   b. increase in price that results from an increase in demand for a good whose supply is limited.
   c. negative relationship between the price of a good and the quantity of the good demanded.
   d. increase in the quantity of a good available as the price of the good increases.

127. A change in demand can be graphically represented by
   a. a movement down along a particular demand curve.
   b. a movement up along a particular demand curve.
   c. a rightward or leftward shift of a demand curve.
   d. a change in demand cannot be represented graphically.

128. Which of the following will NOT cause a shift in the demand curve for good X?
   a. a change in the price of a complementary good.
   b. a change in the price of good X.
   c. a change in consumer preference from good X to good Y.
   d. consumers' incomes increase and good X is a desirable good.

129. A graphical representation of the demand for fresh air by people living in Winnipeg who enjoy breathing fresh air could be represented by
   a. a downward sloping line.
   b. an upward sloping line.
   c. a line going up the vertical axis.
   d. a line going along the horizontal axis.

130. The effects of a decrease in the price of coffee, other things being equal, are best represented by which of the following?
   a. a leftward shift in the demand curve for coffee.
   b. a downward movement along the demand curve for coffee.
   c. a rightward shift in the demand curve for coffee.
   d. an upward movement along the demand curve for coffee.

131. Assuming that people purchase more automobiles when their incomes increase, a rise in consumers' incomes, other things being equal, will cause
   a. the demand curve for automobiles to shift to the left.
   b. the demand curve for automobiles to shift to the right.
   c. a movement down along the demand curve for automobiles.
   d. a movement up along the demand curve for automobiles.

132. Suppose that most consumers regard beef and pork as substitute foods in their diets. Then a decrease in the price of pork will cause the demand curve for beef to
   a. shift to the left as consumers switch from buying beef to buying pork.
   b. shift to the left as producers increase pork production and reduce beef production.
   c. shift to the right as consumers switch from beef to pork.
   d. shift to the right as producers increase pork production and reduce beef production.

133. Assume that beef and chicken are substitutes. Then, other things being equal, an increase in the price of beef will
   a. increase the demand for chicken and the price of chicken.
   b. decrease the demand for chicken and the price of chicken.
   c. increase the demand for chicken and decrease its price.
   d. decrease the demand for chicken and increase its price.

134. The price of Pepsi Cola falls dramatically. As a result, your demand curve for gasoline will likely
   a. shift upward to the right.
   b. shift downward to the right.
   c. become more vertical.
   d. be unaffected since Pepsi Cola and gasoline are not complements.

135. An increase in the price of cameras, other things being equal, will have which of the following effects on the market for photographic film?
   a. A downward movement along the demand curve for film.
   b. An upward movement along the demand curve for film.
   c. A rightward shift in the demand curve for film.
   d. A leftward shift in the demand curve for film.

136. Assume that steak and potatoes are complements. Then, other things being equal, an increase in the price of steak would
   a. increase the demand for potatoes.
   b. decrease the demand for potatoes.
   c. increase the demand for potatoes and decrease the price of potatoes.
   d. decrease the demand for potatoes and increase the demand for steak.

137. Assuming that travel decreases when incomes fall, a decrease in consumer income, other things being equal, would
   a. decrease the quantity of travel demanded.
   b. increase the demand for travel.
   c. decrease the demand for travel.
   d. increase the quantity of travel demanded.

138. Assume that chicken and beef are substitutes. A decrease in the price of beef would, as an indirect effect,
   a. decrease the demand for chicken and beef.
   b. increase the demand for chicken.
   c. decrease the demand for chicken.
   d. increase the demand for chicken and increase its price.

139. Which of the following will cause a movement along the demand curve for good X?
   a. a change in the price of a close substitute.
   b. a change in the price of good X.
   c. a change in consumer tastes from good X to good Y.
   d. a change in consumers' incomes.

140. Which of the following would NOT shift the demand curve for television sets?
   a. an increase in the price of television sets.
   b. an increase in the incomes of consumers.
   c. an increase in the price of radios (a substitute).
   d. an increase in the price of cable service (a complement).

