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Time-management and academic achievement.

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TIME-MANAGEMENT AND ACADEMIC ACHIEVEMENT

by

Gregory D. Wells

B.A. University of Calgary

A Thesis
Submitted to the Faculty of Graduate Studies
through the Department of Psychology
in Partial Fulfillment of the
Requirements for the Degree
of Master of Arts at the
University of Windsor

Windsor, Ontario, Canada
1993
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ABSTRACT

The purpose of this study was to investigate the relationship between time management and academic achievement. To this end there were two specific aims. The first aim was to analyze the factor structure of time-management in an attempt to determine whether the construct consists of more than one component. The second aim was to examine whether time-management practices were predictive of academic performance even when general ability was controlled for. The time-management behaviour and attitudes of eighty-eight university students were assessed via their scores on a time-management questionnaire. Subject scores on the Multidimensional Aptitude Battery (Jackson, 1984) were used as a measure of general ability. Single semester grade point averages (for the semester in which the time-management and ability measures were taken) were obtained from college records.

Scores on the time-management instrument were submitted to a principal components analysis which revealed two distinct components. A subsequent regression analysis was carried out wherein grade point average was regressed on each of the time-management components and on MAB-verbal scores in a stepwise procedure. While MAB-verbal scores accounted for the largest proportion of the variance ($R^2 = .13$), both components were found to be significant predictors of grade point average (combined increment in $R^2 = .14$). It is concluded that the construct of time-management appears to consist of more than one component, and that the time-management behaviours, feelings, and beliefs
incorporated by these components may have an influence on academic achievement over and above the influence of general ability.
ACKNOWLEDGEMENTS

This study was made possible through the contributions and support of a number of people. I would especially like to convey my appreciation to Dr. Akira Kobasigawa for his advice and guidance throughout the project. Dr. Kobasigawa's insights, knowledge, and expertise were invaluable to me at all stages of this undertaking.

I would also like to express my thanks to the other members of my thesis committee, Drs. Anne McCabe and Richard Lewis. Their support and comments were most helpful.

Finally, to my wife Leslie, I would like to convey my deepest gratitude. She is my inspiration. Her encouragement and support throughout this project were not only appreciated but truly indispensable.
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CHAPTER I

INTRODUCTION

Throughout history, time has been viewed as a valuable commodity. To squander the hours of the day, attests the time honoured maxim, is to squander one's future. There is perhaps no situation in which this assertion has more obvious relevance than in the university student's life. University life involves time demands which, for many students, have been heretofore unequalled in their complexity. Along with various academic deadlines and requirements are an array of social, familial, and often occupational responsibilities. Quite simply these demands often exceed or are perceived as exceeding the amount of time available to the student. Students are thus forced to make decisions regarding the distribution of this most valuable resource. They must to one extent or another organize or manage their time and the effectiveness of this management will obviously vary from student to student.

The notion that time factors play an important role in academic work has led to a great deal of research into the relationship between time and academic achievement. The majority of this work has focused on the relationship between total time allocated to study and academic achievement (e.g., Keith, 1982, Schuman, Walsh, Olson, and Etheridge, 1985, Delucchi, Rohwer, and Thomas, 1987). The rationale for this focus has been the common sense supposition that the more time a student spends studying, the higher their school achievement should be.
It can be argued that this conceptualization of the relationship between time factors and academic achievement, in focusing exclusively on the total amount of time spent in study, is limited in scope. Another, broader conceptualization is time-management. In this view, the total amount of time allocated to study per se is of relatively minor importance. What is critical rather is how effectively individual students organize their time in general. High achieving students may not devote more total time to study but according to this broader conceptualization, through the implementation of various principles of time-management they do make more effective use of their time. There is a substantial literature concerning time-management and its relationship to achievement. Much of this literature is, however, anecdotal and lacks the empirical support characteristic of scientific investigation. With two notable exceptions the few relevant empirical papers that do exist are difficult to interpret with specific regard to the time-management/academic achievement relationship. Furthermore the vast majority of previous literature has treated time-management as a unidimensional construct. The possibility that time-management involves independent components and that certain of these components may be more important than others has not been considered. The present study will empirically investigate the relationship between time-management and academic achievement. In response to the discussed deficiencies of the previous literature the purpose of this study is two-fold. This study aims to
investigate whether time-management involves multiple components and, if this is the case, to determine whether these components are differentially predictive of academic achievement.

Also, it has been suggested that time-management skills may simply reflect general ability. The relationship between general ability and academic performance has been well established. Thus if time-management behaviour is merely a facet of general ability, confirmation of a time-management/school achievement relationship is uninteresting. For this reason it is important to demonstrate that time-management has an influence above and beyond that of ability. Consequently a vital additional part of the present study was to assess individual aptitude in the service of eliminating its influence. In the following text I will review literature pertaining to the relationship between time-management and achievement. I will then describe the present investigation.

The concept of time-management has its origins in the popular literature. There has been a great deal of such literature extolling the benefits of effective time-management (e.g., Schuler, 1979, Lakein, 1973). The popular literature consists of a number of general principles postulated to be a part of this effective management of time. These principles involve recommendations such as priority setting, schedule planning, list making, making use of small blocks of time, subdividing larger tasks, doing things now (versus procrastinating), saying 'no' to people, and delegating. As will
be discussed these principles from the popular literature have served as the basis for item selection in recently developed time-management questionnaires.

The popular literature purports that implementation of the various principles of effective time-management will lead to improved performance. The bulk of this popular literature, however, though often intuitively convincing, is largely anecdotal and bereft of scientific substantiation. Nor does it offer speculation as to possible relationships among the various espoused aspects of time-management, or as to the possibility that certain aspects or groupings of aspects of time-management have a greater effect on performance than others.

Few empirical papers have dealt with the concept of time-management and those that have are difficult to interpret with regard to the effects of time-management practices on performance. In the following sections I will briefly discuss two areas of empirical research which have considered time-management: studies of self-regulated learning (SRL) and studies of time-management training. Each of these bodies of research will be discussed with regard to their relevance to the time-management/academic achievement relationship and with regard to their shortcomings for addressing the specific question of whether time-management practices influence performance.

Time-management variables are often incorporated in studies of self regulated learning (SRL). For example Zimmerman and Pons (1986) probed the study behaviours of high and low achieving
high-school sophomores in various situations. Among other strategies, students reported on making use of techniques relevant to time-management such as organizing and transforming to-be-learned materials, planning ahead and goal-setting, and structuring one's environment to be conducive to study. They found that reported use of these time-management components, in conjunction with the reported use of other self-regulating strategies not involving time-management, such as monitoring and information seeking, to be highly associated, as a group, with scores on standard achievement tests. Other studies (e.g., McCombs, 1986; Zimmerman, 1990) have found similar correlations between time-management components in the context of SRL variables and indices of achievement. Such findings, though interesting, are difficult to interpret in the specific context of effective time-management however. These investigations of self-regulated learning have tended not to study time-management behaviour independently and few of these studies have related time-management behaviour to quantitative achievement indices (such as grade point average).

A second body of research has involved training in time-management. These studies usually involve training sessions where subjects review self-instructional time-management manuals, or participate in time-management seminars. Training materials draw from principles outlined in the popular literature discussed earlier and, in accordance with this literature, look at time-management as a general construct; they do not consider possible
relationships between time-management principles, or the effectiveness of particular aspects of time-management. Nor, to my knowledge, do any of these training studies consider the potential influence general aptitude might have on the likelihood of profiting from training in time-management.

An example of a study of this kind which found positive results was carried out by Hall and Hursch (1982). They found that after reading a time-management training manual the amount of time subjects allocated to "high priority" tasks increased, as did self ratings of performance. Conversely Bost (1984) examined the effects of time management peer counselling on the grades of freshmen undergraduates. He looked at the grade point averages of four groups of academically at-risk students. An experimental group received time-management training in the context of peer counselling. A placebo group received peer counselling for academic adjustment in general (no specific instruction in time-management). A third group served as a control and received no treatment, and finally a group of students who were not contacted was included. The authors found no statistical differences in grade point average among these four groups. Thus, as a whole, studies of time-management training have failed to provide conclusive evidence that time-management is related to performance. What reasons might underlie this discrepancy?

