INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

UMI

A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor MI 48106-1346 USA
313/761-4700 800/521-0600

ACADEMIC ACHIEVEMENT AND THE SELF-REGULATION OF STUDY TIME: QUANTITATIVE AND QUALITATIVE DIMENSIONS

by

Robert W. Kovach

A dissertation to the Graduate Faculty in Educational Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

1997

Approval Page

This manuscript has been read and accepted for the Graduate Faculty in Educational Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

9/18/97
Date

Barry J. Zimmerman
Chair of Examining Committee

9/14/97
Date

Executive Officer

Shirley Feldmann

Alan Gross

Barry J. Zimmerman

Supervisory Committee

The City University of New York

Abstract

ACADEMIC ACHIEVEMENT AND THE SELF-REGULATION OF STUDY TIME: QUANTITATIVE AND QUALITATIVE DIMENSIONS

by

Robert W. Kovach

Advisor: Professor Barry J. Zimmerman

Previous research has documented the significance of self-regulation in learning acquisition. The purposes of the present study were threefold: (1) to narrow the focus of self-regulation specifically to students' time management strategies; (2) to test the relationship between students' time use and their self-efficacy perceptions; and (3) to test the relationship between quantitative and qualitative time management dimensions.

Quantitative time management was operationally defined as the use of strategies to allocate time for studying or to improve the rate of one's learning. Qualitative time management was defined operationally as the use of strategies to improve the degree or depth of one's learning. To minimize socially desirable responses, data were obtained by means of an open-ended, structured interview. Teacher ratings of students' time management practices were employed to validate interview data.

Fifty tenth-grade students answered questions regarding their methods of time use across a range of learning contexts. It was found that high-achievers used significantly more quantitative and qualitative time management strategies than did low-achievers. As predicted, high-achievers surpassed low-achievers in their perceived self-efficacy to manage time.

Additionally, self-efficacy measures correlated with time management measures, and there was a strong association between students' self-reported time use practices and teacher ratings of students' time management. Lastly, quantitative and qualitative time measures were found to be positively and significantly correlated. Implications of these findings were discussed.

Acknowledgements

I owe an enormous debt of gratitude to my professors who each gave so freely of themselves and their expertise. They are: Nicholas Anastasiow, Bruce Brown, Zita Cantwell, Shirley Feldmann, Marian Fish, Alan Gross, Roger Millsap, Delores Perin, David Rindskopf, Philip Saigh, Carol Kehr Tittle, S. S. Zalkind, and Barry Zimmerman. Special thanks go to Professors Feldmann, Gross, and Zimmerman, who served on my Dissertation Committee.

In addition, four people stand out as essential for the completion of this dissertation. The first is Dr. Anastasia Kitsantas, who, despite her very crowded schedule, assumed the added burden of data-collection for this study. Without her kind help, this study would not have been possible.

In this connection, special gratitude is extended to the principal of the participating school, whose appreciation for educational research goes beyond lip service to active support. Thanks is also due to those students and staff who participated in this study.

Thirdly, particular recognition is extended to Professor Barry J. Zimmerman. I first met Professor Zimmerman at the Educational Psychology Department Open House that introduced me to the program which I was destined to pursue and again when I interviewed for admission. I felt such joy at the prospect of working with him on those occasions. This emotion has deepened into profound fondness and respect as I have experienced Barry Zimmerman as teacher, advisor, co-author, mentor, and friend.

Lastly, I could never have reached this stage (nor the earlier ones) had it not been for the steadfast support of my loving wife Nancy. Her cheerful acceptance of family responsibilities while I went off to study late into the night is appreciated beyond words. Her decision to abandon Ph.D. widowhood in pursuit of both her Bachelor's and Master's degrees--with straight-As in each!--necessitated a shared juggling of priorities as we shifted roles from helper to helpee in mutual support. The long, arduous, but rewarding climb toward this degree could never have been accomplished without her help.

To each of these wonderful people I extend heartfelt thanks.

Table of Contents

Chapter 1

Introduction, Historical Background, Theoretical Framework, Problem Statement, and Importance of This Study

Introduction

What is the one resource that all persons share in equal abundance? It is neither health, wealth, intelligence, physical attractiveness, strength, food, nor even clean water or air. The answer is time. Through no special merit or effort other than being alive, all persons acquire exactly 168 hours each week to utilize as they will. Being bounded by time is a common denominator of our humanity.

A recent poll of 2001 Americans by the *Wall Street Journal* (Graham & Crossen, 1996) found that 59% of respondents described their life as busy and another 19% claimed that life had become uncomfortably so. Interestingly, 75% of those with incomes greater than $100,000 per year said that managing their time was more difficult than managing their money.

The problems of governing one's time, of course, are not limited to financial matters. Any successful undertaking, including learning, requires an expenditure of the limited resource of time. Since time management is significant to effective learning, it is essential that students learn to use their time well. This study seeks to probe the question, What is it that competent students do in managing their study time--both quantitatively and qualitatively--that separates them from their less successful peers? A brief history of developments in

American education will bring us the point where the management of study time has emerged as a pivotal theoretical construct as well as an important practical concern.

Historical Background

In the half-century that has elapsed since the end of the Second World War, American education has seen a variety of remedies proffered for its improvement. Prior to the War, Thurstone's (1938) formulation of a Primary Mental Abilities Test, widely accepted as having defined the scope of learner aptitudes, was expected to expedite the classification of students for placement into optimal instructional settings. In the wake of Thurstone's achievement, Cronback's (1957) Aptitude x Treatment Interaction model of instruction was hailed as strengthening the scientific basis for the matching of instruction to students' abilities. During the 1950s, school districts around the country, in accordance with Thurstone's conception of fixed abilities and Cronbach's instructional model, first measured and then grouped students into rigid ability "tracks."

Fueled by an outpouring of funds for President Johnson's War on Poverty, there followed in the 1960s nationwide programs such as Head Start and Follow Through which were aimed at compensating for disadvantaged youngsters' intellectual deficits, attributed to these students' membership in inadequate home environments (Hess, 1970; Marjoribanks, 1976). However, declining achievement scores in the 1970s provoked a widespread "Back to Basics" movement that sought to heighten standards of student achievement

and to make more rigorous the licensing and "accountability" of teachers.

These prescriptions all rested, wholly or in large part, on assumptions that student abilities are immutable and developmentally stable, that learning outcomes are dependent upon the matching of educational experiences to students' needs, and that teachers and administrators bear ultimate responsibility for students' achievement through their maintenance of high instructional standards (Zimmerman, 1990a).

In the last decade or so, a group of learning theorists and researchers has proposed a different set of assumptions about academic education. Whereas prior movements were based upon theories that viewed students as primarily reactive recipients of instruction, self-regulation theorists postulate that students:

> (1) can personally improve their ability to learn through selective use of metacognitive and motivational strategies; (2) can proactively select, structure, and even create advantageous learning environments; and (3) can play a significant role in choosing the form and amount of instruction they need (Zimmerman, 1989b, p. 4).

Theories of Self-Regulated Learning

Self-regulation has been defined as "the process whereby students activate and sustain cognitions, behaviors, and affects that are systematically oriented toward the attainment of goals" (Schunk, 1994, p. 75). A generalized theory of self-regulated learning (SRL) posits learners who are metacognitively, motivationally, and behaviorally active participants in their own learning (Zimmerman, 1986). Such students approach

educational tasks with confidence, diligence, and resourcefulness; are aware of when they know a fact and when they do not; proactively seek out information when needed; find a way to succeed despite obstacles; view acquisition as a systematic and controllable process; and accept responsibility for academic outcomes (Zimmerman, 1990a). SRL theorists endeavor to promote self-regulated learning and regard self-regulated learners as models for their peers.

Elements of SRL have been studied from a range of theoretical perspectives including constructivist (e.g., Brown, Bransford, Ferrara, & Campione, 1983; Paris & Lindauer, 1982; Resnick, 1987), operant (e.g., Brigham, 1982; Kanfer, 1977; Mace & Kratochwill, 1988), phenomenological (e.g., McCombs, 1984; Robinson, 1987; Sameroff, 1987) volitional (e.g., Corno, 1987; Kuhl,1984; Scardamalia & Bereiter, 1986) Vygotskian (e.g., Davydov & Raddzikhovski, 1985; Leontiev & Luria, 1968; Wertsch & Stone (1985), and social cognitive (Bandura, 1989; Schunk, 1989; Zimmerman, 1989a; also see Zimmerman & Schunk, 1989 for an overview of SRL research in each of these traditions). This study explicitly operates from within the latter (social cognitive) theoretical frame.

The substrate of social cognitive research, including SRL, is Bandura's (1986) social cognitive theory which explains human learning via a triadic model of mutually--although not necessarily equally--interactive personal,

behavioral, and environmental factors. Social cognitive theory predicates three key SRL subprocess. These are: (1) self-observation, or deliberate attention to aspects of one's behavior; (2) self-judgments, or comparison of present performance with one's goals; and (3) self-reactions to goal progress that motivates behavior (Bandura, 1986; Kanfer & Gaelick, 1986; Schunk, 1990).

Learning Strategies. According to researchers (e.g., Borkowski, Carr, Rellinger & Pressley, 1990; McCombs, 1989; Zimmerman, 1989a; Zimmerman & Martinez-Pons, 1992), central to the entire scope of SRL is the implementation of learning strategies. SRL learning strategies are defined as plans, methodically derived and performed, that enable learners to acquire information or to accomplish a task (Weinstein, Goetz, & Alexander, 1988). Learning strategies cover a range of actions. In their investigation of students' strategy use, Zimmerman and Martinez-Pons (1986) identified 14 classes of self-regulated behaviors. These include: self-evaluating, organizing and transforming, goal-setting and planning, information seeking, record keeping and monitoring, environmental structuring, self-consequating, rehearsing and memorizing, seeking assistance, and reviewing records.

A body of research has demonstrated that knowledge of strategies alone is no assurance of their being carried out (e.g., Schneider, 1985). To ensure strategy

effectiveness, students additionally must metacognitively monitor, i.e., self-observe their cognitive actions (Pressley & Ghatala, 1990) and make strategy attributions, i.e., ascribe performance outcomes to the use of a particular strategy (Anderson & Jennings, 1980). Systematic inquiry into the nature of strategy formulation, use, and training is only a relatively recent development (e.g., Borkowski et al., 1990).

Self-Efficacy Perceptions. Also critical to social cognitive theory is the concept of perceived self-efficacy, defined as self-judgments regarding one's ability to attain designated levels of performance of a task or skill (Bandura, 1977, 1982, 1986). This definition connotes situational or domain specificity, rather than a global personality trait (Pintrich & Schrauben, 1992). In given learning contexts, perceptions of one's self-efficacy are salient to performance and cohere with the underlying SRL premise of learners as metacognitively, motivationally, and behaviorally active participants, rather than passive recipients.

Researchers (e.g., Borkowski et al., 1990; McCombs, 1989) have theorized that the effectiveness of strategies may depend upon learners' perceptions of self-efficacy to implement them. In addition, accumulating evidence reveals that self-efficacy perceptions are correlated with learning outcomes (Zimmerman & Martinez-Pons, 1986,

1988, 1990, 1992). Thus, empirical findings indicate that learning effectiveness is related to students' abilities to comprehend, initiate, and monitor their use of strategies as well as to perceive themselves capable of performing these tasks and of attaining learning outcomes.

An Overview of Time Management

There is mounting evidence that self-regulated learning components are correlated with academic achievement (Britton & Tesser, 1991; Pintrich & DeGroot, 1990; Wibrowski, 1992; Zimmerman, 1989a, 1990b; Zimmerman & Martinez-Pons, 1986). These findings suggest that the self-regulation of academic study time, defined as self-initiated efforts by students to plan and regulate their study time effectively, is a necessary precondition for academic success.

Any model of superior time management would account, in the first place, for students' allocating sufficient time to studying that is distraction-free, uninterrupted, and ample in length; that is, to students' organizing of time which is conducive to sustained learning. Thus, it follows that when students allocate insufficient time to studying it is unlikely they will reach command of material. But research (Nelson & Leonesio, 1988, below) shows that even under conditions of time sufficiency, students often still do not attain mastery. The allocation of adequate learning time is, therefore, an

essential, but not necessarily a sufficient, condition for masterful learning. Cases where time adequacy has been attained but mastery has not been reached suggest a qualitative time dimension that is also associated with successful studying.

Therefore we may logically distinguish between two conditions relative to study time. The first, that condition which takes into account the amount of time spent in learning may be termed *quantitative time management*. Such a condition may be characterized by such actions as the scheduling of activities, the setting of priorities and goals, and the checking off of tasks accomplished. In this condition the learner may address such questions as, How much time will a given task require? What amount of time is available to me? In what order shall I work on the tasks before me? Can I study more efficiently?

By contrast, a second study time condition would seem to account for the quality of time devoted to learning and may be termed *qualitative time management*. Such a condition may be characterized by the self-evaluation of results obtained from one's time investment in a particular activity. Given involvement in a learning task, the student may ask such questions as, How well am I spending my time on this task? How thorough is my grasp of this topic? Have I been using this time to my best advantage? Can I study better?