141. In economic terms, to say that the demand for a product has increased means th
   a. the demand curve has shifted to the left.
   b. the product's price has fallen and as a result, consumers are buying a larger quantity of the product.
   c. the product has become particularly scarce for some reason.
   d. consumers are now willing to purchase more of the product at each possible price.

142. Which of the following will increase the demand for small automobiles?
   a. a fall in the price of small automobiles.
   b. a fall in insurance rates for small automobiles.
   c. a fall in the price of large automobiles.
   d. a fall in buyers' incomes (assuming small automobiles to be a desirable good).

143. Your local grocery store advertises a sale on apples for two days, and more apples than usual are sold. This is an example of
   a. a change in demand due to a change in consumer preferences for apples.
   b. a change in demand due to a change in the price of apples.
   c. a change in the quantity of apples demanded due to a change in price.
   d. a change in the quantity of apples due to a change in consumer preferences for apples.

144. A graphical representation of hockey fans' demand for Stanley Cup Tickets when the price per ticket is $5 (tickets for Stanley Cup games are usually much more than $5), could likely be represented by a line that is
   a. upward sloping from a price of $5.
   b. downward sloping from a price of $5.
   c. horizontal at a price of $5.
   d. There is not enough information to determine a demand curve.

145. You enjoy eating steak, but you get laid off from your job and find that your income is cut in half. Your demand curve for steak would likely
   a. shift inward to the left.
   b. shift outward to the right.
   c. become horizontal at the price of steak.
   d. not be affected at all since you still enjoy eating steak.

146. The effects of a decrease in the price of orange juice, other things being equal, would best be represented by which of the following?
   a. a rightward shift in the demand curve for orange juice.
   b. a downward movement along the demand curve for orange juice.
   c. a leftward shift in the demand curve for orange juice.
   d. an upward movement along the demand curve for orange juice.

147. Other things being equal, the effects of an increase in the price of orange juice would best be represented by a (an)
   a. upward movement along the demand curve for orange juice.
   b. leftward shift in the demand curve for orange juice.
   c. downward movement along the demand curve for orange juice.
   d. rightward shift in the demand curve for orange juice.

148. A graphical representation of the demand for medicine prescribed by a physician that a person believes is necessary to cure their illness is likely
   a. a vertical line starting at the quantity prescribed.
   b. a horizontal line starting at the price of the prescription.
   c. a normal demand curve sloping downward to the right.
   d. a curve that slopes upward to the right from the prescription price.

149. Assuming coffee and tea to be substitutes, a rise in the price of coffee is likely to have which of the following effects on the market for tea?
   a. an upward movement along the demand curve for tea.
   b. a downward movement along the demand curve for tea.
   c. a leftward shift in the demand curve for tea.
   d. a rightward shift in the demand curve for tea.

150. Assuming that the amount of clothing people purchase increases as their income increases, an increase in consumer income, other things being equally, would:
   a. increase the demand for clothing.
   b. decrease the demand for clothing.
   c. increase the quantity of clothing demanded.
   d. decrease the quantity of clothing demanded.

Ensure that you have completed all 30 items from 121 to 150 on your IBM sheet.

You may now proceed to the Post Achievement Questionnaire. Use the GREEN IBM Computer form to answer the last set of questions.

Appendix E

Post Achievement Questionnaire

POST ACHIEVEMENT QUESTIONNAIRE

We are interested in your reaction to all 3 of the achievement tests that you have just completed. There are no right or wrong answers, but please consider each question carefully before you answer it.

You will notice that for each question, there is a pair of phrases, one phrase at each end of a ten point scale. Please indicate for each pair of phrases which point on the scale best represents you attitude by blackening the corresponding bubble on the computer sheet.

EXAMPLE: How physically fit do you feel presently?

Not good At all									Extremely Fit
1	2	3	4	5	6	7	8	9	10

If you felt extremely fit, you would mark number 10 on the answer sheet.

RECORD YOUR RESPONSES TO THESE QUESTIONS IN <u>ITEMS 1-60</u> ON THE <u>GREEN</u> COMPUTER SHEET.