The answer may lie in more thorough examination of time-management as a construct. As mentioned studies of time-management training such as those above do not consider the
possibility that time-management is a multidimensional construct. The possibility that time-management involves multiple components may have relevance to the mentioned discrepancies found in time-management training studies. If multi-dimensionality in time-management behaviour is indeed the case, then the different components may be differentially effective. It follows that disparate results in time-management training studies may result from differential emphasis on particular components (of varying effectiveness). Thus it is important that the possibility that time-management is multidimensional be tested. As will be discussed, two recent studies have tested this possibility and have found empirical confirmation of it.

Surprisingly, also absent from this previous research is any attempt to construct or employ a standardized tool for assessing time-management behaviour. Such a tool is of course immensely valuable to the scientific investigation of the effectiveness of time-management techniques. It is able to provide an objective and consensual measure of what constitutes time-management behaviour. Indeed, it is hard to imagine how any general claims about the effectiveness of time-management training can be made without such an instrument.

Time-management training is obviously employed in the service of behaviour modification. The rationale for such training is the contention that it leads to improved performance, whether in academia, business, or any of a variety of other potential applications. Ultimately research should focus on the
effectiveness of different training programs. Preliminary to this, however, it is essential to assess whether such an intuitively obvious correlational relationship between time-management behaviour and academic performance does indeed exist. Such assessment requires the independent measurement of time-management variables via the development of an objective time-management instrument, as well as the incorporation of quantitative achievement indices.

As mentioned, the potential confound of student ability also needs to be addressed. It must be determined whether or not time-management is simply another facet of aptitude. If this is the case then a relationship between time-management and academic performance is not particularly interesting. The relationship between general aptitude and achievement in higher education has been well established. For time-management behaviour to be an important factor in academic achievement in its own right, it must have an influence above and beyond that of general intelligence.

Two recent studies, (Britton & Tesser, 1991, Macan, Shahani, Dipboye, & Phillips, 1990), have recognized that there are deficiencies in the previous literature and have sought to empirically investigate the relationship between time-management and academic performance. Both of these studies assess the componentiality of time-management and relate time-management components to achievement indices. Through the employment of regression analysis, the Britton and Tesser (1991) study also
addresses the important question of general ability.

Britton and Tesser (1991) hypothesized that time-management practices of high school seniors would be predictive of college grade point average. To assess such practices, the authors developed and employed a 35 item time-management questionnaire. Item selection was based on a theoretical model of effective time-management described by Britton and Glynn (1989) which synthesizes the popular literature with empirical research in computer science. Computer-operating systems manage the limited time available to their central processing unit by implementing programs which specify goals, make lists, and use priorities. Analogously, mental time-management is described by Britton and Glynn as a metacognitive system where goals and subgoals are selected and prioritized and then used to create tasks and subtasks which are then themselves prioritized. These tasks are then listed on a "to-do" list, scheduled and carried out. Accordingly Britton and Tesser selected items for their time-management questionnaire which inquire about goals (e.g., "Do you have a clear idea of what you want to accomplish this week?"); list making (e.g., "Do you make a list of the things you have to do each day?"); and priorities (e.g., "Do you set and honour priorities?"). Additionally items designed to assess subjects' attitudes towards time-management were included (e.g., "Do you believe there is room for improvement in the way you manage your time?"). The questionnaire requires subjects to answer on a five-point scale which consists of the responses always, frequently,
sometimes, infrequently, and never. Scoring ranges from 1 to 5 points for each item, with higher scores indicating better time-management skills.

Britton and Tesser administered this questionnaire to first and second year college students in 1983. Four years later they obtained cumulative grade point averages from college records. As a measure of aptitude, SAT scores were also obtained. As the authors point out, relatively strong relationships between scholastic aptitude (as assessed via SAT scores) and grade point average have been well documented. Thus aptitude was seen as a potential confound, in that time-management might simply be an aspect of ability. A principal components analysis of the questionnaire revealed three components. The first of the components was named Short-Range Planning by the authors as it seems to incorporate items which involve daily or weekly planning (e.g., "Do you plan your day before you start it?"). The second component was named Time Attitudes because it appears to encompass attitudinal items involving the constructive use of time and whether respondents feel in control of their time resources (e.g., "Do you often find yourself doing things which interfere with your schoolwork simply because you hate to say no to people?"; "Do you feel you are in charge of your own time, by and large?"). The third component was called Long-Range Planning as it seems to include items which involve, for example, long term goal setting, keeping track of dates on a calendar, and not waiting until the last minute to complete assignments.
Regression analysis resulted in two of these time-management factors being significantly predictive of grade point average and indeed accounting for more variance than SAT scores. In a stepwise procedure Time Attitudes entered first ($R^2 = .15$, $p<.001$), followed by Short-Range Planning (increment in $R^2 = .06$, $p < .02$). SAT score entered third (increment in $R^2 = .05$, $p<.03$). Long-Range Planning did not enter ($p<.05$). The authors concluded that time-management practices do indeed have an influence on college achievement.

Macan, Shahani, Dipboy, & Phillips (1990) also investigated the relationship between time-management practices and academic achievement. These authors did not consider the influence of general ability. As part of their investigation, they developed their own time-management questionnaire. Items in this questionnaire were compiled in accordance with the various aforementioned time-management principles postulated by the popular literature. Drawing from tips, ideas, and techniques recommended in the popular literature the authors created 76 items assessing time-management which were then reduced to 46 items following an item analysis of undergraduate student responses to the original 76 questions. The 46 remaining items constituted the time-management questionnaire implemented in the study.

Macan et al. used this instrument in the service of assessing time-management practices, and the correlations that these practices have with self-perceptions of performance as well
as self-reports of grade point average. The authors note that poor time-management has been discussed not only as a causal factor in poor academic performance but also as a source of stress. Thus Macan and her colleagues also assessed correlations between time-management practices and various measures of stress.

Like Britton and Tesser, these authors found time-management behaviour to be multidimensional. They retained four components, which together accounted for 72% of the common variance. They labelled the four factors as follows: Factor 1 was called Goals and Priorities; Factor 2 was named Mechanics—Planning, Scheduling (making lists, planning, scheduling); Factor 3 was called Perceived Control of Time; Factor 4 was labelled Preference for Disorganization. They described Factor 1 as consisting of items which measure goal setting and the prioritizing of various tasks by which these goals might be achieved. Factor 2 was described as involving items assessing list making and planning behaviours. The items making up Factor 3 were characterized as consisting of items reflecting the degree of control which an individual feels they have over their time. The authors interpret the last factor, Factor 4, as being made up of items reflecting an individual's preference in general for disorganization in their workspace and approach to projects. The authors reverse-scored items making up this last factor such that higher scores reveal a preference for organization.

The most predictive of these components was Factor 3, Perceived Control of Time. This factor was associated with
significantly greater self-evaluations of performance as well as various stress indices. The remaining three components were also significantly correlated, to varying, lesser degrees, with indices of academic performance and stress. The authors concluded that their study supports popular notions of the benefits of effective time-management but also demonstrates a greater complexity to time-management dynamics than has been previously indicated.

Casual observation of the high loading items from each of the above studies would suggest that the Perceived Control of Time factor extracted in the Macan et al. study parallels the Time Attitudes component of the Britton and Tesser study. Other comparisons are less clear, although a number of items within Factors 1 (Setting Goals and Priorities) and 2 (Mechanics-Planning, Scheduling) of the Macan et al. study appear to correspond to those comprising the Short-Range Planning component of the Britton and Tesser study.

These two recent studies have responded to gaps in the previous literature. Both studies provide evidence that time-management is multidimensional and suggest that a robust relationship exists between time-management and academic achievement. Furthermore both studies suggest that a less behavioural, more cognitive/affective component of time-management is most crucial with regard to this relationship. Additionally the Britton and Tesser study indicates that time-management has an influence on academic achievement independent
of that of general ability.

Present Study

The purpose of the present study was to examine the relationship between time-management and academic achievement. Accordingly there were two specific aims of the study. First, the componentiality of time-management as a construct was investigated, and second, the strength of the relationship between time-management components and grade point average was explored, taking into account the influence of general aptitude.