Moreover, there would seem to be an association between quantitative and qualitative time management. Often the amount of learning one experiences may be directly proportional to time spent in study. In other instances learning gains may not follow from increases in time allocations. Thus, from a logical standpoint, students need to account for both time quantity and time quality to attain skillful learning; i.e., both the quantity and the quality of learning time need to be managed harmoniously. In so doing, the learner may address questions such as, Will I improve my learning [qualitative] if I extend the time I have allotted [quantitative]? Shall I give up sleeping or eating [quantitative] to complete my understanding of the material [qualitative]? If I do, will gains in task completion [quantitative] be offset by losses in learning efficiency the next day [qualitative]? Will taking breaks from studying [quantitative] improve productivity [qualitative]? These questions suggest both a relationship between quantity and quality of time expended in adept learning and the self-management of the quantitative/qualitative relationship.

A guiding theory of study time adequacy is Carroll's (1963) model for school learning which holds that time is a key determinant of one's learning. Carroll suggests that the time a student takes to learn a task under given

conditions may be labeled the student's "aptitude for learning this task" (p. 725). Thus, a student with a greater aptitude for learning a given task will take less time to learn that task than will persons with less aptitude for learning the task. Carroll's model comprises five elements:

> (1) *aptitude* (as defined above); (2) *ability to understand instruction* (which is seen as a function of time); (3) *perseverance*, the amount of time the learner is willing to engage actively in learning; (4) *opportunity*, time allowed for learning; and (5) *quality of instruction*, a measure of the degree to which instruction is presented so that it will not require additional time for mastery beyond that required in view of aptitude (p. 729. Material in parentheses added).

Notice that all five elements in Carroll's model are defined in terms of time and that elements 1-3 are internal to the learner while elements 4 and 5 are under external control. It is axiomatic in Carroll's model that instruction be designed so that adequate time will be provided for all students to acquire essential material.

However, Nelson and Leonesio (1988) have empirically documented the failure of some students to attain learning mastery even under conditions of abundant time.

These researchers termed this phenomenon the "labor-in-vain effect," where substantial extra study time yields little or no gain in recall. What accounts for the "labor-in-vain effect" will be discussed further in Chapter 2.

Contemporaneous with the Nelson and Leonesio study is the development by Macan, Shahani, Dipboye, and Phillips (1990) of a Time Management Behavior Scale to examine the dimensionality of time management behaviors and to examine the correlations of time management with self-perceptions of performance and grade point average. Macan et al. employed a five-point Likert scale that ranged from *seldom true* to *very often true*. Use of such an instrument, however, may prompt subjects to respond in ways not characteristic of their actual performance. For studies of the kind proposed, limited item, multiple-choice scales look to be methodologically inferior to data gathering using a free response, structured interview (Zimmerman & Martinez-Pons, 1995).

Problem Statement

As will be seen in Chapter 2: Review of Literature, studies to date that specifically examine time management are relatively sparse, are often unclear as to what processes or strategies were monitored (e.g., Morgan, 1985), and are seldom linked to an unambiguous self-regulation model of learning (e.g., Britton & Tesser, 1991; Kleijn, van der Ploeg, & Topman, 1994). In

addition, preceding studies are silent about distinguishing between quantitative study time dimensions and qualitative dimensions.

Furthermore, prior research on time use has relied upon data collected by Likert-type questionnaire items (Britton & Tesser, 1991; Macan, Shahani, Dipboye, & Phillipps, 1990). As Zimmerman and Martinez-Pons (1986) discovered early in their research on academic self-regulation, the use of Likert-type questions produced extensive evidence of social desirability and low levels of variability in the answers they obtained (Zimmerman & Martinez-Pons, 1995). These findings raise methodological questions concerning the suitability of Likert-scale questionnaire items in the collection of self-reported time use data.

Nonetheless, factor analyses of these questionnaire item sets have revealed that the most predictive items of academic achievement in these scales involved self-perceived ability to manage. Britton and Tesser (1991) labeled this perceived ability a self-efficacy factor, a variable that has been found to be closely associated with students' learning strategies (Zimmerman & Martinez-Pons, 1986; 1988).

Therefore, there is need for a study which: (a) is linked to an unequivocal SRL model; (b) is based upon students' perceptions derived from their normal assignments; (c) uses a data-collection method that

minimizes response bias; (d) examines specific time management strategies actually utilized by students; (e) evaluates associations between strategy use and self-efficacy perceptions; (f) evaluates associations between strategy use and academic achievement; and (g) evaluates associations between quantitative and qualitative time management dimensions.

Importance of This Study

This study seeks to demonstrate that quantitative and qualitative dimensions of students' use of their study time influence students' effectiveness in school. This study narrows the focus of academic self-regulation specifically to students' time management strategies and tests the relationship between students' time use and their self-efficacy perceptions as well as the relationship between quantitative and qualitative time management dimensions.

To control for possible response bias in gathering self-report data, this study employed a free response, structured interview instrument consisting of items with low social desirability. Zimmerman & Martinez-Pons (1995) found that

> use of an open-ended response format allows students to respond qualitatively to typical academic problem contexts without reliance on proscribed response options. However, variable probing by the experimenter during qualitative assessment could be a source of unreliability with an open-ended format. A structured interview procedure was developed that constrained the experimenter's questioning but still elicited

> student-generated answers. The probes were designed to draw out answers from reticent or nonverbal subjects. By planning the questions and follow-up probes ahead of time, we could insure both the reliability of interview administration and standardized scoring. (p. 3)

Zimmerman and Martinez-Pons (1995) concluded that a structured interview format "is particularly suitable for studying a form of learning that involves student agency, initiative and self-direction" (p. 7). The Time Management Contexts Scale developed to probe students' time use in this study was designed to follow the criteria recommended by Zimmerman and Martinez-Pons.

Prior research did not have any way of validating the accuracy of self-reported Likert-scale items. In this study, information gathered from teachers was used as a criterion to validate students' strategy reports.

Further, prior studies focused on the quantitative use of time, e.g., the number of hours spent during study in an evening, but gave relatively little attention to the qualitative use of time, namely, how efficiently and how thoroughly the student studied during that particular period. This study included specific items designed to probe both quantitative and qualitative dimensions of study time and is, to the best of the researcher's knowledge, the first ever to address the qualitative dimension of time use.

Finally, this study attempted to identify which strategies most constituted a predictive basis from which efforts to train those strategies can be launched.

Chapter 2

Literature Review: Academic Achievement and Time Management, Adequacy of Study Time, and Time Use Training

The notion that wise use of study time will yield learning benefits has spawned a cottage industry of books (e.g., Gall, 1988; Longman & Atkinson, 1988; Walter & Siebert, 1981) that occupy prime shelfspace in the self-help sections of the nation's bookstores. Although these works have generated a volume of sales, they unfortunately rest upon intuitive appeal and lack empirical undergirding.

More to the point of the current study are scholarly investigations relevant to time management. Educational research on this subject falls naturally into three divisions: studies relating academic achievement to self-regulated learning (SRL), including time management; studies of time adequacy; and studies of time use training. These branches of research will be examined and implications drawn from them.

I. Academic Achievement and Time Management

Studies have demonstrated the link between self-regulated learning components and academic achievement. Zimmerman and Martinez-Pons (1986) used a free-response,

structured questionnaire to interview 80 male and female tenth-graders, segregated into high- and low-achievement groups, regarding their use of self-regulated learning strategies. High achievers manifested significantly greater use of 13 (of 14) self-regulated learning categories than did lower achievers. Moreover, students' membership in their respective achievement group was predicted with 93% accuracy. Regression analysis showed self-regulated learning measures to be better predictors of standardized achievement scores than students' gender and socio-economic status. These results buttress Zimmerman's (1989a, 1990b) social cognitive model of academic self-regulation which integrates personal, behavioral, and environmental learning processes and postulates reciprocal causality among them. According to this model, when students monitor their performance and attribute outcomes to their strategies, their learning becomes self-regulated and they display increased self-efficacy, greater intrinsic motivation, and higher academic achievement than their non-monitoring peers.

Additionally, Wibrowski (1992) studied academic self-regulation among 100 inner-city youths and found that when students from disadvantaged environments actively engaged in self-regulating their learning, they enhanced their academic success significantly. Analysis of the intercorrlations among variables showed that time accounting, defined as students' awareness of specific

times at which learning activities take place, produced the greatest number of significant intercorrelations among the 18 variables tested. It should be added that Wibrowski's Learning Activities Inventory (LAI) was a structured interview instrument derived from students' descriptions of their daily study activities.

Pintrich and DeGroot (1990) conducted a correlational study of relationships among self-regulated learning, motivational orientation, and classroom academic performance using a Likert-type questionnaire that probed student motivation, cognitive and metacognitive strategy use, and management of effort. Participants were 100 female and 73 male seventh-grade science and English students. Three motivational components were tested: (1) an expectancy component, or students' beliefs about their ability to perform a task; (2) a value component, or students' goals and beliefs about the importance and interest of the task; and (3) an affective component, or students' emotional reactions to the task. Results showed positive correlations between cognitive strategy use and self-efficacy (r = .33) and intrinsic value (r = .63) and between self-regulation and self-efficacy (r = .44) and intrinsic value (r = .73). Regression analyses revealed that, depending on the outcome measure, self-regulation, self-efficacy, and test anxiety emerged as the best predictors of performance.

The studies cited above demonstrate the relationship between academic achievement and broad-range SRL components. As time management constitutes one aspect of learning self-regulation, we turn next to studies focused specifically upon time management. Three studies are cited here which linked time management skills to academic achievement.

First, Britton and Tesser (1991) tested the hypothesis that college GPA would be predicted by time management practices. Ninety college students completed a 35-item time management questionnaire in 1983 and their SAT scores were obtained. In 1987, each student's cumulative GPA was acquired. Factor analysis of questionnaire results produced loadings on three distinct factors: Short-Range Planning, Time Attitudes, and Long-Range Planning. Regression analyses showed that two of the time management components (Short-Range Planning and Time Attitudes) were significant predictors of cumulate grade point average ($\underline{R}^2$ = .21) and accounted for more variance than did SAT scores (increment in $\underline{R}^2$ = .05). The authors concluded that time management practices may influence academic achievement among college students.

Second, for three prospective studies, Kleijn, van der Ploeg, and Topman (1994) developed a Likert-type questionnaire, labeled "Study Management and Academic

Results Test" (SMART), to measure cognitions related to study and exam-taking. The investigators queried first-year medical students in three trials (N = 129, 151, 156, respectively). Factor analysis of the 29 SMART items produced four factors: Academic Competence, Test Competence, Time Management, and Strategic Studying. Academic Competence and Test Competence yielded a Pearson correlation of r = .53, while Academic Competence correlated with Time Management, r = .40 and with Strategic Studying, r = .34. A stepwise multiple regression analysis with academic performance (GPA) as the dependent variable showed that scores on Test Competence, Time Management, and to a lesser extent, Test Anxiety, explained more than 37% of the variance on GPA.

Thirdly, Morgan (1985) compared three conditions of self-monitoring of private study for their effects on academic performance and intrinsic motivation upon 240 first-year college students taking education courses. After being blocked into three numerically equal groups: high, moderate, and low academic achievement prior to college, subjects were randomly assigned to one of four study conditions: (1) a self-monitor subgoal condition; (2) a self-monitor time-on-study condition; (3) a self-monitor distal-goal condition; and (4) a control condition. ANOVA results showed that the self-monitor subgoal condition significantly outperformed the other three conditions on end-of-year exam scores, even though

students in the time-on-study condition spent significantly more time studying each week than did students in the other conditions. An important conclusion from this study is that undue emphasis upon time management may actually *reduce* the effectiveness of one's studying. However, a flaw in this study is that monitored subgoals are not specified. Although time-on-study was not associated with learning outcomes, one cannot tell whether or not other (qualitative) aspects of time self-monitoring in the subgoal condition may have contributed to the group's superior performance.

II. Adequacy of Study Time

If the management of one's study time is an important self-regulatory technique as studies above suggest, then being sure that one allocates sufficient time to studying must certainly follow. But what is adequate study time? How is it determined? To what extent does it vary among individuals? Several studies have attempted to answer these questions.

Gettinger (1984) investigated the quantitative dimension of time management in reaching learning mastery among fourth and fifth graders. Subjects were asked to read two expository prose passages of equal difficulty. In one version, children read the assigned passage along with an audiotaped narration of the selection and were then tested. The reading-and-testing cycle was repeated until the children reached 100% mastery on the test. In

the other version, children were informed of the 100% mastery goal, but were allowed to regulate individually the number of study-test trials taken on the passage. The study's most relevant finding was that students who self-regulated chose to spend less time in learning than they needed to reach mastery.