DO NOT WRITE IN THIS BOOKLET.

1. Your present age is:

1 = 18 or less	6 = 27 - 30
2 = 19 - 20	7 = 31 - 35
3 = 21 - 22	8 = 36 - 40
4 = 23 - 24	9 = 41 - 45
5 = 25 - 26	10 = older than 45

2. How important was it for you to do well on these achievement tests?

Not at all important									Extremely important
1	2	3	4	5	6	7	8	8	10

3. How successful did you feel at the end of these tests?

Not at all Successful									Extremely Successful
1	2	3	4	5	6	7	8	8	10

4. How much control did you have over your performance on these tests?

Very little Control									Completely under My control
1	2	3	4	5	6	7	8	9	10

To what extent did each of the following factors determine your performance on the achievement tests?

	No Influence on my Performance									A Great Deal of Influence on My performance
5. Luck	1	2	3	4	5	6	7	8	9	10
6. Test difficulty	1	2	3	4	5	6	7	8	9	10
7. Effort	1	2	3	4	5	6	7	8	9	10
8. Ability	1	2	3	4	5	6	7	8	9	10
9. Professor	1	2	3	4	5	6	7	8	9	10
10. Knowledge of material	1	2	3	4	5	6	7	8	9	10
11. Desire to do well	1	2	3	4	5	6	7	8	9	10
12. Attention to the lecture	1	2	3	4	5	6	7	8	9	10

Rate the extent to which you experienced each of the following feelings as a reaction to the achievement tests.

13. Pride 1 2 3 4 5 6 7 8 9 10 Ashamed

14. Discouraged 1 2 3 4 5 6 7 8 9 10 Encouraged

15. Confident 1 2 3 4 5 6 7 8 9 10 Helpless

16. Unmotivated 1 2 3 4 5 6 7 8 9 10 Motivated

17. Surprised 1 2 3 4 5 6 7 8 9 10 Not surprised

18. Angry 1 2 3 4 5 6 7 8 9 10 Not at all angry

19. Happy 1 2 3 4 5 6 7 8 9 10 Sad

How much was your performance due to:

20. Effort 1 2 3 4 5 6 7 8 9 10 Ability

21. Luck 1 2 3 4 5 6 7 8 9 10 Test Difficulty

22. Effort 1 2 3 4 5 6 7 8 9 10 Luck

23. Ability 1 2 3 4 5 6 7 8 9 10 Test Difficulty

24. To what extent did you attend to the lecture presentation?

1 2 3 4 5 6 7 8 9 10
attended very little — attended very much

25. Expressed in terms of percentages, how would you describe your attention to the lecture?

1). 10%
2). 20%
3). 30%
4). 40%
5). 50%
6). 60%
7). 70%
8). 80%
9). 90%
10). 100%

26. To what extent did the lecturer help you focus your attention on the material being presented?

1	2	3	4	5	6	7	8	9	10
not at all									very much so

27. How alert were you to the video-tape presentation?

1	2	3	4	5	6	7	8	9	10
not at all alert									very much alert

28. To what extent did the instructor have an impact on your "alertness" to the lecture presentation?

1	2	3	4	5	6	7	8	9	10
not at all									very much so

29. To what extent did your interest in the subject increase because of the lecturer?

1	2	3	4	5	6	7	8	9	10
not at all									very much so

30. To what extent did you find the lecture intellectually challenging and stimulating?

1	2	3	4	5	6	7	8	9	10
not at all									very much so

31. To what extent did you find the lecture material difficult?

1	2	3	4	5	6	7	8	9	10
easy									very difficult

32. To what extent did you find what you have learned from the lecture valuable ?

1	2	3	4	5	6	7	8	9	10
not at all valuable									very valuable

33. How much did the instructor's style of presentation hold your interest during the lecture?

1	2	3	4	5	6	7	8	9	10
not at all									very much so

34. How much did you learn from the lecture?

1	2	3	4	5	6	7	8	9	10
very little									very much

35. If this were a real university lecture and you had to take notes, would you revise them before taking a test?
1 = yes 2 = no.