To this end a partial replication of the Britton and Tesser study was carried out. Of the two recent studies discussed, the Britton and Tesser study was chosen for replication due to its inclusion of control for general ability, due to its exclusive focus on the time-management/academic achievement relationship, and due to its employment of more objective achievement indices. The replication was termed partial as some elements from the study were selected while others were omitted or altered. Britton and Tesser's time-management instrument was employed to assess time-management behaviour and grade point averages were obtained from college records (as a measure of academic performance). Data analysis also paralleled the Britton and Tesser study, with one important exception (see method section).

One obvious distinction between this investigation and the Britton and Tesser study involved the respective countries in which assessment of university students took place. Subjects in
this study attended a Canadian university rather than an American institution. In a related manner, the two subject samples differed culturally by virtue of the likelihood that subjects in the present study were predominantly Canadian while those in the Britton and Tesser study were predominantly American. It was felt that administering the Britton and Tesser instrument to a subject sample drawn from a student population at a Canadian university would provide evidence as to the general utility of the instrument across the two populations, as well as a basis for comparing the two populations with regard to factor structure and overall score information.

Another difference between the two studies concerns the general ability measures used. Rather than making use of SAT data, a group administered intelligence test; the multi-dimensional aptitude battery (MAB; Jackson, 1984), was employed as a measure of general ability (see method section). The reason for this was essentially practical. An alternate to SAT data had to be used, as such information is not available for Canadian students. Correlations between SAT scores and freshman grade-point average are similar to those found between intelligence test scores and college grades (both are generally considered to be in the .40s and .50s). As a predictor of grade point average the MAB is comparable to well known individually administered intelligence tests such as the WAIS (Anastasi, 1986). Thus it was felt that the MAB would provide an index of general ability as robust as that provided by the SAT.
The final, and perhaps most fundamental, difference between the two investigations concerns the temporal framework of the studies' respective research designs. As mentioned the Britton and Tesser study was prospective, initially assessing time-management behaviour as well as obtaining SAT scores, and then, a number of years hence, relating them to cumulative grade point average. This study, on the other hand, was relatively concurrent in nature; ability measures and time-management behaviour were related to each student's subsequent single-term grade point average. Thus an attempt was made to provide relatively concurrent evidence for a relationship between time-management and academic achievement. This basic difference in research design makes the studies distinguishable in several ways.

In Britton and Tesser's study general ability (as indicated by SAT scores) was assessed in highschool, and a number of years later correlated with cumulative college grade point average. Conversely, in this investigation general ability (as indicated by MAB scores) was assessed in the same semester which would subsequently provide the grade point average measure. Thus, there is in this study much closer temporal proximation between ability and achievement indices.

This is an important difference because the adequacy of general ability measures as predictors of grade point average may well decline as the temporal distance between ability and performance assessment increases. The SAT is an instrument administered in highschool, and is intended primarily as an
assessment of college readiness. There is very little information on the relationship between the SAT and grade-point average beyond the freshman year. Indeed Britton and Tesser's own data suggest that with regard to senior level college students these correlations may be significantly lower. What this suggests is that the distance in time between ability and performance measures in the Britton and Tesser study may have resulted in an underestimation of the strength of ability in the prediction of grade point average (and subsequently an overestimation of the relative strength of time-management in predicting grade point average). By assessing ability and achievement relatively concurrently, it was felt that the predictive strength of ability would be more accurately reflected.

A related issue is that relatively long-term prospective studies such as Britton and Tesser's which employ initial ability assessments rely heavily on the assumption that ability as an individual attribute remains relatively stable. This assumption is questioned by many (e.g., Rees and Palmer, 1970, McCall, Appelbaum, and Hoggarty, 1973). As in this study general ability was assessed in close temporal proximity to attaining grade point average, the question of stability of intelligence was not an issue.

A final point with regard to difference between the two studies in terms of temporal design concerns the fact that Britton and Tesser also collected time-management data up to four years before the collection of grade point average data. While
cumulative grade point average is undoubtedly a rich achievement index, it results in a substantial time lapse between the writing of the time-management questionnaire and the most recent grades. It is assuming, perhaps erroneously, that time-management practices have remained stable over a four year period. It was felt that claims about the time-management/grade point average relationship could be made with more confidence if time-management practices were assessed immediately prior to the unfolding of single-semester grade point average.

It was the expectation of this study that time-management would be revealed as a multidimensional construct. It was further expected that a relationship between time-management components and academic achievement would be found such that those scoring more highly in terms of effective time-management would on average also have higher grade point averages.
CHAPTER II

METHOD

Subjects

Eighty-eight subjects, thirty six male and fifty two female undergraduate students, enrolled in introductory psychology classes at the University of Windsor in Windsor, Ontario, participated in the present study in exchange for course credit. Introductory psychology classes at the University of Windsor typically consist of students from a variety of academic majors and demographic groups. Subjects ranged in age from 18 to 26 years and had on average completed 2.1 years of university.

Materials

Time-management questionnaire. The time-management questionnaire used in this study was an instrument developed by Britton and Tesser (1991). This questionnaire consists of thirty five items assessing time-management behaviour. It requires subjects to answer on a five-point scale which consists of the responses always, frequently, sometimes, infrequently, and never. For each item, scoring is determined such that responses indicating predefined "good" time-management practices are given 5 points while those at the other end of the scale are scored as 1 point. Accordingly other responses are given intermediate values. Thus superior time-management behaviour is indicated by higher scores on the scale.

The Multi-Dimensional Aptitude Battery (MAB). The MAB, developed by Douglas Jackson in 1984 is described as,
"provid(ing) a convenient, objectively-scorable measure of general aptitude or intelligence ... " (p. 5). The MAB incorporates a number of features from the individually administered Wechsler series of intelligence tests. Like the WAIS-R, the MAB consists of separate performance and verbal scales (each consisting of five subscales) which can be administered on their own or collectively. In this study the verbal section was used alone. The rationale for employing solely the verbal section rather than the performance section or the test in its entirety was based on the demonstrated relationship that exists between the WAIS-R and the MAB. The MAB is strongly correlated with the WAIS-R. Indeed, rather remarkably, it is more highly correlated with the WAIS-R than is the WAIS itself. The Wechsler verbal scales have repeatedly been demonstrated to be more highly correlated with academic achievement than either the performance scales or the full length test (Anastasi, 1986). Although such a relationship of verbal portion superiority in the MAB, with regard to academic achievement, has not, to my knowledge, been demonstrated, it was reasoned here that this would be likely, due to the close MAB/WAIS-R relationship. In any case this likelihood was the impetus for selecting the MAB verbal scales alone to be administered to the subjects. At a more general level, the MAB was chosen as a test of general aptitude for its combination of excellent psychometric properties (Anastasi, 1986), economy, and ease of administration. This battery of tests, along with the time-management questionnaire
were administered during the spring or summer of 1993 while subjects were enrolled in an introductory psychology course.

Grade Point Average. Single semester grade point average for each student was obtained from university records. This grade point average was received by each student for the semester (either spring or summer) in which he or she was enrolled during their participation in the study. Thus grade point averages were obtained from the office of the registrar for each student following the cessation of the semester in which they completed introductory psychology. Due to the intensive nature of the workload imposed by the brevity of the spring and summer sessions, students typically enrol in only one or, occasionally, two courses. Thus obtained grade point averages were indicative of grades received by each student in introductory psychology and possibly one other course.

Procedure

Subjects were tested in groups of approximately 5-10 persons in a small lecture room at the university. After the subjects had entered the room and were seated, they were presented with a consent form. They were asked to read this form over carefully before signing and submitting it.

After the signed consent forms had been collected a brief description of the purpose of the study was related to the subjects. Specifically, they were given the following information: "This is a study of whether or not how students manage their time is related to how well they do at university."
To this end you will be filling out a questionnaire which inquires as to how you manage your time. To relate this information to academic achievement it is also necessary that your permission be granted for me to look at your university records. I want to emphasize that this information will be dealt with in strictest confidence. No permanent record will be kept linking grades to particular students. The study also requires that a measure of general ability be taken. This information is important because it is well known that general ability is related to academic achievement and I wish to determine whether or not time-management skills are related to grades over and above the influence of general ability; it is important that general ability be controlled."