In a follow-up study, Gettinger (1985) investigated the relative contributions of three key time variables: time allocated for learning, time spent or engaged in learning, and time actually needed for learning. She found that students differed in the rate at which they learned. The slowest may need five to six times as much time as the fastest to learn the same material (Block, 1971). As Carroll's (1963) model predicted, spending or allocating less time than needed in learning a reading task had a direct negative effect on both initial learning and later retention. When permitted to self-determine the number of trials they would engage in while learning, students spent on average only 68% of the time they actually needed to attain mastery. Further, spending significantly less time than needed resulted in an average learning decrease of 11%, as well as a 15% lower rate of retention one week later.

In two related studies, Ghatala, Levin, Pressley and their associates continued on the path set by Gettinger's (1984, 1985) research (above). In the earlier study, Pressley, Snyder, Levin, Murray, and Ghatala (1987)

explored subjects' ability to monitor whether what was being read was being remembered, referring to this aspect of memory monitoring as "perceived readiness for examination performance," or PREP. College students' awareness of how much they had learned was greater after taking a test on the just-read passage, even though no explicit performance feedback was provided. The authors suggested that taking a test seemed to be a metacognitive experience [Flavell, 1979] for adults in this study; that is, testing yielded information about how much the subjects had learned. Pressley et al. concluded that even college students are not very aware of how much they were learning from text, as evidenced by the fact that their PREP during reading was far from perfect.

In a follow-up study which proved more directly related to time sufficiency, Ghatala, Levin, Foorman, and Pressley (1989) explored factors influencing children's perceived readiness for examination performance (PREP) and their self-regulation of study time while reading. The central question of the investigation was how much time (PREP time) one thought it would take to learn a fixed amount of information. Ghatala *et al.* hypothesized that the underpreparation Gettinger (1984, 1985) observed (above) was due to a mismatch between students' metacognitive and cognitive states: students did not adequately monitor their state of learning as they read

and, therefore, believed they had acquired more information than they actually had.

The investigators undertook three experiments (the second and third of which are most relevant here) in which they set up four conditions. These were: 1 = Study, where subjects read a passage as many times as they wished before recall testing; 2 = Test, subjects read the passage only once, then were tested and no feedback on test results were given; 3 = Estimate, the same as the Test condition, except that after each test subjects were asked to estimate the number of items they got correct; and 4 = Feedback, in which subjects were informed of the number of items they answered correctly after each test. Results were similar to Gettinger (1984), in that in Experiment 2, children inflated their PREP estimates due to their certainty about being correct in answering multiple-choice items which, in fact, were incorrect.

In Experiment 3, which used a recall test for determining mastery, the match between elected study trials and trials needed for mastery was close in the Test and Estimate conditions but not in the Study condition, where subjects elected less than half of the trials needed to reach criterion. The study showed that when given the opportunity to assess their PREP level on recall tests following self-elected study trials, students were more likely to persist at studying until

they were at or close to the 100% mastery criterion. Thus, children can effectively regulate their study time on a reading passage to attain a specific criterion on a subsequent recall test (but not a multiple choice test) of factual knowledge. In addition, the nature of the test appears to be critically related to effective PREP time regulation.

Yet there are occasions where students do not learn even when the time provided for them to do so is abundant. Nelson and Leonesio (1988) tested university undergraduates' metacognitive monitoring processes regarding either accuracy-of-learning or speed-of-learning. Three major findings emerged from this study which were: (1) ease-of-learning and feeling-of-knowing judgments were reliably related to study-time allocation, with more self-paced study time being allocated to the supposedly more difficult items; (2) even when instructed to master every item and when allowed unlimited study time to do so, people terminate study before learning is completed; and (3) large increases in self-paced study time can yield little or no increase in the subsequent likelihood of recall, the "labor-in-vain effect."

What accounts for the "labor-in-vain effect?" Leonesio and Nelson (1987) hypothesize that in learning situations a judgment-of-learning (JOL) dynamic is in force. This dynamic has also been called the "norm of study" (Le Ny, Denhiere, & Taillanter, 1972), and may

also perhaps be referred to as self-efficacy for quiz- or exam-taking. This metacognitive dynamic may be in error. The researchers state that

> while studying an item, if a person is able to recall the item from short-term memory, he or she may conclude that the item has been learned; however, subsequently, the person might be incorrect on that item during a test of long-term memory, even though earlier it could be recalled (from short-term memory). Put differently, the irony is that the person's metacognitive monitoring was valid (after all, he or she could recall the item during study, so in that sense it had been mastered), but that monitoring is partially irrelevant for the eventual task being studied for (Nelson & Leonesio, 1988, p. 684).

This reasoning is plausible but speculative and suggests the need for further systematic inquiry into students' actual strategy use in managing their study time.

III. Time Use Training

As will be seen, in many ways time use training studies only tangentially touch upon issues raised thus far. They are included here briefly, however, to "round out" the picture of pertinent time management research.

There is evidence that TM skills can be taught with some success both in non-academic settings as well as in academic settings. With regard to the former, Hall, and Hursch (1982) found an increase in self-reported time spent on "high-priority" tasks (i.e., writing articles or completing current projects) after participants read a time management manual.

King, Winett, and Lovett (1986) found that working wives who participated in time management training received both

immediate and long-term benefits. Subjects showed significant increases in their knowledge of time and stress management factors, spent more time on a self-determined, stress-reducing, enjoyable activity, and reported a greater amount of self-efficacy for time and stress management-related behaviors.

In academic settings, time management training has not always proven effective. Tichenor (1977) examined self-monitoring and self-reinforcement of studying to partial out the relative contributions of self-monitoring and self-reinforcement to change in behavior in the number of minutes studied and test scores. After 6 weeks, students who self-reinforced in their natural environment significantly increased their study time. However, no significant difference was seen between groups in test scores. These results may be due in part to the possibility that students were primarily deficient in study skills. Tichenor brings the subject around full circle when he suggests that focusing on increasing study time instead of study skills may be more appropriate for academic under-achievers whose main problem relates to lack of effort rather than skill deficiency.

Jackson and Van Zoost (1972) demonstrated a significant increase in self-reported knowledge of study habits as a result of self-monitoring plus self-reinforcement, but they also found that none of their conditions produced a gain in academic performance beyond chance.

Bristol and Sloane (1974) examined the effects of contingency contracting on study rate and test performance. They found that contingency contracting did significantly increase the study rate of students of a wide range of ability, but it improved the test performance of only below-average students.

Finally, Macan, Shahani, Dipboye, and Phillipps (1990) noted that time management research so far has dealt with training aimed at changing what is assumed to be a unidimensional construct of good time management, although the the literature seems to controvert this assertion. Not only has the assumption that time management is unidimensional been untested, they claimed, but there have been no systematic attempts to develop a psychometrically sound measure to assess conventional time management behaviors, a contention that does seem to be borne out.

Macan et al. state that little is known about the correlation of naturally occurring time management with personality and indicators of stress and performance. Thus, before additional research is conducted to determine the effectiveness of different types of time management training, it is important to assess whether there are correlational relationships between time management and the various outcome measures these time management programs are intended to modify.

Thus, the authors embarked upon the development of a Time Management Behavior Scale (TMB), composed of 46 items

which loaded onto four major factors. These factors are: 1= Setting Goals and Priorities; 2 = Mechanics and Planning; 3 = Perceived Control of Time; and 4 = Preference for Disorganization. The two major findings of this study are that: (1) time management is multidimensional and (2) that potentially important relationships were found between some aspects of TM and self-reported performance and stress. However, it should be noted that the four factors accounted for only 8% of variance of self-reported GPA.

Implications

From this literature review it is possible to draw at least five major implications which bear upon further investigation of time management. These implications are:

1. There is a positive relationship between academic achievement and SRL components, one of which is the management of one's study time.

2. Allocation of the proper amount of time has a direct bearing upon learning acquisition. However, also important is the issue of quality; i.e., what one does in the hours devoted to study.

3. Most studies deal with time management only secondarily, either as one of several variables or as related to some cognitive or metacognitive activity. Since Items 1 and 2 obtain, it follows that time management is a significant phenomenon that requires systematic exploration in its own right.

4. Enough is known about time management to postulate with confidence that it not a unidimensional variable; indeed, time management strategies need to be studied over a variety of contexts to understand their impact upon academic achievement.

5. Research methods to date have been almost exclusively limited to forced-choice instruments, with the notable exception of the studies by Zimmerman and Martinez-Pons and Wibrowski. The research by Zimmerman and Martinez-Pons established the effectiveness (1986) and the validity (1988) of an open-ended, structured interview questionnaire and as a result this instrument seems especially well-suited to exploring the research hypotheses which naturally spring from the literature pertinent to time management.

Rationale

What kind of variables should a study of students' time use examine? Several important variables spring to mind. Most obviously, students' strategies aimed at maximizing *total study time* [quantitative] are important measures. But how that time is used, as measured by *specific learning strategies* aimed at improving learning [qualitative], are also critical.

Additionally, students' self-efficacy perceptions regarding specific learning tasks form a category of important variables. As seen above in the section on "Self-Efficacy Perceptions" (pp. 6-7), students' self-efficacy has been empirically linked to learning effectiveness. Thus,

(1) a student's perceptions of self-efficacy to provide adequate amounts of study time [quantitative self-efficacy], as well as (2) to manage that time through effective learning strategies [qualitative self-efficacy], are variables that deserve investigation.

But given a research instrument constructed of items having low social desirability, how accurate can students' self-reports be? A source of data verification is certainly the students' own teachers. Those educators who directly observe and interact with students are well-positioned to rate students on indirect measures of student time use through their observations of students' recording, punctuality, and completeness of assignments and of grasp of material.

What outcomes might be expected in such a study? If results were consistent with prior findings, it would be expected that high-achieving students would score higher on both quantitative and qualitative time management measures than their low-achieving peers. Similarly, high-achievers ought to outscore low-achievers on self-efficacy perceptions both to produce and to use their study time. These outcomes are expected because, as previously noted, perceptions of self-efficacy have been found to be highly correlated with achievement across the full range of learning tasks.

Hypotheses

Based upon the foregoing, it seemed reasonable and important to devise a dissertation study to test the following hypotheses:

H1: High-achievers will significantly surpass low-achievers in their use of quantitative and qualitative time management measures.

H2: High-achievers will significantly surpass low-achievers in their perceived self-efficacy to manage time.

H3: Students' self-efficacy measures will correlate with time management measures.

H4: A significant correlation will be found between teacher ratings of student time use effectiveness and student self-reported strategy use.

H5: Quantitative and qualitative time strategies will be positively and significantly correlated.

Chapter 3

Method

Subjects

An all-girls high school in New York City provided the sample of students interviewed in this study. The school population consisted of 30% Hispanic students, 10% Black students, and 25% Asian students. White students made up the remaining 35% of the school population, a decline from the 50% level seen two years before. Tuition at this private school amounted to $6,000 per year, with about one-third of students receiving financial assistance.

All English students from the entire sophomore class served as a pool from which a sample (N = 50) was drawn. Students were chosen from English classes because this course is mandated for all students in New York State and students in this course were heterogeneously grouped. (Heterogeneous grouping is less likely in other courses because students, either through overt "tracking" or through self-selection based upon perceived course demands, often fall into homogeneous groups.)

Sophomore English students were dichotomized into two achievement groups, "Low" and "High," by selection on course grade-point average (GPA). Twenty-five of the lowest students and 25 of the top students were randomly selected from their respective lowest and highest English achievement

quartiles. The mean GPA in English for the Low group was 74.64, SD = 3.83; the High group mean was 93.68, SD = 2.64, $t(1,48) = 418.94$, $p > .01$.

This school has a policy of expelling students who fail more than one course in a semester. Therefore, the subject sample chosen was skewed toward higher achievement averages than are typically seen in the population of urban students. In that sense, the lowest quartile in this school generally outperforms the lowest quartile in other urban high schools.

Materials

1. Time Management Contexts Scale. Previous research (Zimmerman & Martinez-Pons, 1986, 1995) demonstrated that an open-ended, structured interview was superior to that of a closed-choice questionnaire in probing students' use of global SRL strategies. The Time Management Contexts Scale (TMCS, Appendix C), based upon Zimmerman and Martinez-Pons' work, was constructed of items deemed to have low social desirability as a check against students' response bias.

The 15-item TMCS (Appendix C) was designed to gather data on students' strategy use across 12 time management contexts. These contexts were drawn from a broad overview of SRL literature and were determined to be significant in the self-regulation of study time. The time management contexts included were: 1) time sufficiency; 2) assignment recording; 3) assignment ordering; 4) *time use efficiency*; 5) *reading*; 6) *writing*; 7) *comprehending ideas*; 8) *remembering facts*; 9) coping when behind schedule; 10) self-

motivating; 11) taking planned breaks, and 12) "else," to include any information which the subject might add regarding her time use.

The five contexts denoted by italics were devised specifically to segregate quantitative and qualitative time use dimensions. Quantitative time management was operationally defined as indications of student use of strategies for allocating study time or for improving their rate of learning. Quantitative time management was probed by asking how students went about studying "faster" in the five italicized contexts. Qualitative time management was defined operationally as indications of student use of strategies for improving the degree or depth of their learning and was probed by asking how students studied "better" in the same five contexts.