36. If additional reading material of today's lecture were available would you be interested in having a copy?

1	2	3	4	5	6	7	8	9	10
not at all interested								very much interested	

37. Would you advise today's lecturer to write a text book on this topic?

1	2	3	4	5	6	7	8	9	10
would not recommend								would highly recommend	

38. To what extent would you be interested in taking other economic classes with this professor?

1	2	3	4	5	6	7	8	9	10
not at all interested								very much interested	

39. The lecture presentation was:

1	2	3	4	5	6	7	8	9	10
very boring								very interesting	

40. What was your most recent psychology test score?

1 = 91 - 100% (A+)
2 = 86 - 90% (A)
3 = 81 - 85% (A-)
4 = 78 - 80% (B+)
5 = 76 - 77% (B)
6 = 71 - 75% (C+)
7 = 66 - 70% (C)
8 = 61 - 65% (C-)
9 = 51 - 60% (D)
10 = less than 50% (F)

41. What was your high school grade point average?

1 = 91 - 100% (A+)
2 = 86 - 90% (A)
3 = 81 - 85% (A-)
4 = 78 - 80% (B+)
5 = 76 - 77% (B)
6 = 71 - 75% (C+)
7 = 66 - 70% (C)
8 = 61 - 65% (C-)
9 = 51 - 60% (D)
10 = less than 50% (F)

STUDENT EVALUATION OF INSTRUCTOR

Please rate the lecture you just viewed on the items listed below. On the IBM sheet provided, please blacken the bubble that best reflects your opinion.

1 = poor
2 = marginal
3 = satisfactory
4 = very good
5 = outstanding

42. Rate the instructor compared to others you have had at the this university.	1	2	3	4	5
The instructor:					
43. was organized	1	2	3	4	5
44. provided an outline of the lecture	1	2	3	4	5
45. gave a preliminary overview of the lecture	1	2	3	4	5
46. used headings and subheadings	1	2	3	4	5
47. signalled transitions to new topics	1	2	3	4	5
48. was clear	1	2	3	4	5
49. facilitated taking notes	1	2	3	4	5
50. used concrete examples of concepts	1	2	3	4	5
51. gave multiple examples	1	2	3	4	5
52. repeated difficult ideas	1	2	3	4	5
53. wrote key terms on overhead	1	2	3	4	5
54. was expressive	1	2	3	4	5
55. varied speech and tone of voice	1	2	3	4	5
56. moved about while lecturing	1	2	3	4	5
57. gestured with hands and arms	1	2	3	4	5
58. made eye contact	1	2	3	4	5
59. enhanced presentation with the use of humor	1	2	3	4	5
60. This instructor's overall teaching effectiveness was	1	2	3	4	5

Please ensure that you have completed all 60 responses.

Footnotes

[1]This hypothesis focuses specifically on addressing six questions: "Will internals benefit more from expressive instruction than externals?" "Will internals benefit more from organized instruction than externals?" "Will low test-anxious students benefit more from expressive instruction than high test-anxious students?" "Will moderate test-anxious students benefit more from expressive instruction than high test-anxious students?" "Will low test-anxious students benefit more from organized instruction than high test-anxious students? "Will moderate test-anxious students benefit more from organized instruction than high test-anxious students? The most appropriate type of statistical procedure for addressing these questions involves simple contrasts for each effective teaching condition and not interactions (see Perry & Magnusson, 1987, p. 456 for further details).

[2]This hypothesis focuses specifically on addressing four questions: "Will externals benefit more from high expressive than low expressive instruction?" "Will externals benefit more from high organized than low organized instruction?" "Will high test-anxious students benefit more from high expressive than low expressive instruction?" "Will high test-anxious students benefit more from high organized than low organized instruction? The most appropriate type of statistical procedure for addressing these questions involves simple contrasts for each effective teaching condition and not interactions (see Perry & Magnusson, 1987, p. 456 for further details).