They were also informed at this time that, due to the sensitive nature of aptitude tests, feedback on individual MAB scores could not be given, although information regarding the study's overall findings would be made available to them upon request. Specifically they were told, "The implications of an individual's score on an aptitude test are very easily misunderstood. There is a danger that a student may interpret his or her score as meaning something that it doesn't. For this reason you will not be able to receive feedback as to your particular score on the aptitude test you will be filling out. This does not mean that you will be unable to obtain information about the results of the study. Anyone who is interested in the general findings of the study will be supplied with this
information if they request it. Like with the university records, information about your score on the aptitude test will be dealt with in strictest confidence. No permanent record will be kept linking particular students to specific aptitude scores."

The time-management questionnaire was then distributed and students were asked to place their student identification numbers in the designated space. Students were informed at this time that this identifying information was essential in order to correlate the aptitude and time-management measures with university records of grade point average. They were again assured that this information would be dealt with in strictest confidence and that no permanent record matching identification with test scores and grade point average would be kept.

Subjects were then asked to fill out the questionnaire, taking care to be as honest and accurate as possible in their responses. They were also asked to turn their questionnaires over when completed and to then to wait quietly until the rest of the group had finished.

After all subjects had completed the questionnaire, this instrument was collected and the MAB-verbal materials (question booklet and answer sheet) were distributed. The MAB-verbal was then administered, with Jackson's instructions for administration being strictly adhered to.

Following completion of the MAB, subjects were asked to check over their answer sheets to make sure that all of the requested identification information (student number, date of
birth, sex, and date of test) had been provided and was accurate. MAB materials were then collected. Before thanking the subjects for their participation, they were again informed that although information regarding the outcome of the study would be made available to them upon request, feedback regarding their individual MAB-verbal scores would not be.

Procedures of Data Analysis

Data analysis paralleled that of the Britton and Tesser (1991) study (with MAB verbal scores substituting for SAT scores). In accordance with the Britton and Tesser study an initial analysis of potential factors constituting the time-management questionnaire was carried out by subjecting the questionnaire items to a principal components analysis. Criteria for factor extraction was determined by component eigenvalues and by a Scree test. With regard to the principal components analysis there was one fundamental distinction between the two studies. This investigation employed an oblique rotational scheme on the extracted factors while Britton and Tesser used an orthogonal rotational scheme. In orthogonal rotation, factors may not be correlated with each other. This allows for ease of interpretation but requires the researcher to assume that the underlying factors are operating independently of one another (Tabachnick & Fidell, 1983). Oblique rotational techniques make no such assumption and allow for the possibility that factors may be correlated with each other. While results of oblique rotations are more difficult to interpret it was felt that time-management
factors might well be interdependent. A recognized way of deciding between orthogonal and oblique rotation is to initially perform an oblique rotation and then inspect the size of factor correlations (Tabachnick & Fidell, 1986). Correlations greater than .30 indicate an overlap in variance between factors that should be considered. An initial oblique rotation was carried out for this study which showed a correlation between factors greater than .30 (see results). It was thus decided to employ oblique rather than orthogonal rotation.

Also in replication of Britton and Tesser, a regression analysis was carried out to analyze the effects of time-management practices, wherein grade point average was regressed on the extracted time-management components and on MAB score in a data-determined stepwise procedure. Time-management components were based on least squares factor scores (M = 0, SD = 1).
CHAPTER III
RESULTS

Results will be reported in two major sections. Initially findings from an analysis of the factor structure of the time-management questionnaire will be related. Subsequently the results of the regression analysis, wherein grade-point average was regressed on MAB-verbal scores and the extracted time-management component scores, will be reported.

Factor Structure of Time-Management Instrument

Overall scores on the time-management questionnaire ranged from 73 to 150, with a mean of 112.9 and a standard deviation of 14. Higher scores indicate better time-management and as will be discussed this range and mean are considerably higher than those found previously with this instrument (Britton & Tesser, 1990). Questionnaire items were subjected to a principal components analysis in order to explore potential factors associated with this instrument. While there were 11 factors which surpassed an eigenvalue of 1, a subsequent Scree test exhibited a distinct "elbow" after two components. On this basis two components were retained and rotated with a promax (oblique) solution. These two components accounted for 29% of the variance. Examination of the factor loadings indicated that each of the factors is interpretable. Table 1 lists the items loading .40 or more on each of the factors.

The first factor was labelled Short-Range Planning as it appears to incorporate items reflecting daily or weekly planning.
Table 1. Time-Management Questionnaire Factor Structure and Loadings

<table>
<thead>
<tr>
<th>Factor/item</th>
<th>Short-Range Planning (Factor 1)</th>
<th>Confidence in Time Decisions (Factor 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short-Range Planning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Do you make a list of the things you have to do each day?</td>
<td>.86</td>
<td>-.18</td>
</tr>
<tr>
<td>2. Do you write a set of goals for yourself for each day?</td>
<td>.85</td>
<td>-.16</td>
</tr>
<tr>
<td>3. Do you make a schedule of the activities you have to do on work days?</td>
<td>.81</td>
<td>-.20</td>
</tr>
<tr>
<td>4. Do you spend time each day planning?</td>
<td>.69</td>
<td>.12</td>
</tr>
<tr>
<td>5. Do you plan your day before you start it?</td>
<td>.61</td>
<td>.18</td>
</tr>
<tr>
<td>6. Do you keep things with you that you can work on whenever you get spare moments?</td>
<td>.57</td>
<td>.09</td>
</tr>
<tr>
<td>7. Do you have a set of goals for each week ready at the beginning of the week?</td>
<td>.51</td>
<td>.17</td>
</tr>
<tr>
<td>8. Each week do you do things as they naturally occur to you, without an effort to make a plan and compulsively follow it?*</td>
<td>.49</td>
<td>.06</td>
</tr>
<tr>
<td>9. Do you have a clear idea of what you want to accomplish during the next week?</td>
<td>.41</td>
<td>.16</td>
</tr>
<tr>
<td>10. Do you keep your important dates (e.g., exam dates, research paper due dates, etc.) on a single calendar?</td>
<td>.40</td>
<td>.17</td>
</tr>
<tr>
<td><strong>Confidence in Time Decisions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Do you set and honour priorities?</td>
<td>-.00</td>
<td>.70</td>
</tr>
<tr>
<td>2. Do you make constructive use of your time?</td>
<td>.05</td>
<td>.63</td>
</tr>
<tr>
<td>3. Generally do you think you can usually accomplish all your goals for a given week?</td>
<td>-.03</td>
<td>.61</td>
</tr>
<tr>
<td>4. Are you able to make minor decisions quickly?</td>
<td>-.05</td>
<td>.49</td>
</tr>
<tr>
<td>5. When you have several things to do, how often do you try to figure out which are most important?</td>
<td>.00</td>
<td>.47</td>
</tr>
<tr>
<td>6. Do you try to schedule your best hours for your most demanding work?</td>
<td>.19</td>
<td>.46</td>
</tr>
<tr>
<td>7. Do you set deadlines for yourself for completing work?</td>
<td>.28</td>
<td>.46</td>
</tr>
<tr>
<td>8. Do you usually keep your desk clear of everything other than what you are currently working with?</td>
<td>.15</td>
<td>.43</td>
</tr>
<tr>
<td>9. Do you feel in charge of your own time by and large?</td>
<td>-.05</td>
<td>.41</td>
</tr>
</tbody>
</table>

Note. Factor 1 accounts for 21% of total variance, and Factor 2 for 8%. *These items were reverse scored, for example, responses of "never" were given a score of 5.
Those who scored highly on this factor report engaging in specific short term time-management behaviours like list-making and daily or weekly activity scheduling. The second factor was designated Confidence in Time Decisions as it seems to consist of items which reflect feelings of surety with regard to one's management of time. Students who score highly on this factor report that they feel in charge of their time and have little trouble making decisions about how their time is spent.