The TMCS was field tested with secondary-level students from another school (N = 20) prior to full-scale implementation. Students were asked to determine whether questionnaire items were clearly-stated and comprehensible. Results showed that TMCS items were unambiguous and that they differentiated low-achievers from high-achievers. Based on these findings, the TMCS was deemed suitable for data gathering on students' strategy use.

2. Students' self-efficacy for time management was tested by use of a 15-item Self-Efficacy for Studying Scale (S-ESS, included in Appendix C). Items on the S-ESS were designed to probe student's self-perceptions across each of

the 12 time management contexts and were arranged as natural follow-up questions to the TMCS items. Prior to full-scale implementation, S-ESS items were piloted on the same sample and in the same manner as were TMCS items. Equivalent results were obtained.

3. Teacher Observation Scale. Prior research did not have any way of validating the accuracy of self-reported Likert-scale items. In this study, information gathered from teachers through the use of the Teacher Observation Scale (TOS, Appendix D) was used as a performance-based criterion to confirm students' strategy reports.

The TOS was submitted to six experienced high school teachers to determine its face or domain validity and to cull out ambiguities in wording or meaning. All six teachers found the instrument to be comprehensive, conceptually valid, and unambiguous. None of the teachers anticipated any problems in using the scale.

Procedure:

1. Permission to Conduct Research

Permission to conduct research at the all-girls high school was sought from the building principal. Permission was granted on condition that the investigator conduct the interviews. This stipulation was acceptable to the researcher and his advisor and permission from the principal was granted in writing (Appendix A).

2. Informed Consent

Students and their parents were asked to sign a consent form (Appendix B) for participation in the study. Parents and students were informed that participants would be interviewed regarding students' study methods and were requested to permit the researcher to access students' course grades and achievement scores. Participation in the study was voluntary and had no bearing on students' grades.

3. Interviews

Upon receipt of properly signed consent forms, students were interviewed by a hired investigator, a young, popular physical education teacher in the girls' high school who herself had earned a Ph.D. in the same department as the researcher. Although the investigator was not completely naive to the achievement levels of participants, she was restricted to asking questions as they appeared on the typed version of the TMCS and S-ESS or to rephrasing them if the subject asked for further explanation. To draw out responses from reluctant or nonverbal subjects, the interviewer was permitted to ask the follow-up question to each TMCS item and to ask, "What do you mean by --------?" or "Could you please elaborate?" in cases where a student's answer was cryptic or unclear. She was permitted to repeat questions and to rephrase questions at the student's request. At the completion of the interview, students were thanked and given a $5 honorarium for their participation.

4. Recording of Data

A hand-size audio tape recorder was used to record the interviews of all participants, thereby providing an exact record of students' responses to the TMCS and S-ESS items. Subjects were given the choice of having their responses either tape recorded or written down by the interviewer. All 50 subjects opted for the taping procedure. Seven 90-minute cassettes of the interviews of the 50 subjects were produced. These audio recordings were transcribed verbatim by the researcher into a set of typed transcripts which served as the basis for scoring TMCS and S-ESS data.

5. Categories, Units of Analysis, and Scoring

Data derived from the TMCS were scored in the following way:

Self-regulation *categories* were drawn from self-regulation literature for the 12 time management *contexts*. These categories were made final during pilot testing. In all, 16 self-regulation categories were identified. These categories were: 1) time monitoring; 2) time estimating; 3) record keeping; 4) goal setting; 5) task ordering; 6) environmental structuring; 7) comprehension checking; 8) self-quizzing; 9) anticipating test questions; 10) rehearsing/memorizing; 11) self-motivating; 12) self-consequating; 13) re-scheduling; 14) help-seeking; 15) stress management and 16) "other."

The unit of analysis for the TMCS was a phrase or sentence given in response to a question asked. Each phrase

or sentence that pointed to a time management strategy used by the student for a self-regulation category was scored as indicating the student's strategy use for that category. In certain instances a given response was scored for more than one category: e.g., "If I see that I have a half-hour more work to do but that my favorite show will come on in 20 minutes, I work harder to reward myself for doing the assignment." In this example, the response indicates a strategy that meets the criteria for both 1) time monitoring and 12) self-consequating. In this case the student's use of a time management strategy would have been scored for two categories.

For the S-ESS, the unit of analysis was the numerical self-efficacy score given by the student to each item. The S-ESS responses ranged in whole numbers from 1 to 10. Data were recorded in whole number form as supplied by each student.

For the TOS, the unit of analysis was the numerical score given by the teacher to each item. TOS responses ranged in whole numbers from 1 to 5. Data were recorded in whole number form as supplied by the each student's English teacher. Once entered into the data set, Items 6 and 7 on the TOS were recoded such that "1" responses became "5" and "5" responses became "1," with similar transformations for "2" and "4" responses. These conversion were done to account for the negative relationship between the last two items of the TOS with the first five. Following recoding,

teachers' scores were summed to produce a TOS score for each student.

All students and teachers answered every question posed and a complete data set was produced. Data derived from the TMCS were independently scored by two graders, using protocols devised during pilot testing. Both scorers were naive to participants' achievement levels. All 50 transcripts were scored by the researcher and half the transcripts, randomly selected, were graded by a second scorer.

6. Scoring Training

Since pilot testing was based on small samples, a few transcripts taken at random from the actual study were used to refine scoring protocols devised during piloting. A single transcript was "practice scored" by each grader independently and results were compared. Single-transcript practice sessions were repeated until an 85% level of agreement was maintained over three consecutive iterations. From these sessions, scoring rules were extended to responses not seen in pilot samples. Five practice sessions were required to reach criterion. Practice transcripts were returned to the transcript mix and were scored four to six weeks later.

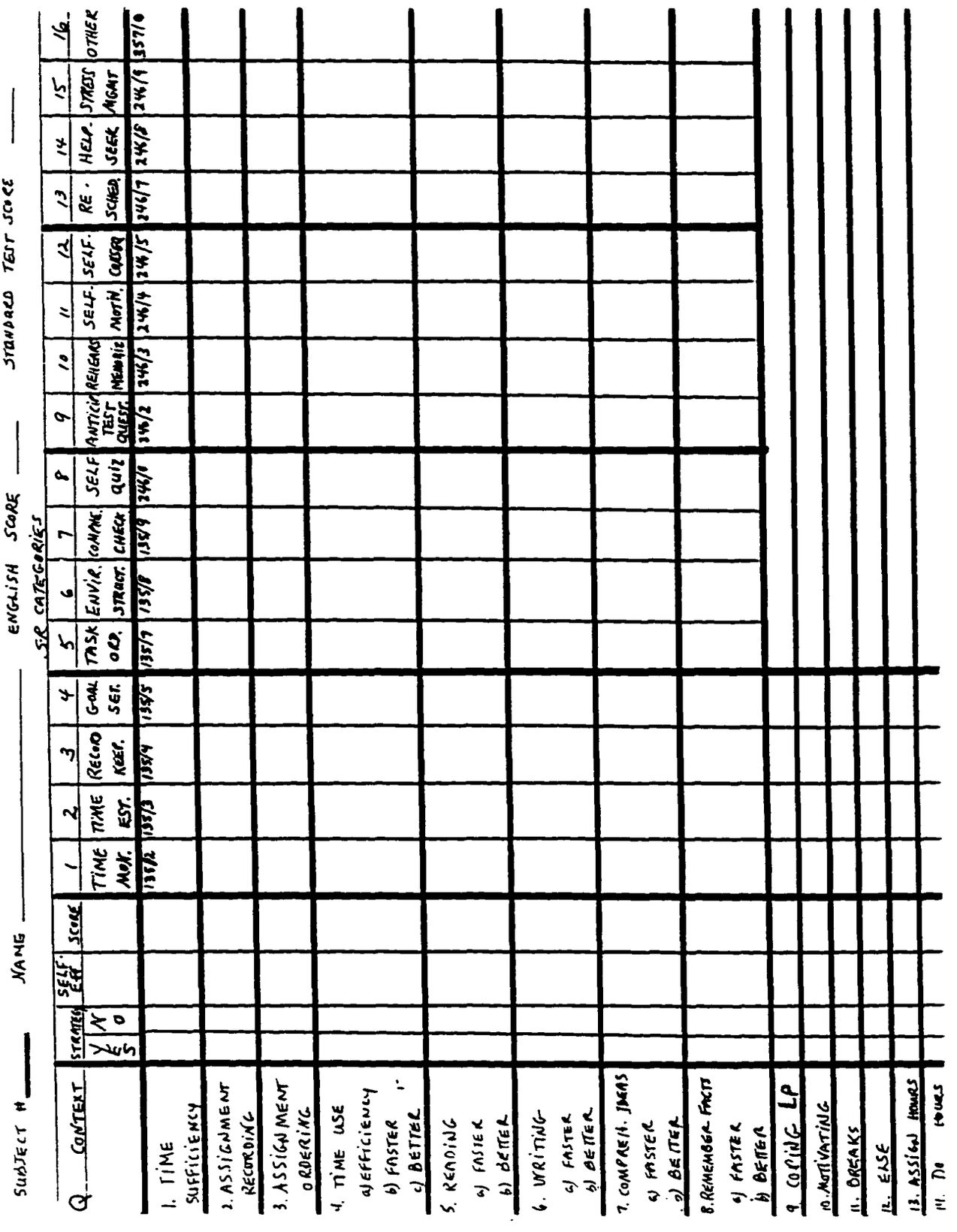
Inspection of subjects' self-regulation reports revealed one low-achieving student who claimed to use an unusually high number of strategies. Previously, this girl had displayed personal problems and was felt by her teacher to

be an unreliable source of self-report data. As a result, this subject was dropped from the study. An additional low-achieving student was selected and this subject's data were included in the data set. Only in this instance did the scorer know the subject's achievement level prior to data coding.

Scoring Grid

Data were scored by use of a grid consisting of vertical and horizontal axes. The vertical axis depicted the 12 learning *contexts* along with the subject's corresponding self-efficacy reports; the horizontal axis indicated the SR *categories*. Figure 1, next page, shows the layout of the Scoring Grid, which represents graphically both the TMCS and the S-ESS. Intersecting the two axes were cells for each of the 15 self-regulation categories, to be tallied one or more times when the student indicated strategy use in a given context. A sixteenth self-regulation category variable, labeled "other" was included on the horizontal axis to permit scoring of any unanticipated self-regulation strategies. However, as no responses fit this category, "other" was dropped from the analysis.

Figure 1: Scoring Grid



Reliability Analyses

Reliability tests of the TMCS, the S-ESS, and the TOS were conducted using the SPSS/PC+ Reliability procedure. Tests of the TMCS produced a Cronbach *alpha* of .89. Reliability tests of the Self-Efficacy for Studying Scale (S-ESS) produced an *alpha* of .94.

The TOS was subjected to three reliability exams. In the first instance, all seven items of the TOS were tested and an *alpha* of .67 was observed. Then, the TOS was partitioned into two parts, the first five items and the last two. This division was created because the last two items were thought to be qualitatively different from the first five. These items were included in the TOS because they were believed to elicit information missed by the first five.

The first five items were segregated from the TOS and tested for reliability; an *alpha* of .93 resulted. The last two TOS items were similarly tested and results showed an *alpha* coefficient of .82. Because these tests demonstrated the TOS to be composed of two separate scales, the last two items (the second subscale) were ignored during data analysis.

Coding of Data

For both the S-ESS and the TOS, whole number answers were coded into the data file directly as given by students and teachers. Verbal responses to the TMCS required scoring

before data coding. After TMCS data were scored, they were coded into the data file for analysis.

Inter-rater Reliability

Inter-rater reliability was assessed using a procedure endorsed by Withall (1949) for use by a judge and coder. Identical categorical judgments by both scorers were divided by the total number of strategies identified for each participant by both scorers. The inter-rater reliability was .93 for the 50% of transcripts tested for reliability. Prior to data entry, inter-rater discrepancies were resolved through discussion.

Data Analysis

Means and standard deviations were computed across achievement groups (hereafter called "groups") for each item of all three instruments used in this study.

Findings from this study were scrutinized using Pearson correlations, discriminate function analysis, factor analysis, and regression procedures.

Data analysis proceeded in the following manner: Tests of total (or global) use of a variable were performed, usually on a full range of component variables. Then, tests on an intermediate range (fewer) of the variables were conducted. Lastly, tests of specific-level (individual or domain-specific) variables were performed.

Statistical testing took place in two phases. These were: (1) test of the study's hypotheses; and (2) other statistical investigations, including: tests not related to

the study's hypotheses and tests of special interest. Such inquiries included tests of a variable's predictive power, or whether a variable composed of several underlying variables might be reduced to fewer components.

Tests of H1: *High achievers will significantly surpass low achievers in their use of quantitative and qualitative time management measures.*

1. To determine whether groups differed on total strategy use, a t-test was performed on STRATOT, a composite variable formed by summarizing strategy reports across all TMCS items.

2. To determine whether groups differed on general quantitative time use, a t-test was performed on QUANSTRT, a composite variable formed by summing the five quantitative time use variables.

3. To determine whether groups differed on general qualitative time use, a t-test was performed on the QUALSTRT, a composite variable formed by summing the five qualitative time use variables.

4. To determine whether groups differed on the specific quantitative time management variables, t-tests were performed on all quantitative variables.

5. To determine whether groups differed on the specific qualitative time management variables, t-tests were performed on all qualitative variables.

Tests of H2: *High achievers will significantly surpass low achievers in their perceived self-efficacy to manage time.*

1. To determine whether groups differed on total self-efficacy perceptions, a t-test was conducted on SEFFTOT, a composite variable formed by summing self-efficacy perceptions across S-ESS items.

2. To determine whether groups differed on self-efficacy perceptions relative to quantitative time use, a t-test was performed on QUANSEFF, a composite variable formed by summing the five self-efficacy items associated with quantitative time use.

3. To determine whether groups differed on self-efficacy perceptions relative to qualitative time use, a t-test was performed on QUALSEFF, a composite variable formed by summing the five self-efficacy items associated with qualitative time use.

4. To determine whether groups differed on strategy use relative to specific quantitative variables, t-tests were conducted on the five quantitative variables.

5. To determine whether groups differed on strategy use relative to specific qualitative variables, t-tests were conducted on the five qualitative variables.

Tests of H3: *Students' self-efficacy measures will correlate with time management measures.*

1. To determine the association between global self-efficacy measures and global strategy use, a Pearson correlation was computed between the composite variable, SEFFTOT, created by summing self-efficacy perceptions across all contexts, and the composite variable STRATOT, created by summing strategy reports across all contexts.

Of the 15 self-regulation categories, five are time-related: Time Monitoring, Time Estimating, Goal Setting, Task Ordering, and Rescheduling. A composite variable, TIME, was formed by summing strategy reports across the time-related categories.

2. To determine the association between general self-efficacy perceptions and general time-related strategies, a Pearson correlation was calculated between the composite variables, SEFFTOT and TIME.

3. To test the association between self-efficacy measures and quantitative and qualitative time measures, Pearson correlations were computed between specific self-efficacy items and their corresponding quantitative and qualitative time management strategies.

4. To determine the association among student self-efficacy perceptions and quantitative and qualitative time use, Pearson correlations were computed among the four composite variables, QUANSTRT, QUALSTRT, QUANSEFF, and QUALSEFF.

Test of H4: *A significant correlation will be found between teacher ratings of student time use effectiveness and student self-reported time management.*

1. To determine the association between teacher ratings of student time use and student self-reports, a Pearson correlation was calculated between the composite variables TOSCORE, the sum of teacher ratings of student time use, and three associated variables: STRATOT, the sum of strategy reports across all learning contexts; QUANSTRT, the sum of strategy reports across the five quantitative contexts; and QUALSTRT, the sum of strategy reports across the five qualitative contexts.

Test of H5: *Quantitative and qualitative time strategies will be positively and significantly correlated.*

1. To determine of association between general quantitative and general qualitative time management measures, a Pearson correlation was computed between the composite variable, QUANSTRT and the composite variable QUALSTRT.

Chapter 4

Results

This Chapter is divided into two parts. Part I describes tests of the study's hypotheses. Part II examines additional analyses.

Part I: Tests of the Study Hypotheses

To determine the effectiveness across various levels of usage (wide-spread, intermediate, specific) of those variables which underlay particular hypotheses, study hypotheses were tested in the following manner:

Tests of total (or global) use of a variable were performed, usually on a full range of component variables. Then, tests on an intermediate range (fewer) of the variables were conducted. Lastly, tests of specific-level (individual or domain-specific) variables were performed.

Tests of H1: *High-achievers will significantly surpass low-achievers in their use of quantitative and qualitative time management measures.*

Hypothesis 1 was subjected to five analyses, all of which supported the hypothesis.

Test 1. To determine whether groups differed in their total strategy use, a *t*-test was performed on STRATOT, a composite variable formed by summing the TMCS items across all 18 learning contexts. Low-achieving subjects used a mean of 9.20 strategies, SD = 3.61, while the mean for high-

achieving subjects was 15.32 strategies, SD = 4.89. It was found that high-achievers used significantly more strategies than did low-achievers, $t(1,48) = 25.38$, $p < .01$.

Test 2. To determine whether groups differed in their strategy use relative to general quantitative time management, a t-test was performed on QUANSTRT, a composite variable formed by summing the five quantitative time use variables. Low-achievers reported a mean of 2.60 quantitative strategies, SD = 1.15. High-achievers had a mean of 4.12, SD = 1.54. It was found that high-achievers implemented significantly more quantitative time strategies than did low-achievers, $t(1,48) = 15.64$, $p < .01$.

Test 3. To determine whether groups differed in their strategy use relative to general qualitative time management, a t-test was performed on QUALSTRT, formed by summing the five qualitative time use variables. Low-achievers used a mean of 2.60 qualitative strategies, SD = 1.47. High-achievers had a mean of 4.40, SD = 1.66. It was found that high-achievers implemented a significantly greater number of qualitative time strategies than did low-achievers, $t(1,48) = 16.47$, $p < .01$.

Test 4. To determine whether groups differed in their strategy use relative to specific quantitative variables, t-tests were run separately on the five quantitative variables. Results showed that groups differed significantly on three of the five quantitative variables, as seen in Table 1.

Test 5. To determine whether groups differed in their strategy use relative to specific qualitative variables, *t*-tests were run separately on the five qualitative variables. Groups differed significantly on four of the five qualitative variables, as Table 1 shows.

TABLE 1

Results of *t*-Tests of Strategy Use By Achievement Group Across Five Quantitative and Five Qualitative Learning Contexts
(DF = 1, 48)

Quantitative Strategies

Variable	High-Group Mean N of Strategies	Low-Group Mean N of Strategies	Difference in Means
TUFASTRA	.52	.12	.40 **
REFASTRA	.64	.52	.12 n.s.
WRFASTRA	.92	.80	.12 n.s.
CIFASTRA	1.00	.56	.44 **
RFFASTRA	1.04	.60	.44 ***

Qualitative Strategies

Variable	High-Group Mean N of Strategies	Low-Group Mean N of Strategies	Difference in Means
TUBESTRA	.96	.60	.36 *
REBESTRA	.72	.32	.40 *
WRBESTRA	.92	.68	.24 n.s.
CIBESTRA	.92	.52	.40 *
RFBESTRA	.88	.48	.40 **

The common suffix "STRA" refers to strategy use. The prefixes refer to the context. TUFA = Time Use Faster; TUBE = Time Use Better; REFA = Reading Faster; REBE = Reading Better; WRFA = Writing Faster; WRBE = Writing Better; CIFA = Comprehending Ideas Faster; CIBE = Comprehending Ideas Better; RFFA = Remembering Facts Faster; RFBE = Remembering Facts Better. * $p < .05$; ** $p < .01$; *** $p < .001$

The results of these fourth and fifth tests demonstrated that on those TMCS items related specifically to

quantitative and qualitative strategy use, high-achievers used significantly more strategies than did low-achievers in seven of the ten quantitative and qualitative contexts. These findings are interpreted as supporting Hypothesis 1. Therefore, all five tests confirmed Hypothesis 1.

Tests of H2: *High-achievers will significantly surpass low-achievers in their perceived self-efficacy to manage time.*

Five analyses were conducted to test Hypothesis 2. All five tests supported the hypothesis.

Test 1. To determine whether groups differed in their general self-efficacy perceptions, a *t*-test was conducted on SEFFTOT, the composite variable formed by summing student self-efficacy perceptions across S-ESS items; that is, across the 16 of 18 learning contexts that called for self-efficacy judgments. The mean total score for low-achievers was 104.68, SD = 23.45. For high-achievers, the mean total score was 127.84, SD = 11.63. It was found that high-achievers had significantly greater perceived self-efficacy to perform global time management strategies than did low-achievers, $t(1,48) = 19.57$, $p < .01$.

Test 2. To determine whether groups differed in their self-efficacy perceptions relative to quantitative time use, a *t*-test was performed on QUANSEFF, a composite variable formed by summing the five self-efficacy items associated with quantitative time use. The mean total for low-

achievers was 32.64, SD = 7.03. High-achievers had a mean total of 39.05, SD = 4.14. It was found that high-achievers perceived themselves able to implement quantitative time strategies to a significantly greater extent than did low-achievers, $t(1,48) = 15.39$, $p < .01$.

Test 3. To determine whether groups differed in their self-efficacy perceptions relative to qualitative time use, a t-test was performed on QUALSEFF, a composite variable formed by summing the five self-efficacy items associated with qualitative time use. The mean total for low-achievers was 30.68, SD = 9.05. High-achievers had a mean total of 38.32, SD = 4.63. It was found that high-achievers perceived themselves able to implement qualitative time strategies to a significantly greater extent than did Low-achievers, $t(1,48) = 14.12$, $p < .01$.

Test 4. To determine whether groups differed in their self-efficacy perceptions of strategy use relative to specific quantitative variables, t-tests were run separately on the five quantitative variables. Groups differed significantly on four of the five quantitative variables, as shown in Table 2.

Test 5. To determine whether groups differed in their self-efficacy perceptions of strategy use relative to specific qualitative variables, t-tests were run separately on the five qualitative variables. Groups differed significantly on all five qualitative variables, as Table 2 shows.

TABLE 2

Results of t-Tests of Self-Efficacy Perceptions By Achievement Group Across Five Quantitative and Five Qualitative Self-Efficacy Contexts (DF = 1, 48)

Quantitative Strategies

Variable	High-Group Mean Self-Eff Score	Low-Group Mean Self-Eff Score	Difference in Means
TUFASEFF	7.24	6.24	1.00 *
REFASEFF	7.92	6.56	1.36 **
WRFASEFF	7.92	7.28	0.64 n.s.
CIFASEFF	8.04	6.40	1.64 **
RFFASEFF	7.92	6.16	1.76 ***

Qualitative Strategies

Variable	High-Group Mean Self-Eff Score	Low-Group Mean Self-Eff Score	Difference in Means
TUBESEFF	7.96	5.92	2.04 ***
REBESEFF	7.40	5.88	1.52 **
WRBESEFF	7.64	6.28	1.36 *
CIBESEFF	7.48	6.28	1.20 *
RFBESEFF	7.84	6.32	1.52 ***

* $p < .05$; ** $p < .01$; *** $p < .001$

Outcomes of the fourth and fifth tests demonstrated that on those S-ESS items related specifically to self-efficacy perceptions of quantitative and qualitative strategy use, high-achievers had significantly higher estimations of their ability to implement such strategies than did low-achievers in nine out of the ten contexts. These latter tests are interpreted as supportive of Hypothesis 2. Therefore, these five tests confirmed Hypothesis 2.

Tests of H3: *Students' self-efficacy measures will correlate with time management measures.*

Four correlational analyses were computed among self-efficacy measures and time management measures to test Hypothesis 3. The first and second tests, each a single correlation, supported the hypothesis. The third test, a set of correlations, was inconclusive. The fourth test, another set of correlations, supported the hypothesis.

Test 1. To determine the association between global self-efficacy measures and global strategy use, a Pearson correlation was computed between the composite variables, SEFFTOT, the sum of self-efficacy perceptions across all contexts, and STRATOT, the sum of strategy reports across all contexts. The correlation was $r = .55$, $p < .01$. This result is interpreted as confirming Hypothesis 3.

Test 2. To determine the association between the composite variable SEFFTOT, the sum of all self-efficacy perceptions, and the composite variable, TIME, the sum of the five *category* variables pertaining to time: Time Monitoring, Time Estimating, Goal Setting, Task Ordering, and Rescheduling, a Pearson correlation was calculated. The correlation was $r = .42$, $p < .01$. This result is interpreted as confirming Hypothesis 3.

Test 3. To test the association between self-efficacy measures and quantitative and qualitative time measures, Pearson correlations were computed between specific self-efficacy items and their corresponding quantitative and

qualitative time management strategies. Results of these calculations are shown in Table 3.

TABLE 3

Pearson Correlations Between Self-Efficacy Measures And Corresponding Quantitative and Qualitative Time Use Measures

Quantitative Dimensions

Correlations:	TUFASTRA	REFASTRA	WRFASTRA	CIFASTRA	RFFASTRA
TUFASEFF	.36*				
REFASEFF		.05			
WRFASEFF			.15		
CIFASEFF				.47**	
RFFASEFF					.29

Qualitative Dimensions

Correlations:	TUBESTRA	REBESTRA	WRBESTRA	CIBESTRA	RFBESTRA
TUBESEFF	.36*				
REBESEFF		.32			
WRBESEFF			.36*		
CIBESEFF				.28	
RFBESEFF					.53**

1-tailed Significance: * - .01 ** - .001

Table 3 demonstrates that results of these tests were inconclusive. In five of the ten instances, the correlation between a specific self-efficacy item and its corresponding quantitative or qualitative time management measure was significant. In just as many cases, corresponding self-efficacy and quantitative or qualitative measures did not correlate at a significant level. These results are interpreted as neither confirming nor refuting Hypothesis 3.