Clear interpretation of both of these factors with regard to academic achievement is possible. With regard to the first factor, writing down what immediate academic accomplishments one wants to attain and then establishing priorities and a time frame for their realization sets the stage for achievement. Providing that the plan is a good one it should contribute to fulfilment of one's short term academic aspirations.

The second factor indicates feeling in charge and in control of one's time, which suggests that one has faith in one's ability to honour one's priorities and to accomplish one's goals. The extent to which a person believes in their own capabilities presumably determines the effort and perseverance that they will put forth. Such effort and perseverance would logically be rewarded by improved performance.

**Regression Analysis**

In order to analyze the effects of time-management on academic achievement a data-determined stepwise procedure was employed. This analysis involved regression of grade point
average on each of the two time-management components (Short-Range Planning and Confidence in Time Decisions) and on MAB-verbal IQ scores.

A measure of grade point average was obtained for each student. Single term grade point averages were provided by the office of the registrar following the completion of the semester (either spring or summer) in which the students participated in the study. Grade point averages ranged from 2.0 to 13.0, on a conventional scale ranging from F (0.0) to A+ (13.0). The mean grade point average was 7.5, with a standard deviation of 2.73.

As a measure of general aptitude, each student completed the verbal portion of the Multi-dimensional Aptitude Battery (MAB). The total MAB-verbal IQ scores ranged from 79 to 131, with a mean of 100.4 and a standard deviation of 9.3.

Factor scores for the two time-management components were calculated on the basis of least-squares factor scores (M = 0, SD = 1). As can be seen in Table 2, both Short-Range Planning and Confidence in Time Decisions were significantly correlated with grade point average (r = .28 and .30, respectively) as was MAB-verbal IQ (r = .35). Correlations between either of the time-management variables and verbal IQ in this sample were relatively low. Consequently, there was little concern about time-management/verbal IQ multicollinearity. There was, however, a significant correlation (.49) between the two time-management components. A recognized method for dealing with multicollinearity involves the stepwise, or hierarchical entry of
Table 2. Correlations Among the Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>GPA</th>
<th>MAB</th>
<th>TM1</th>
<th>TM2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>---</td>
<td>.36*</td>
<td>.29*</td>
<td>.32*</td>
</tr>
<tr>
<td>MAB</td>
<td>---</td>
<td>-.07</td>
<td>-.03</td>
<td></td>
</tr>
<tr>
<td>TM1</td>
<td>---</td>
<td>---</td>
<td>.49*</td>
<td></td>
</tr>
<tr>
<td>TM2</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

Note. GPA = grade point average; MAB = Multidimensional Aptitude Battery; TM1 = time-management component 1, Short-Range Planning; TM2 = time-management component 2, Confidence in Time Decisions. *p<.01.
variables into the analysis (Tabachnick & Fidell, 1983). Employment of the stepwise procedure allows for clear determination as to whether variables correlated with each other contribute independently to the equation. In this case stepwise entry allowed for the determination of whether each time-management variable contributed unique variance in the prediction of grade point average beyond that which was shared between them.

As can be seen in Table 3, this stepwise procedure resulted in the MAB component entering first ($R^2 = .13$, $p < .01$) followed closely by the Confidence in Time Decisions component (increment in $R^2 = .11$, $p < .01$). The Short Term Planning factor entered third (increment in $R^2 = .03$, $p < .08$). Note that even though aptitude entered the regression equation first, the combination of the time-management components still adds 14% to the predicted variance, exceeding the contribution of MAB-verbal IQ scores. Also, although some of the variance was clearly shared between the two time-management components (as evidenced by their correlation with each other), the Short Term Planning factor still provided an independent contribution to the equation.
Table 3. Summary of Stepwise Procedure for Dependent Variable GPA

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Partial $R^2$</th>
<th>Model $R^2$</th>
<th>F</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MAB SCORE</td>
<td>.13</td>
<td>.13</td>
<td>12.45</td>
<td>.01</td>
</tr>
<tr>
<td>2</td>
<td>FACTOR 2</td>
<td>.11</td>
<td>.24</td>
<td>11.62</td>
<td>.01</td>
</tr>
<tr>
<td>3</td>
<td>FACTOR 1</td>
<td>.03</td>
<td>.27</td>
<td>3.75</td>
<td>.05</td>
</tr>
</tbody>
</table>
CHAPTER IV

DISCUSSION

There were two major purposes of this study. Firstly, the factor structure of the time-management questionnaire was examined to determine whether time-management was a unidimensional construct or if it consisted of more than one component. The second major purpose was to examine whether time-management had an influence on academic performance beyond that of general aptitude.

In accordance with these stated purposes, two major conclusions can be drawn from the results of the investigation. Firstly self-reported time-management appears to consist of two independent components. Secondly these factors seem to be predictive of grade point average over and above the influence of general aptitude. Each of the major conclusions will be discussed in turn with emphasis on comparisons to the findings of Britton and Tesser's study (1991) (whose time-management questionnaire was employed).

In order to determine whether time-management, as assessed by the Britton and Tesser instrument, is multi-dimensional, the factor structure of this instrument was analyzed. The conclusion drawn from this analysis is that the results clearly indicate the emergence of two distinct components. Factor One (Short-Range planning) exemplifies most strongly the representation of time-management that is advanced by self-help manuals and seminars. These sources most strongly advocate the type of skills
encompassed by this factor, such as list-making, daily planning, and keeping track of important dates. Factor Two (Confidence in Time Decisions) is less oriented to specific skill acquisition and is more cognitive/affective in nature. It incorporates items which reflect the strength of an individual's personal convictions about his or her relationship to time. Examples of items loading highly on this factor are, "Do you set and honour priorities?", and "Do you feel you are in charge of your own time, by and large?". In combination these two factors account for a substantial portion (29%) of the common variance. Much of the previous literature (e.g., Schuler, 1979, Lakein, 1973) does not consider the possibility of more than one dimension to time-management. The findings of the present study indicate, however, that time-management is multi-dimensional and that therefore it is important to differentiate between the distinctive aspects involved.

While the two factors identified are correlated to some extent they differ in important ways. For example, those who spend time each day planning might also set deadlines for completing their work, but it does not necessarily follow that they meet these deadlines (honour their priorities) or that they feel in charge of their time. Again, that these factors, though correlated, contribute independently to grade-point average is evidenced by the stepwise regression procedure.

As this investigation employed Britton and Tesser's time-management instrument it is important to compare the factor
structure extracted in this study to that of the original study. Those authors found there to be three components. The first of these was labelled Short-Range Planning as it consisted of items referring to daily or weekly planning (e.g., "Do you plan your day before you start it?"). The second component extracted they named Time Attitudes because it seemed to incorporate attitudinal items involving the constructive use of time and whether respondents feel in control of their time resources (e.g., "Do you often find yourself doing things which interfere with your schoolwork simply because you hate to say no to people?"; "Do you feel you are in charge of your own time, by and large?"). The final component which consisted of items reflecting long term goal setting, keeping track of dates on a calendar, and not waiting until the last minute to complete assignments was labelled Long-Range Planning.

The two factors extracted in the present study are similar to Britton and Tesser's Short-Range Planning and Time Attitudes factors. Indeed strong item to item resemblance was the impetus for retaining Britton and Tesser's label for the Short-Range Planning factor. All of the items (with one notable exception: "Do you set and honour priorities?") constituting Britton and Tesser's Short-Range Planning factor were included in the factor of the same name in the present study. Several other items, clearly also involved in short term planning (e.g., "Each week do you do things as they naturally occur to you, without an effort to make a plan in advance and compulsively follow it?"); "Do you
have a set of goals for each week ready at the beginning of the week?" also loaded highly on the Short-Range Planning factor in the present study.

The second factor of the present study, Confidence in Time Decisions, though certainly bearing some resemblance to Britton and Tesser's Time Attitudes factor, was not as clearly matched. Two highly loaded items are common to both these factors. Both factors include the items, "Do you feel you are in charge of your own time, by and large", and "Do you make constructive use of your time?". Additionally, while only items loading .40 or higher were included in Table 1, Britton and Tesser's Time Attitudes item, "Do you believe there is room for improvement in the way you manage your time?" had a fairly high loading of .35 in this study.