Test 4. To determine the association among subjects' self-efficacy perceptions and strategy use relative to quantitative and qualitative time use, Pearson correlations were computed among the four composite variables, QUANSTRT, QUALSTRT, QUANSEFF, and QUALSEFF. Six correlations were produced, as shown in Table 4.

TABLE 4

Pearson Correlations Among The Composite Variables Related to Quantitative and Qualitative Strategy Use And Quantitative and Qualitative Self-Efficacy (N = 50)

Correlations:	QUANSTRT	QUALSTRT	QUANSEFF	QUALSEFF
QUANSTRT	1.00			
QUALSTRT	.77**	1.00		
QUANSEFF	.51**	.58**	1.00	
QUALSEFF	.46**	.53**	.84**	1.00

1-tailed Significance: * - .01 ** - .001

As Table 4 demonstrates, all four variables were significantly related to each other, $p < .01$. These findings are interpreted as supportive of the proposition that quantitative and qualitative self-efficacy measures are correlated with their corresponding time management measures.

The results of Test 1, Test 2, and Test 4--all involving component variables--supported Hypothesis 3. The results of Test 3--which tested associations between specific self-efficacy judgments and corresponding quantitative and qualitative strategies--were inconclusive. Given these findings, it was determined that the tests of hypothesis 3 supported the hypothesis.

Tests of H4: *A significant correlation will be found between teacher ratings of student time use effectiveness and student self-reported strategy use.*

Test 1. To determine the association between teacher ratings of student time use and student self-reports, a Pearson correlation was calculated between the composite variables TOSCORE, the sum of teacher ratings of student time use and three variables associated with student time use: STRATOT, the sum of strategy reports across all learning contexts; QUANSTRT, the sum of strategy reports across the five quantitative contexts; and QUALSTRT, the sum of strategy reports across the five qualitative contexts. Table 5 reports the correlations obtained.

TABLE 5

Pearson Correlations Between Teacher Ratings of Students' Time Use and Three Measures of Students' Strategy Reports

Correlations:	STRATOT	QUANSTRT	QUALSTRT
TOSCORE	.61 **	.50 **	.55 **

1-tailed Significance: * - .01 ** - .001

As can be seen from Table 5, all three correlations between teacher ratings of student time use and student total, quantitative, and qualitative self-reported strategy use were found to be statistically significant, $p < .01$. These findings confirm Hypothesis 4.

Tests of H5: *Quantitative and qualitative time strategies will be positively and significantly correlated.*

To determine the association between quantitative and qualitative time strategies, a Pearson correlation was calculated between the composite variables, QUANSTRT, the sum of strategy reports across the five quantitative contexts, and QUALSTRT, the sum of strategy reports across the five qualitative contexts. This correlation was $r = .77$, $p < .01$. This finding confirms Hypothesis 5.

Part II: Additional Analyses

Results of hypothesis tests represent only a portion of the study. Part II addresses information not yet treated and is divided into two sections. Section A presents results of tests indirectly related to the hypotheses. Section B handles important questions unanswered by hypothesis testing. Taken together, Sections A and B present additional analyses which add to the study's import.

Section A: Tests Not Directly Related to Study Hypotheses.

Although no hypotheses were tested in this Section, significance tests were performed on two variables: homework time assigned to students and actual time students spent doing homework. In addition, time management strategies related to self-regulation categories were examined in this Section.

Homework Time Assigned. Of interest in this study was the amount of daily homework assigned to students. To determine whether groups differed on amount of homework assigned, reported homework times were subjected to a *t*-test. Results revealed that low-achievers were assigned a mean of 3.35 hours of homework per night, SD = 1.02, while the mean for high-achievers was 3.74 hours, SD = .86. It was found that the amount of homework assigned did not differ significantly between groups, $t(1,48) = 2.14$, $p < .15$.

Actual Homework Time. In comparison with homework time assigned, actual time spent doing homework varied significantly between groups. This finding was obtained in the following manner: Data on actual homework time were scrutinized by a *t*-test. Low-achievers reported a mean of 2.42 hours, SD = 1.08, spent on homework each evening, whereas high-achievers reported 3.77 hours, SD = 1.08. It was found that high-achievers spent significantly more time doing homework than did low-achievers, $t(1,48) = 19.58$, $p < .01$.

Self-Regulation Strategies Associated With Time.

Hitherto, strategy use has been described along the *contexts* dimension of this study. However, there remains a *categories* dimension that bears investigation.

Test 1. To determine whether groups differed with respect to global use of all self-regulation strategies, the 15 strategy categories were combined into the variable

SRCATEGS and a *t*-test between groups was performed. The mean number of SR strategies used by low-achievers was 9.28, SD = 3.53; for high-achievers the mean was 15.32, SD = 4.88. It was found that high-achievers used significantly more self-regulation strategies that did low-achievers, $t(1,48) = 25.09$, $p < .01$. These results mirrored the *t*-test of the STRATOT variable along the contexts dimension.

The 15 self-regulation categories can be seen as comprising two separate sets of strategies, five that pertain directly to time management and ten that relate to more general self-regulation and less directly to time management.

Test 2. To determine whether groups differed with respect to broad use of time-related self-regulation categories, the five variables pertaining directly to time (Time Monitoring, Time Estimating, Goal Setting, Task Ordering, and Rescheduling) were combined into a composite variable labeled TIME. Groups were then compared on this variable. The mean for low-achievers on the TIME variable was 3.68, SD = 1.97; for high-achievers the mean was 5.68, SD = 2.48. It was found that groups differed significantly in their use of self-regulation categories directly related to time, $t(1,48) = 9.96$, $p < .01$.

Test 3. The ten remaining self-regulation category variables (Record Keeping, Environmental Structuring, Comprehension Checking, Self-quizzing, Anticipating Test Questions, Rehearsing/Memorizing, Self-monitoring, Self-

consequating, Help-seeking, and Stress Management) were combined into one general self-regulation variable, indirectly related to time, called SELFREG. Groups were then compared on this variable. Low-achievers demonstrated a mean of 5.60 SELFREG strategies, SD = 2.52, while the high-achiever mean was 9.64, SD = 3.40. It was found that groups differed significantly in their use of general self-regulation strategies indirectly related to time, $\underline{t}(1,48) = 22.78$, $\underline{p} < .01$.

Test 4. A Pearson correlation was calculated between the composite variable TIME, the sum of the five *category* variables pertaining to time, and SELFREG, the sum of all self-efficacy perceptions. The Pearson correlation between TIME and SELFREG, was .72, $\underline{p} < .01$. Earlier, it was seen that the Pearson correlation between TIME and SEFFTOT was .42, $\underline{p} < .01$. (See Hypothesis 3, Test 2).

Test 5. As a post-hoc exam of Tests 1-3, above, a Discriminate Function Analysis was performed on the 15 self-regulation strategies, to determine their relative importance in discriminating between groups. A single function was produced having a multiple correlation with group membership of $\underline{R} = .70$, $\underline{p} < .05$. The discriminate function correctly classified 84% of the cases. The pooled within-groups correlations between the variables and the discriminant function is shown in Table 6.

TABLE 6

Pooled Within-Groups Correlations Between Fifteen Self-Regulation Strategy Variables and Canonical Discriminant Function (Variables Ordered by Size of Correlation within Function)

	FUNCTION 1
SRREHMEM	.49
SRMOTIV	.39
TTASKORD	.36
SRSTRESS	.35
SRHELPSK	.31
SRCONSEQ	.31
TGOALSET	.27
SRENVIRN	.25
TIMONITR	.24
SRCOMPCK	.24
TIMESTIM	.20
SRSLFQIZ	.15
SRTESTQS	.15
SRECKEEP	-.13
TIMSCHED	.00

The prefix "T" (also "TI" or "TIM") represents self-regulation strategies directly related to time use. The prefix "SR" represents self-regulation strategies indirectly related to time management. The suffixes (in descending order) are: REHMEN = Rehearsing/Memorizing; MOTIV = Self-Motivating; TASKORD = Task Ordering; STRESS = Stress Managment; HELPSK = Help-Seeking; CONSEQ = Self-Consequating; GOALSET = Goal-Setting; ENVIRN = Environmental Structuring; MONITR = Self-Monitoring; COMPCK = Comprehension Checking; TIMESTIM = Time Estimating; SLFQIZ = Self-Quizzing; TESTQS = Anticipating Test Questions; RECKEEP = Record Keeping; TIMSCHED = Re-Scheduling.

One method of assessing the contribution of a variable to the discriminant function is to examine the correlation between the variable and the function. The pooled within-groups correlations shown in Table 6 are the correlations between each of the 15 *category* variables and the discriminant function produced from them. The variables are rank-ordered and show in descending order the relative contribution of each variable to the discriminant function. Variables with low values have a weak association with the function, and their effects tend to be unstable.

Section B: Other Tests--Scale Properties

In an effort to establish the properties of the S-ESS and TOS, two analyses were performed.

Test 1. To determine whether the S-ESS could be condensed into distinct underlying constructs, the S-ESS items were factor analyzed. Principal-components analysis, followed by oblique rotation, produced three factors, which accounted for 68% of the variance. However, 53% of the total variance was accounted for by the first factor, 8.5% by the second factor, and 6.5% by the third. It was therefore concluded that the S-ESS is essentially a one-factor scale. Results of this analysis are shown in Table 7.

TABLE 7

Factor Matrix of S-ESS Items Following Factor Analysis and Oblique Rotation

Factor Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
TSSEFF	.75	.37	.28
ARSEFF	.59	.42	.36
AOSEFF	.81	-.39	.09
TUFASEFF	.61	.29	-.17
TUBESEFF	.83	.06	.18
REFASEFF	.69	.28	-.25
REBESEFF	.79	.16	-.13
WRFASEFF	.58	.30	-.40
WRBESEFF	.77	.20	-.37
CIFASEFF	.79	-.41	.10
CIBESEFF	.77	-.47	.04
RFFASEFF	.81	-.40	-.08
RFBESEFF	.83	-.05	-.16
COPESEFF	.76	-.18	.16
MOTISEFF	.69	.19	.40
BRAKSEFF	.65	-.13	-.35
ENGGRADE	.57	.11	.31

Examination of Factor 1 in Table 7 shows highest loadings (.79 or higher) among two sets of self-efficacy variables. The first set involved self-efficacy for the *mechanics* of time management: Assignment Ordering (.81) and Time Use Better (.83). The second set involved self-efficacy related to *specific learning domains*: Reading Better (.79), Comprehending Ideas Faster (.79), Remembering Facts Faster (.88), and Remembering Facts Better (.83). By contrast, the highest loading, excluding negative values with dubious interpretation, for Factor 2 was .42 and for Factor 3, .40. As pointed out above, Factor 1 accounted for 78% of the variance specified by the three factors.

Test 2. To determine the extent to which TOS scores could predict achievement group membership, TOS items were subjected to discriminate function analysis. A single discriminate function was produced, which had a canonical correlation with TOS items of $R = .96$, $p < .01$. This function correctly classified 100% of the cases.

Chapter 5

Discussion

Methodology

As noted at the outset, prior studies of time management have been scant, have often obscured the underlying processes (e.g., Morgan, 1985), and have seldom been guided by a clear self-regulation model of learning (e.g., Britton & Tesser, 1991; Kleijn, van der Ploeg, & Topman, 1994). In addition, preceding studies have not distinguished between quantitative and qualitative dimensions of time use.

The present study sought to address these deficiencies by focusing on subjects' specific quantitative and qualitative time management strategies actuated in settings of time constraint. Thus, the TMCS repeatedly asked subjects to elucidate their actions under the condition, "If you have limited time [to complete a learning task]." In doing so, the study tied subjects' responses to self-regulation categories that are well established in learning literature (Zimmerman & Martinez-Pons, 1986; 1988).

Prior research on time use, furthermore, relied upon data collected by Likert-type questionnaire items (Britton & Tesser, 1991; Macan, Shahani, Dipboye, & Phillipps, 1990). As Zimmerman and Martinez-Pons (1986) discovered in their self-regulation research, the use of Likert-type questions produced extensive evidence of social desirability and low

levels of variability in the answers they obtained (Zimmerman & Martinez-Pons, 1995). These findings raised methodological questions concerning the suitability of Likert-scale questionnaire items in the collection of self-reported time use data.

The present study sought to obviate these methodological problems through the use of a structured interview which had two critical advancements over a Likert-scale. First, it attempted to eliminate the social desirability of certain responses by not presenting them as choices to subjects. Students in this study were "on their own" in formulating answers, a situation, Zimmerman and Martinez-Pons (1995) concluded, that was "particularly suitable for studying a form of learning that involves student agency, initiative and self-direction" (p. 7).

Secondly, the structured questionnaire used in this study scripted the interviewer's comments so as to provide for a full range of variability in subjects' responses. Follow-up "probes" were included to elicit answers from uncommunicative subjects, on the one hand, but to delimit the range of interviewer comments, on the other.

An additional flaw seen in prior research was the lack of any means of validating the accuracy of self-reported Likert-scale items. The present study addressed this issue through the use of the TOS, which not only discriminated between low- and high-achievers with 100% accuracy, but the

results of which were highly correlated with global, quantitative, and qualitative strategy use.