Other items constituting Britton and Tesser's Time Attitudes factor were not a part of the Confidence in Time Decisions factor found in this study. For example unlike with the Confidence in Time Decisions factor, Time attitudes incorporated such items as, "On an average day do you spend more time with school-work than with personal grooming?", and "Do you often find yourself doing things which interfere with your schoolwork simply because you hate to say "No" to people?". Other items loading highly on Confidence in Time Decisions (e.g., "Generally do you think you can accomplish all your goals for a given week?", and "Are you able to make minor decisions quickly?") did not do so on Time Attitudes. One Confidence in Time Decisions item, "Do you usually
keep your desk clear of everything other than what you are
currently working with?" loaded highly on Britton and Tesser's
third factor, Long Range Planning. Two other Long Range Planning
items also loaded fairly highly on Confidence in Time Decisions,
though below .40. These were, "Do you have a set of goals for the
entire quarter?", and "The night before a major assignment is due
are you usually still working on it?" which had factor loadings
of .34 and .35 respectively.

The relationship between Confidence in Time Decisions and
Time Attitudes with regard to the shared items is clear.
Unquestionably, the items clearly reflect both attitudes toward
time and confidence in one's management of time. Differences
between the two factors are less apparent. The Confidence in Time
Decisions Factor reflects a general sense of confidence about
one's relationship to time. This pervading sense of confidence
provides a foundation for making major and minor time decisions
with surety and without hesitation. Note that confidence in
making time decisions does not necessarily mean that the right
decisions are made, only that they are made with conviction and
without reservation. Thus priorities will be selected without
vacillation and once selected will be honoured unequivocally,
whether or not they are misguided priorities in terms of school
work. The point is that it is this confidence, rather than
necessarily believing in what is considered prudent time-
management by others, that is predictive of academic achievement.
This seems to be where this factor differs from Britton and
Tesser's Time Attitudes factor. Items loading highly on Britton and Tesser's Time Attitudes factor such as, "On an average day do you spend more time with school-work than with personal grooming?", and "Do you often find yourself doing things which interfere with your schoolwork simply because you hate to say "No" to people?" reflect attitudes about time but do not necessarily reflect confidence in one's decisions about time.

In contrast to the Britton and Tesser study, there was no clear emergence of a third time-management factor. As mentioned, however, one item ("Do you usually keep your desk clear of everything other than what you are currently working with?") which loaded highly on the Confidence in Time Decisions factor also did so on Britton and Tesser's third factor, Long-Range Planning. While Britton and Tesser do not discuss how this item is pertinent to Long-Range Planning, an argument can be made that keeping one's desk clear of everything other than what is currently being worked with, reflects a sense of surety in decision making. It suggests that one is confident as to what is necessary to accomplish the task at hand. There is no clutter because there is no indecision about what needs to get done and thus what materials will be required. If something is needed it will be on the desk, if it is not it will not remain on the desk.

That Confidence in Time Decisions is distinct from Long-Range Planning is clear. Confidence is clearly not required for such items as, "Do you skim reading materials first to see if they are worth reading in depth?", or "Do you keep your important
dates on a single calendar?".

That some items from both the Long Range Planning and Time Attitudes factors of the Britton and Tesser study load quite highly on the Confidence in Time Decisions factor of this investigation (recall that several such items load fairly highly on Confidence in Time Decisions but not so highly as to be included on Table 1) suggests a possible explanation for the lack of a third factor emerging in this study. Perhaps much of the combined variance in time-management scores accounted for by Time Attitudes and Long Range Planning is subsumed by the singular contribution of Confidence in Time Decisions in this study.

The similarities between the factor structure of the two studies provide some evidence of generalizability. It seems clear that time-management is not a unidimensional construct; more than one component exists. Further it would appear that one of these components involves short term planning skills like list making. Also, it would seem that there is a less behavioural, more personality oriented dimension to time-management. The precise nature of this component differs somewhat between the two studies. Whether this difference is a reflection of cultural differences between Canadian and American students, of different time demands imposed by Canadian versus American universities, of age or educational level differences between the two student samples (as will be discussed forthwith, the two samples can be distinguished on these dimensions), or some other variable(s), is a topic for future research.
In addition to comparison of this study with the Britton and Tesser investigation regarding factor structure, another contrasting finding that bears mention concerns the range and mean of overall scores on the time-management questionnaire. While those researchers found total scores to range from 52 to 123 with a mean of 91 and a standard deviation of 14, the present study revealed substantially higher scores. The minimum score was 73, the maximum score 150, and the mean 112.9 (SD=14). These are fairly large differences that should be accounted for.

Two related explanations for this discrepancy involve differences between the subject groups with regard to age-related developmental level, and with regard to university experience. Britton and Tesser's study was prospective and they did not relate subject ages at the beginning of the study. It is reported however, that the time-management questionnaire was filled out during the students first or second year at college. From this it can be determined that the students probably had on average less than one full year of university experience at the time of writing, and it can be inferred, based on typical age of entry to university, that they were in about their eighteenth year. In these two respects Britton and Tesser's subjects differ from those of the present investigation. Subjects in the present study, while all enrolled in an introductory psychology course, were not all newcomers to university. The average student had completed slightly over two years of university and was aged 21 years.
Age differences between subject groups suggests one possible explanation for the divergent findings of the two studies with regard to overall time-management scores. Levinson (1986) has outlined a number of chronological periods that correspond to critical transitions in adult life. The first of these periods is labelled Early Adult Transition and occurs between the ages of 17 and 22. This is seen as a period where adolescence is left behind and where preliminary choices for adult life must be made. Age 22 is the beginning of the subsequent transitional period (22-28 years) referred to as Entering the Adult World. Here is where initial choices are made with regard to occupation, friendship, love, values, and lifestyle. The estimated mean age of Britton and Tesser's subjects (18 years) suggests that these subjects have recently entered Levinson's Early Adult Transition period. Subjects of the present study (mean age 21) are nearing completion of this phase and about to go into the Entering the Adult World period. Thus it is conceivable that the chronological differences between the two subject groups reflect differences in the transitional periods that they are in and thus the choices, questions, and changes of adulthood that they are facing. Dealing with such challenges may demand improvements in the effectiveness with which they manage time.

Another, related explanation has to do with the more specific challenges presented by higher education. Subjects of the present study had more experience in a university setting than those of the Britton and Tesser study. Conceivably the
increased time demands imposed by university compels students to modify in a positive direction their time-management behaviour or attitudes. If such is the case then perhaps the higher questionnaire scores of subjects in the present study reflect improvements in time-management that are borne of the necessity of coping with university life.

What these possible explanations suggest is that there may be an effect of age-related developmental level and/or higher education experience on time-management. Perhaps there is an improvement in time-management that corresponds to transitions from adolescence to adulthood. Or perhaps university life imposes demands which foster more effective time-management. Whether time-management improves with development or university experience is a direction for future research.

Although, intuitively, it does not seem likely, the discrepancy between the studies with regard to overall time-management scores might also be explained by inter-country cultural differences or by differences between American and Canadian universities in terms of the time demands they impose upon students. Conceivably there is a higher value placed on the effective management of time in Canada than in the United States. Or perhaps Canadian universities impose greater time demands on their students than do American Universities, resulting in superior time-management. While they cannot be discounted, neither of these explanations is intuitively convincing. Casual observation does not suggest any obvious factors inherent to
American universities or American culture that would indicate a proclivity to less effective time-management. Cultural differences, if they are related to time-management, are likely to be more subtle in nature, reflecting differences in the structure of time-management components, rather than better or worse time-management per se.

A final issue concerning the factor structure findings (and subsequently findings of a time-management/academic performance relationship) involves the possibility of bias in subject's responses on the time-management questionnaire. It is the position taken here that subjects answered questions as honestly as possible. As with any self-report method, however, there is the danger of response bias. As Britton and Tesser (1991) point out, it is possible with this particular instrument that subjects responses were not truthful but rather were answered in a fashion that they felt would portray them in the best light; their responses may have been influenced by the Social Desirability bias. In such a case high scorers may not necessarily be good time managers but rather simply be adept at responding in a socially desirable fashion. Moreover it is conceivable that, in some cases, such behaviour may be related to academic performance (Britton & Tesser, 1991). Thus if the instrument is not an accurate reflection of actual time-management feelings and behaviour but of a tendency to respond in a way that is socially desirable, then correlations between scores on the time-management questionnaire and academic performance might be
spurious.

Such an explanation in this study is, however, problematic for several reasons. Firstly the anonymity built into the design (names were not recorded) removes social-desirability as a motivating factor. As the investigator was unable to link particular students to particular scores (a fact students were made clearly aware of on consent forms) there was no obvious benefit to the student for responding in a socially desirable fashion.

Secondly if social desirability solely determined subject responses, then only a single factor, social desirability, would have emerged. In actuality two factors did. Perhaps one could argue that only certain items were susceptible to the response bias and that these items were associated with one of the factors. Such an argument is implausible however. Inspection of items loading highly on each factor does not suggest differentiation on the basis of desirable items. Moreover many items not incorporated by either factor appear to be at least as desirable as those included. For these reasons, it is felt that attempting to explain this study's results in terms of the social-desirability bias is unwarranted.

The second purpose of this study was to determine whether time-management is predictive of academic performance taking aptitude into account. In this regard it is concluded here that the findings strongly suggest that indeed self-reports of time-management are related to academic achievement. Significant,
robust correlations with grade point average were found for both the Short-Range Planning factor \( r = .28 \) and the Confidence in Time Decisions factor \( r = .30 \). As expected general aptitude was also significantly correlated with grade point average \( r = .36 \). That the effects of time-management are independent of general aptitude and that the components have unique contributions in the prediction of grades was evidenced by the regression analysis. While the regression analysis indicated that aptitude was a stronger predictor of academic achievement than either component, it was only slightly so in the case of the Confidence in Time Decisions factor. Moreover both factors in combination surpass the contribution of aptitude.

The results then, clearly suggest that time-management is predictive of academic performance. As will now be discussed, this finding lends credence to a conceptualization of effective time management and resultant performance payoff proposed by Britton and Glynn (1989). As mentioned earlier, these authors have proposed a model of time-management wherein effective time-management is seen as involving a metacognitive system. In this system goals are first identified and prioritized. On the basis of these goals, tasks are produced and prioritized, then placed on a to-do list, scheduled, and ultimately, carried out. Britton and Glynn view this mental time-management as analogous to computer programs which have been designed to maximize the time resources of the computer's central processing unit or cpu. Thus they developed their model in accordance with this analogy. Like
the human mind, the cpu can only do one thing at a time and thus maximal efficiency in the allocation of time resources is very important. Like in these computer programs, effective time-management is viewed in the Britton and Glynn model as requiring goals to be specified, and tasks to be listed and prioritized. As these programs require time to run so too does effective time-management require time to be spent in planning. Britton and Glynn feel that having such a time-management system would allow a person to achieve maximal efficiency in the distribution of time resources, thus setting the stage for greater intellectual productivity.

To reiterate, Britton and Glynn propose a model for a time-management system analogous to a computer program, the possession of which allows for improved performance. Britton and Tesser loosely based item selection for their time-management instrument on the Britton and Glynn model. In accordance with the Britton and Glynn model, they included items asking about goals, list-making, priorities, and planning. Inspection of the items which constitute the predictive factors suggests that these items much more clearly exemplify the parts of Britton and Glynn's model than items not included in the extracted factors. Items like, "Do you make a list of the things you have to do each day?"; "Do you spend time each day planning?"; "Do you set and honour priorities?"; "When you have several things to do, how often do you try to figure out which are most important?" are directly applicable to the model and are loaded highly on the extracted
factors. Conversely, items not part of an extracted factor like, "Do you smoke an average of at least one pack of cigarettes per day?"; "Do you find yourself waiting a lot without anything to do?", and "Do you clip or xerox articles, which although not presently important to you may be in the future?" seem to be less directly applicable to the model. That items directly applicable to Britton and Glynn's model of effective time-management load highly on factors predictive of grade point average is evidence in support of the model.

The contention that the results of this study support Britton and Glynn's model of effective time-management must be qualified, however, by the fact that a number of items loading highly on the predictive Confidence in Time Attitudes factor are not clearly applicable to the model. Britton and Tesser selected a number of attitudinal items by extending the computer analogy and noting that the very existence of computer programs to manage cpu resources is evidence that the designers of these programs believed in their usefulness and importance. They reasoned that in a similar fashion effective time-managers should have positive attitudes toward time-management and thus included such items as, "Do you feel in charge of your time?", and "Do you often find yourself doing things which interfere with your schoolwork simply because you hate you say "No" to people?". Some, though not all, of these attitude related items were part of the Confidence in Time Attitudes factor that predicted grade point average. What this suggests is that the Britton and Glynn model of time-
management might be expanded to include an underlying cognitive/affective component. While possessing a metacognitive system of time-management might be necessary to maximize mental time, it might not be sufficient. Actual use of this mental time-management system may require belief in one's capabilities to effectively manage time. A comprehensive model of time-management then, should take into account the cognitive/affective dimension indicated by the Confidence in Time Decisions factor.

The relative magnitude of the contribution of the Confidence in Time Decisions factor to the regression equation, as well as the nature of this factor are related issues which also should be discussed. This factor is the time-management component that appears to be most strongly related to grades in university in this study. As shown in Table 2, both Confidence in Time Decisions and Short-Range Planning correlate significantly with grade point average (r = .30 and .28 respectively). As shown in Table 3, however, Confidence in Time Decisions entered before Short-Range Planning in the stepwise procedure, indicating that this factor (Confidence in Time Decisions) may be the better predictor of grade point average. Admittedly, the significant correlation (r = .49) found between Short-Range Planning and Confidence in Time Decisions suggests that some of the predictive variance contributed by the former factor was shared with the latter. Nevertheless, Confidence in Time Decisions is the more strongly related factor, a finding that corresponds with those of both Britton and Tesser and Macan et al. (1990). All three of
these studies found that the factor most highly related to academic performance involves feelings or beliefs in one's own capabilities with regard to the management of time. Britton and Tesser's Time Attitudes factor has been discussed. The relevant factor in the Macan et al. study (who as mentioned earlier extracted four factors) is labelled Perceived Control of Time. They described this factor as being characterized by items reflecting the degree of control which an individual feels they have over their time.

As Britton and Tesser point out such a cognitive/affective type of component bears a strong resemblance to Bandura's general notion of self-efficacy (Bandura, 1989). According to Bandura a person's beliefs about his or her ability to control events pertinent to self determines that person's motivation, affect, and actions as they apply to a plethora of specific domains (e.g., memory, mathematics, art, baseball). People with a strong sense of efficacy believe in themselves; they are confident of their own capabilities. Belief in oneself allows for perseverance in the face of adversity. This perseverance is the hallmark of many of history's greatest achievers. From Van Gogh to the Beatles, many who have achieved greatness in their fields have been characterized by an undying sense of self-efficacy in spite of numerous rejections.

It seems quite possible that the Confidence in Time Decisions factor represents self-efficacy as it applies to the domain of time. Thus it may be that self-efficacy is an integral
part of effective time-management. With reference to the Britton and Glynn time-management model, it may be that a strong sense of self-efficacy is prerequisite to the effective use of a metacognitive time-management system among those that possess one. It may well be that self-efficacy is an important condition in determining the degree to which the Short Range Planning component of time-management has an influence on academic performance.

Another issue pertinent to the finding of a time-management/academic achievement relationship concerns causal directionality. The interpretation here is that the results indicate that time-management is related to academic performance such that higher time-management scores are partially responsible for better performance. The assumption that improvements in time-management lead to or cause performance improvements necessarily underlies every time-management training program. An alternative interpretation is possible however, although it is unclear how increases in academic performance might result in improved time-management. That effective time-management might somehow be the result of superior grade-point average is implausible in this study, however, due to the temporal frame of the investigation. Grade point average for a single semester was obtained following completion of that semester in which the study took place. Thus, in this instance, time-management was assessed prior to performance, and is therefore unlikely to be the result of it.