Each of the scales used in this study demonstrated a high level of reliability. Moreover, subjects' responses were easily interpretable, as seen in the high inter-rater agreement quotient.

The subjects of this study represented the upper and lower quarters of an all-girls metropolitan high school. The school operates under an explicit policy of dismissing students who fail more than one course in a semester. The study's low achievers had a mean English grade of 74.64, which rounds to a C+ average. Because of exclusion of the lower end of the achievement range, this sample, therefore, provided a more stringent test of the study's hypotheses than would occur in a normally distributed population.

Time Adequacy and Underlying Assumptions

Before addressing the results of hypothesis tests, a prior question merits discussion. This is the issue of assigned homework time versus time actually spent doing homework. Statistical tests showed that low- and high-achievers did not differ on amount of homework assigned but did differ on amount of time actually spent doing homework. It will be recalled that low-achievers reported a mean of 2.42 hours doing homework each evening, while high-achievers reported 3.77 hours. The additional 1.35 hours spent by high-achievers each evening, 56% more than the low-achiever mean, speak loudly to the issue of adequacy of study time.

The accumulated effect of a time advantage of this magnitude accounted for a considerable portion of the difference between achievement groups.

But the rationale of the present study goes beyond study time quantity. It was also assumed that how students studied, and their perceptions of their ability to study, are significant variables in predicting achievement. It was further assumed that quantity and quality of study time were strongly related. As reported, these assumptions (Hypotheses 1, 2, and 5) were confirmed.

Tests of the Study Hypotheses

The tests of each hypothesis were arranged in a general-to-specific pattern. Each of the five hypotheses of the study were confirmed.

Hypothesis 1 predicted that high-achievers would surpass low-achievers in their use of quantitative and qualitative study time. Hypothesis testing proceded from global strategy use, to domain-specific strategy use, to global quanitative and qualitative strategy use, to specific quantitative and qualitative strategy use. Thus, hypothesis 1 was subjected to five tests, each of which lent strong support for the hypothesis. These findings, consistent across all five tests, make it clear that high-achievers used significantly more quantitative and qualitative time management strategies than did low-achievers.

This conclusion is significant because prior research has been silent regarding the distinction between

quantitative and qualitative time use. These findings indicate both the singularity of each time dimension and the availability of new, reliable instruments used to measure them.

Hypothesis 2 predicted that high-achievers would surpass low-achievers in their perceived self-efficacy to manage time. The phenomenon of self-efficacy is critical to any discussion of student achievement, because increasingly scholarship reveals the correlation between self-efficacy perceptions and achievement (Zimmerman & Martinez-Pons, 1986, 1988, 1990, 1992).

Hypothesis 2 was subjected to five tests, extending from general to specific, with outcomes similar to those of hypothesis 1: all five analyses confirmed this hypothesis. These results, across a spectrum of general to specific tests, demonstrate the strong association between student perceptions of their self-efficacy and their achievement group membership. These findings highlight once again the pivotal role that self-efficacy perceptions play in academic learning.

Although Likert-type questionnaires have decided shortcomings, factor analyses of questionnaire item sets have revealed that the most predictive items of academic achievement in these scales involved self-perceived ability to manage. Britton and Tesser (1991) labeled this perceived ability a self-efficacy factor, a variable that has been found to be closely associated with students' learning

strategies (Zimmerman & Martinez-Pons, 1986; 1988). The strong support for hypothesis 2 demonstrated by the five tests extends Britton and Tesser's questionnaire research and confirms the close association between perceived self-efficacy and achievement demonstrated by Zimmerman and Martinez-Pons.

Hypothesis 3, the prediction that self-efficacy measures would correlate with time management measures, was subjected to four tests. Except for the third test, which was inconclusive, all tests supported the hypothesis. Test 3, ten Pearson correlations between self-efficacy measures and corresponding quantitative and qualitative time use measures, generated five correlations that were significant and five which were not. These correlations would have been strengthened had the study been conducted with a more normally distributed sample. That all other hypothesis tests reached significance is testimony to the robustness of the associations tested.

Hypothesis 4, the relationship between teacher ratings of students' time use effectiveness and students' self-reported time management, proved highly significant across the three categories tested. These were correlations between teacher ratings and total strategy use, quantitative strategy use, and qualitative strategy use. Hypothesis 4, therefore, confirmed students' self-reports of their time use.

Hypothesis 5, which predicted that quantitative and qualitative time measures would be positively and significantly correlated, was confirmed with a potent $r = .77$, $p < .01$. This test was important because it demonstrated the very strong association between quantitative and qualitative time management. This finding suggests that successful learners not only know how to provide for adequacy of time, as discussed earlier. They also know how to maximize the effectiveness of the time they supply to themselves.

Other Tests

It will be recalled that data scoring fell across a two-dimensional grid with one axis labeled *contexts* and the other *categories*. The 15 self-regulation categories were partitioned into two parts: five TIME variables and ten general SELFREG variables.

One (non-hypothesis) test is especially noteworthy. This is the Pearson correlation between TIME and SELFREG, which was .72, $p < .01$. This correlation indicated that time management strategies are strongly linked to other, non-time related learning strategies. Such a link suggests that training efforts may assist non-strategic learners to improve their performance.

Further Research

Results of this study highlight the strong relationships between academic achievement, time use, and self-efficacy.

These associations do not suggest causality but they do offer a rich potential for future research.

If anything, the results here underestimate the nature of the associations among these variables. To probe the true strength of these relationships, one prospective study would be the replication of these findings using low-achievers with averages in the below-C range.

The relationship between time use and self-efficacy to manage time was examined in the present study. Still to be explored is the relationship between self-efficacy to manage time and self-efficacy to achieve academically. Such a relationship suggests training in time use effectiveness. Could it be that such training might promote higher achievement? Would such achievement gains be limited to either achievement group?

Even though the hypotheses which propelled this study were confirmed, interesting and important questions remain regarding the students' time management strategy practices. Such questions include:

1. What specific strategies are linked with particular learning contexts?
2. Are there any "universal" time management variables that affect learning outcomes?
3. Are strategies used to focus on qualitative time management different from those used to focus on quantitative time management?

The present study was conducted on the basis that there was need for a study which: (a) was linked to a comprehensive SRL model; (b) was based upon students' perceptions derived from their normal assignments; (c) used a data-collection method that minimizes response bias; (d) examined specific time management strategies which had been utilized by students; (e) evaluated associations between time strategy use and self-efficacy perceptions; (f) evaluated associations between time strategy use and academic achievement; and (g) evaluated associations between quantitative and qualitative time management dimensions. Confirmation of significant positive correlations regarding hypotheses (e) through (g) represent important new contributions to the literature.

Implications for Instructional Practice

Several implications for instructional practice can be deduced from this study. These include the following:

1. That students' time use directly affects the quality and quantity of their schoolwork and their subsequent achievement.
2. That students' self-monitoring of their time use strategies can help them improve their use of time.
3. That teachers need to give proper attention to their students' use of study time.
4. That by promoting student awareness of Item 1, teachers can help students grasp that *how* they use

their study time is as important as *how much* time they use.

5. That training efforts can begin with self-monitoring of time use strategies and ascriptions to learning success therefrom. One way that teachers can help students to self-regulate their study time is by assigning students to:
   a. monitor their time quantity, strategies, and achievement; and
   b. compare (in small groups) the results of 5a.

To manage time is to direct the singlemost resource that defines our humanity. To manage time in the pursuit of learning is to give our humanity the wings with which to attain our greatest potential.

Appendix A
Permission to Conduct Research

SCHOOL

October 14, 1996

Robert Kovach
86-15 Broadway
Elmhurst, NY 11373

Re: Dissertation Study

Dear Mr. Kovach:

I hereby grant you permission to conduct your dissertation study on "Academic Achievement and the Self-Regulation of Study Time: Quantitative and Qualitative Dimensions" at School.

I understand that will be your principal investigator and that she will ask participating students questions regarding their time and strategy use during self-study sessions, the answers to which will be audio tape-recorded for transcription and later analysis. As you will need prior course grade and achievement scores for participating students, you have my permission to obtain these data which I understand you will code and keep strictly confidential.

It is also my understanding that you will be willing to share your completed findings with interested members of the School community.

Yours sincerely,

Principal

Appendix B
Parent/Student Consent Form

Dear Parent,

I am a doctoral candidate in the Department of Educational Psychology at the City University of New York and am currently working on my dissertation. I have received the permission of , Principal, to work with the tenth-grade students at School and would like your daughter to participate in a project on students' studying methods.

The project will take place at School during school hours. The purpose of the project is to gain information on the methods high school students use when they study. My assistant will ask students what they think and do when they go about studying. To make sure no information is lost, the session will be audio tape recorded and your child's anonymity will be protected. To complete this project, I would also like permission to obtain your child's most recent social studies grades and achievement scores.

Your daughter'sparticipation is completely voluntary and will in no way affect her grades in school. Once the data are coded, all names will be deleted so that students' identities cannot in any way be revealed. All information obtained will be kept strictly confidential. Your child's anonymity will be carefully protected, and your child will be free to withdraw from participating at any time.

If you give permission for your daughter to participate, and she agrees also, please sign below.

Thank you.

Robert Kovach

I agree to participate in this project.

Date_____

Parent's Signature _____

Student's Signature_____

Appendix C:
Time Management Contexts and Self-Efficacy for Studying Scales[1]

1. In order to complete your daily homework or studying, do you have any method to help you set aside sufficient time? What if your teacher assigned you more homework than usual?

   On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that you will be able to set aside sufficient time to complete your daily homework or studying?

2. Do you have any method to make sure you don't forget to do all your daily assignments or studying? What if your teacher assigned you more homework than usual?

   On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that you will not forget to do all your daily assignments or studying?

3. If you have limited time for studying, do you do your assignments in any particular order? What if your teacher assigned you more homework than usual?

   On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that you will be able to do your assignments in the order best for you?

4a. If you have limited time for studying, do you have any method to tell when you are using your time efficiently (i.e., not wasting time)?
4b. Do you have any way to be sure you that are studying *faster*?
4c. Do you have any way to be sure that you are studying *better*?

   On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that you will be able to study faster? How sure are you that you will be able to study better?

5a. If you have limited time for your assigned readings, do you have any method for reading *faster*? What if your teacher assigned you more homework than usual?

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that, when you have limited time to complete assigned readings, you will be able to read faster?

5b. If you have limited time for your assigned readings, do you have any method for reading *better*? What if your teacher assigned you more homework than usual?

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that, when you have limited time to complete assigned readings, you will be able to read better?

6a. If you have limited time for writing a paper, do you have any method for writing it *faster*? What if your teacher assigned you a difficult topic?

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that, when you have limited time for writing a paper, you will be able to write it faster?

6b. If you have limited time for writing a paper, do you have any method for writing it *better*? What if your teacher assigned you a difficult topic?

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that, when you have limited time for writing a paper, you will be able to write it better?

7a. If you have limited time for studying, do you have any method for comprehending ideas *faster*? What if your teacher assigned you more homework than usual.

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that, when you have limited time for comprehending ideas, you will be able to absorb ideas faster?

7b. If you have limited time for studying, do you have any method for comprehending ideas *better*? What if your teacher assigned you more homework than usual.

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that, when you have limited time for comprehending ideas, you will be able to absorb ideas better?

8a. If you have limited time for studying, do you have any method for remembering facts *faster*? What if your teacher assigned you more homework than usual.

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that, when you have limited time for studying, you will be able to remember facts faster?

8b. If you have limited time for studying, do you have any method for remembering facts *better*? What if your teacher assigned you more homework than usual.

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that, when you have limited time for studying, you will be able to remember facts better?

9. When you are doing your homework or studying and are not making sufficient progress to complete the homework or studying by bed time, do you have any method to help you cope? What if your teacher assigned you more homework than usual?

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that you will be able to cope when you are not making sufficient progress to complete your homework or studying by bed time?

10. Many times students have difficulty completing homework assignments because there are other, more enjoyable things they would rather do, such as watch TV, daydream, or talk with friends. Do you have any method for motivating yourself to complete your homework assignments under these circumstances? What if you are trying to meet a deadline?

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that you will be able to motivate yourself to do your homework assignments when there are other, more enjoyable things you would rather be doing?

11. Many times students feel they need to take breaks from studying. How important are breaks to you? Do you have any method for including breaks without disrupting your studying?

On a scale of 1 - 10, where 1 is "lowest" and 10 is "highest," how sure are you that you will be able to take breaks without disrupting your studying?

12. To understand how you go about studying, we have covered setting aside sufficient time, making sure you don't forget to do your daily assignments, putting assignments in any particular order, studying better and faster, reading better and faster, writing better and faster, comprehending ideas better and faster, remembering facts better and faster, coping when you are not making sufficient progress, motivating yourself when you would rather be doing other things, and taking time for "breaks." Is there any other aspect of your studying that is important that you do that we have not covered?