A final issue concerns the predictive strength of aptitude
versus that of time-management. While not central to this study's stated purposes, considerable differences with regard to this topic were found between the Britton and Tesser study and the present investigation, and so do bear mention. The studies differ with regard to findings concerning the relative importance of aptitude and time-management for predicting grade point average. Britton and Tesser found the contribution of aptitude, as indicated by SAT scores, to be substantially less than was found here. They found aptitude to be correlated only .20 with grade point average and accounting for only 3% of the unique variance. The present study on the other hand found the GPA/MAB-verbal correlation to be a much higher .38. Additionally, aptitude entered first in the step-wise procedure and accounted for 13% of the predictive variance. Aptitude, then, was a much less prominent contributor to the regression equation in the Britton and Tesser study than in the present investigation. The higher aptitude/grade point average correlation found in this investigation is, however, much more in line with what other studies have found (Anastasi, 1988). It is possible that this discrepancy may be due to the aptitude measure used by Britton and Tesser. As mentioned, the SAT is recognized as an excellent tool for predicting freshman grade point average. It was, however, never intended for long term prediction. The low correlation Britton and Tesser found is thus not surprising and suggests that the relative magnitude of aptitude's contribution to the prediction of grade point average may have been
underestimated in their study.

To summarize the major conclusions, the results of the principal components analysis in this study in conjunction with the findings of Britton and Tesser, as well as with those of Macan et al. (1990) (who as mentioned earlier extracted 4 factors), provide convincing evidence that time-management is a multi-dimensional construct. Furthermore it is clear that some of these components are strongly predictive of academic achievement, and that the time-management/academic achievement relationship is independent of the influence of general aptitude.

An obvious direction for future research would be to investigate possible relationships between time-management and demographic variables such as age, gender, and culture. The Britton and Tesser study did not address the possibility of such relationships and for this reason they were not the focus of this replicative study. Future exploratory investigations employing larger sample sizes might provide information as to possible sex, age, and cultural differences in the factor structure of time-management.

A logical next step in time-management research might involve a confirmatory analysis of a modified Britton and Glynn time-management model (modified in the sense that it recognizes self-efficacy as essential to effective time-management). This would require the development of a new instrument specifically designed in accordance with such a conceptualization of time-management. While Britton and Tesser loosely based item selection
for their questionnaire on the Britton and Glynn model, there seems to be, in this instrument, a paucity of items which reflect outcomes; items which specifically reflect actually carrying out the tasks which have been determined on the basis of established goals and priorities. Outcomes are an important part of the Britton and Glynn model. Ultimately the model views effective time-management as involving more than goal and priority based planning; it involves following through on those plans as well. That one might schedule tasks on a to-do list will only influence academic achievement if these tasks are subsequently performed. Future research could be more confirmatory in nature with item selection based more stringently on the key aspects of the Britton and Glynn model. Thus a future instrument might subdivide items into those reflecting prerequisite goal and priority based planning, and those reflecting outcomes. Additionally, a subdivision of the instrument could include items specifically reflecting self-efficacy as it applies to the realm of time. Such an instrument would allow for confirmatory analysis of a conceptualization of time-management where effective time-management is viewed as involving the possession of a goal-directed metacognitive system, the use of which requires a sense of self-efficacy.

In closing, it should be pointed out that the allure of time-management research lies in its practical implications; the supposition that time-management is a set of skills that can be taught to those that lack them, resulting in improved
performance. This is the basis of the many manuals and seminars devoted to teaching time-management behaviours. Certainly the results of this study suggest that there may be merit in teaching short range planning skills. The other component is less behavioural in nature however, and it is this component that seems to be more important in predicting performance. While there is no reason to believe that improvements in specific behaviours would not result from seminars and manuals, it is less clear that these behavioural changes would necessarily lead to performance improvements. Such improvements may require changes in the confidence that one has in one's abilities, and it is uncertain that making use of existing time-management teaching resources would result in such changes to this cognitive/affective domain. As Bandura (1989) points out, incantations of belief in oneself do not translate to reality. Affirming your capability to yourself cannot convince you that it is so. Changing one's feelings and beliefs of self might require more than time-management seminars and self-help manuals can deliver. In any case this provides another area for future inquiry. Given that time-management predicts performance, how successful are time-management teaching instruments at changing behaviour and beliefs respectively?
References


APPENDIX A

TIME-MANAGEMENT INSTRUMENT
TIME-MANAGEMENT INSTRUMENT

This questionnaire includes 35 items that might be descriptive of you. Please read each question and then place a check mark in one of the parentheses next to the question, corresponding to the category that best describes how the question applies to you. For example, if the first question always applies to you, put a check mark in the parentheses beneath "always". Remember, we are interested in how you think you actually are, not how you would like to be. Be sure to answer all 35 questions.

<table>
<thead>
<tr>
<th>Question</th>
<th>Always</th>
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<tr>
<td>1. Do you believe that there is room for improvement in the way you manage your time?</td>
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<td>2. Do you write a set of goals for yourself each day?</td>
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<td>3. On an average class day do you spend more time with personal grooming than doing school work?</td>
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<td>4. Do you have a set of goals for the entire quarter?</td>
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<td>5. Do you set and honour priorities?</td>
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<td>6. Do you usually have a radio, television, or stereo playing while you study?</td>
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<td>7. Do you usually keep your desk clear of everything other than what you are currently working with?</td>
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<td>8. Are you able to put school work out of your mind when you are socializing?</td>
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<td>9. The night before a major assignment is due, are you usually still working on it?</td>
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<td>10. Are you able to make minor decisions quickly?</td>
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<td>11. Do you clip or Xerox articles which, although not presently important to you, may be in the future?</td>
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<td>12. Do you smoke an average of at least one pack of cigarettes per day?</td>
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<td>13. Do you regularly review your class notes, even when a test is not imminent?</td>
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<td>14. Do you keep important dates (e.g., exam dates, research paper due dates, etc.) on a single calendar?</td>
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<td>15. Do you often find yourself doing things which interfere with your school work simply because you hate to say &quot;no&quot; to people?</td>
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<td>16. Do you plan your day before you start it?</td>
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<td>17. Are you concerned about how well or poorly you use your time?</td>
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<td>18. Do you try to schedule your best hours for your most demanding work?</td>
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<td>19. Do you make a schedule of the activities you have to do on workdays?</td>
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<td>20. Do you find yourself waiting a lot without anything to do?</td>
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<td>21. Do you skim reading materials first to see if they are worth reading in depth?</td>
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<td>22. Do you have a clear idea of what you want to accomplish during the next week?</td>
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<td>23. Do you make constructive use of your time?</td>
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<td>24. Do you set deadlines for yourself for completing work?</td>
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<td>25. Do you spend time each day planning?</td>
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<td>26. Do you continue unprofitable routines or activities?</td>
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<td>27. Do you keep things with you that you can work on whenever you get spare moments?</td>
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<td>28. Do you feel in charge of your own time, by and large?</td>
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<td>29. Do you have a set of goals for each week ready at the beginning of the week?</td>
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<td>30. When you have several things to do, how often do you try to figure out which are most important?</td>
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<td>31. When you have several things to do, do you think it is best to do a little bit of work on each one?</td>
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<td>32. Each week do you do things as they naturally occur to you, without an effort to make a plan in advance and compulsively follow it?</td>
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<td>33. Generally, do you think you can usually accomplish all your goals for a given week?</td>
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<td>34. Do you make a list of the things you have to do each day?</td>
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<td>35. When you have an idea, do you usually try to remember it mentally until you need it, rather than write it down somewhere?</td>
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</table>
VITA AUCTORIS

Gregory Dennis Wells was born on May 9, 1964 in Auckland, New Zealand. After moving to Canada in 1971, he attended public schools in Kingston, Ontario and Calgary, Alberta, receiving his high school diploma in June, 1983. He received his Bachelor of Arts degree from the University of Calgary in 1988, completing the requirements at the University of Alberta as a Special Student. He is presently a full-time student in the Ph.D. program in human development at the University of Windsor.