[1]Based upon free response, structured interview methodology in Zimmerman, B. J., and Martinez-Pons, M. (1988). Construct validation of a strategy model of student self-regulated learning. Journal of Educational Psychology, 80, 284-290.

Appendix D:
Teacher Observation Scale

Student:_____ Course:_____

Directions: Please describe your impressions of the student named above by using the numbers 1 - 5 to indicate your answer to each of the items listed below. Use only WHOLE NUMBERS, not fractions or decimals. All responses will be kept strictly confidential.

1	2	3	4	5
VERY LOW (very rarely)	FAIRLY LOW (infrequently)	MEDIUM (sometimes)	FAIRLY HIGH (often)	VERY HIGH (almost always)

_____ 1. To what extent does this student write down assignments you have made?

_____ 2. To what extent does this student hand work in on time?

_____ 3. To what extent is this student's work completed thoroughly?

_____ 4. To what extent does this student convey knowledge of assigned readings *in class*?

_____ 5. To what extend does this student convey knowledge of assigned readings *in written work*?

_____ 6. To what extent does this student complain about not enough time to finish assignments?

_____ 7. To what extent does this student complain about test items that were not anticipated?

Teacher's Initials:_____

REFERENCES

Anderson, C. A., & Jennings, D. L. (1980). When experiences of failure promote expectations of success: The impact of attributing failure to ineffective strategies. Journal of Personality, 48, 393-405.

Bandura, A. (1971). Social learning theory. New York: General Learning Press.

Bandura, A. (1982). Self-efficacy mechanisms in human agency. American Psychologist, 37, 122-148.

Bandura, A. (1986). Social foundations of thought and action. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. American Psychologist, 44, 1179-1184.

Block, J. H. (1971). Mastery learning: Theory and practice. New York: Holt, Rinehart & Winston.

Borkowski, J. G., Carr, M., Rellinger, E., & Pressley, M. (1990). Self-regulated cognition: Interdependence of metacognition, attributions, and self-esteem. In B. F. Jones & L. Idol (Eds.), Dimensions of thinking and cognitive instruction (pp. 53-92). Hillsdale, NJ: Erlbaum.

Brigham, T. A. (1982). Self-management: A radical behavioral perspective. In P. Karoly & F. H. Kanfer (Eds.), Self-management and behavior change: From theory to practice (pp. 32-59). New York: Pergamon.

Bristol, M. M., & Sloane, H. N. (1974). Effects of contingency contracting on study rate and test

performance. Journal of Applied Behavioral Analysis, 7, 271-285.

Britton, B. K., & Tesser, A. (1991). Effects of time-management practices on college grades. Journal of Educational Psychology, 83, 405-410.

Brown, A. L., Bransford, J. D., Ferrara, R. A., & Campione, J. C. (1983). Learning, remembering, and understanding. In P. H. Mussen (Ed.), Handbook of child psychology, 4th Ed., (Vol. 3: J. H. Flavell & E. M. Markman (Eds.)), (pp. 77-166). New York: Wiley.

Carroll. J. B. (1963). A model of school learning. Teachers College Record, 64, 723-733.

Corno, L. (1987). Teaching and self-regulated learning. In D. C. Berliner & B. V. Rosenshine (Eds.), Talks to teachers. New York: Random House.

Cronback, L. J. (1957). The two disciplines of scientific psychology. American Psychologist, 12, 671-684.

Davydov, V. V., & Raddzikhovski, L. A. (1985). Vygotsky's theory and the activity-oriented approach in psychology. In J. Wertsch (Ed.), Culture, communication, and cognition: Vygotskian perspectives. New York: Cambridge University Press.

Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. American Psychologist, 34, 906-911.

Gall, M. D. (1988). Making the grade. Rocklin, CA: Prima.

Gettinger, M. (1984). Achievement as a function of time spent learning and time needed to learn. American Educational Research Journal, 21, 617-628.

Gettinger, M. (1985). Time allocated and time spent relative to time needed for learning as determinants of achievement. Journal of Educational Psychology, 77, 3-11.

Ghatala, E. A., Levin, J. R., Foorman, B. R., & Pressley, M. (1989). Improving children's regulation of their reading PREP time. Contemporary Educational Psychology, 14, 49-66.

Graham, E., & Crossen, C. (1996, March 8). The overloaded American: Too many things to do, too little time to do them. The Wall Street Journal, pp. R1, R4.

Hall, B. L., & Hursch, D. E. (1982). An evaluation of the effects of a time management training program on work efficiency. Journal of Organizational Behavior Management, 3, 73-96.

Harris, R. J. (1985). A primer of multivariate statistics (2nd ed.). Orlando: Academic Press.

Jackson, B., & Van Zoost, B. (1972). Changing study behaviors through reinforcement contingencies. Journal of Counseling Psychology, 19, 192-195.

Kanfer, F. H. (1977). The many faces of self-control, or behavior modification changes its focus. In R. B. Stuart (ed.), Behavioral self-management: Strategies,

techniques, and outcomes (pp. 1-48). New York: Brunner/Mazel.

Kanfer, F. H., & Gaelick. L. (1986). Self-management methods. In F. H. Kanfer & A. P. Goldstein (Eds.), Helping people change: A textbook of methods (3rd ed., pp. 283-345). New York: Pergamon.

King, A. C., Winett, R. A., & Lovett, S. B. (1986). Enhancing coping behaviors in at-risk populations: The effects of time-management instruction and social support in women from dual-earner families. Behavior Therapy, 17, 57-66.

Kleijn, W. C., van der Ploeg, H. K., & Topman, R. M. (1994). Cognition, study habits, test anxiety, and academic performance. Psychological Reports, 75, 1219-1226.

Kuhl, J. (1984). Volitional aspects of achievement motivation and learned helplessness: Toward a comprehensive theory of action-control. In B. A. Maher (Ed.), Progress in experimental personality research (Vol. 13). New York: Academic Press.

Le Ny, J., Denhiere, G., & Taillanter, D. (1972). Regulation of study-time and interstimulus similarity in self-paced learning conditions. Acta Psychologica, 36, 280-289.

Leonesio, R. J., & Nelson, T. O. (1987). A comparison of three measures of metamemory: Ease-of-learning judgments, judgments of knowing, and feeling-of-knowing judgments. Unpublished manuscript.

Leontiev, A. N., & Luria, A. R. (1968). The psychological ideas of L. S. Vygotsky. In B. B. Wolman (Ed.), Historical roots of contemporary psychology. New York: Harper & Row.

Longman, D. G., & Atkinson, R. H. (1988). College learning and study skills. St. Paul, MN: West.

Macan, T. H., Shahani, C., Dipboye, R. L., & Phillips, A. P. (1990). College students' time management: Correlations with academic performance and stress. Journal of Educational Psychology, 82, 760-768.

Mace, F. C., & Kratochwill, T. R. (1988). Self-monitoring: Applications and issues. In J. Witt, S. Elliott, & F. Gresham (Eds.), Handbook of behavior therapy in education (pp. 489-502). New York: Pergamon.

McCombs, B. (1989). Self-regulated learning and academic achievement: A phenomenological view. In B. J. Zimmerman & D. H. Schunk (Eds.), Self-regulated learning and academic achievement: Theory, research, and practice (pp. 51-82). New York: Springer-Verlag.

McCombs, B. L. (1984). The role of the self-system in self-regulated learning. Contemporary Educational Psychology, 11, 314-332.

Morgan, M. (1985). Self-monitoring of attained subgoals in private study. Journal of Educational Psychology, 77, 623-630.

Nelson, T. O., & Leonesio, R. J. (1988). Allocation of self-paced study time and the "labor-in-vain effect."

Journal of Experimental Psychology: Learning, Memory, and Cognition, 14, 676-686.

Paris, S. G., & Lindauer, B. K. (1982). The development of cognitive skills during childhood. In B. Wolman (Ed.), Handbook of developmental psychology (pp. 333-349). Englewood Cliffs, NJ: Prentice-Hall.

Pintrich, P. R., & DeGroot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. Journal of Educational Psychology, 82, 33-40.

Pintrich, P. R., & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom academic tasks. In D. H. Schunk & J. L. Meese (Eds.), Student perceptions in the classroom (pp. 149-183). Hillsdale, NJ: Erlbaum.

Pressley, M., & Ghatala, E. S. (1990). Self-regulated learning: Monitoring learning from text. Educational Psychologist, 25, 19-33.

Pressley, M., Snyder, B. L., Levin, J. R., Murray, H. G., & Ghatala, E. S. (1987). Perceived readiness for examination performance (PREP) produced by initial reading of text and text containing adjunct questions. Reading Research Quarterly, 22, 219-236.

Resnick, L. B. (1987). Constructing knowledge in school. In L. S. Liben (Ed.), Development and learning: Conflict or congruence. Hillsdale, NJ: Erlbaum.

Robinson, D. N. (1987). What moves us? A note on human motives. Paper presented at the annual meeting of the American Psychological Association, New York.

Sameroff, A. J. (1987). The social context of development. In N. Eisenberg (Ed.), Contemporary topics in developmental psychology. New York: Wiley.

Scardamalia, M., & Bereiter, C. (1986). Fostering the development of self-regulation in children's knowledge processing. In S. S. Chapman, J. W. Segal, & R. Glaser (Eds.), Thinking and learning skills: Current research and open questions (Vol. 2, pp. 563-577). Hillsdale, NJ: Erlbaum.

Schneider, W. (1985). Developmental trends in the metamemory-memory behavior relationship: An integrative review. In D. L. Forrest-Pressley, G. E. MacKinnon, & T. G. Waller (Eds.), Metacognition, cognition and human performance (Vol. 1, pp. 57-109). Orlando, FL: Academic Press.

Schunk, D. H. (1989). Social cognitive theory and self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), Self-regulated learning and academic achievement: Theory, research, and practice (pp. 83-110). New York: Springer-Verlag.

Schunk, D. H. (1990). Goal setting and self-efficacy during self-regulated learning. Educational Psychologist, 25, 71-86.

Schunk, D. H. (1994). Self-regulation of self-efficacy and attributions in academic settings. In D. H. Schunk & B. J. Zimmerman (Eds.), Self-regulation of learning and performance: Issues and Educational Applications (pp. 75-99). Hillsdale, NJ: Erlbaum.

Tatsuoka, M. (1971). Multivariate analysis. New York: Wiley.

Thurstone, L. L. (1938). Primary mental abilities. Psychometric Monographs, 1.

Tichenor, J. L. (1977). Self-monitoring and self-reinforcement of studying by college students. Psychological Reports, 40, 103-108.

Walter, T., & Siebert, A. (1981). Student success. New York: Holt, Rinehart, and Winston.

Weinstein, C. E., Goetz, E. T., & Alexander, P. A. (1988). Learning and study strategies: Issues in assessment, instruction and evaluation. San Diego, CA: Academic Press.

Wertsch, J., & Stone, C. (1985). The concept of internalization in Vygotsky's account of the genesis of higher mental functions. In J. Wertsch (Ed.), Culture, communication, and cognition: Vygotskian perspectives. New York: Cambridge University Press.

Wibrowski, C. R. (1992). Self-regulated learning processes among inner-city students: A social cognitive investigation. Unpublished doctoral dissertation, Graduate School, City University of New York.

Withall, J. (1949). The development of a technique for the measurement of social climate in classrooms. Journal of Experimental Education, 17, 347-361.

Zimmerman, B. J. (1986). Development of self-regulated learning: Which are the key subprocesses? Contemporary Educational Psychology, 16, 307-313.

Zimmerman, B. J. (1989a). A social cognitive view of self-regulated academic learning. Journal of Educational Psychology, 81, 329-339.

Zimmerman, B. J. (1989b). Models of self-regulated learning and academic achievement. In B. J. Zimmerman and D. H. Schunk, Self-regulated learning and academic achievement: Theory, research, and practice. New York: Springer-Verlag.

Zimmerman, B. J. (1990a). Self-regulated learning and academic achievement: An overview. Educational Psychologist, 25, 3-17.

Zimmerman, B. J. (1990b). Self-regulating academic learning and achievement: The emergence of a social cognitive perspective. Educational Psychology Review, 2, 173-201.

Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. American Educational Research Journal, 23, 614-628.

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct validation of a strategy model of student self-regulated

learning. Journal of Educational Psychology, 80, 284-290.

Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. Journal of Educational Psychology, 82, 51-59.

Zimmerman, B. J., & Martinez-Pons, M. (1992). Perceptions of efficacy and strategy use in the self-regulation of learning. In D. H. Schunk & J. L. Meese, Student perceptions in the classroom (pp. 185-207). Hillsdale, NJ: Erlbaum.

Zimmerman, B. J., & Martinez-Pons, M. (1995, April). A structured interview measure of self-regulated learning: Combining qualitative and quantitative assessment. Paper presented at the symposium entitled Qualitative and Quantitative Issues in the Assessment of Strategies and Self-Regulated Learning at the annual meeting of the American Educational Research Association, San Francisco, CA.

Zimmerman, B. J., & Schunk. D. H. (Eds.) (1989). Self-regulated learning and academic achievement: Theory, research, and practice. New York: Springer-Verlag.