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Conscientiousness and the prediction of task duration: Evidence of the role of personality in time prediction

William Ernest Kelly

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CONSCIENTIOUSNESS AND THE PREDICTION OF TASK DURATION:

EVIDENCE OF THE ROLE OF PERSONALITY IN

TIME PREDICTION

by

William Ernest Kelly, M. A.

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

COLLEGE OF EDUCATION
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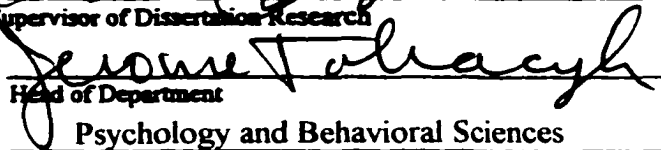
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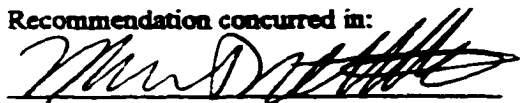
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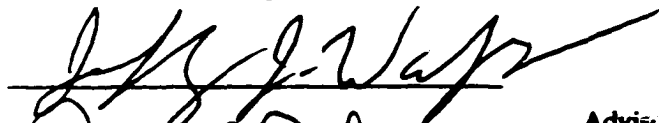
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ABSTRACT

Accuracy in predicting the duration necessary to complete a task is an important dimension of daily life. There exists a large degree of variation in an individual's accuracy in predicting task duration. One domain suggested to influence accuracy of predicting duration is that of personality factors and individual differences. Empirical and theoretical links were found in the literature between the personality factor conscientiousness, of the Five Factor Model of Personality, anxiety, and predicting task duration. The purpose of this dissertation was to empirically examine the role of conscientiousness and anxiety in the accurate prediction of task duration. Ninety-five undergraduate students completed the State-Trait Anxiety Inventory (STAI), the Neuroticism, Extroversion, Openness Personality Inventory - Revised (NEO-PI-R), and predicted the duration needed to read three passages. Results indicated that individuals scoring high on conscientiousness were significantly less accurate, by overestimation, in predicting the amount of time needed to complete a task than individuals scoring average or low on conscientiousness. A step-wise regression revealed that self-discipline was the only facet of conscientiousness that significantly accounted for accuracy in predicting task duration. Anxiety was not significantly related to predicting task duration. Potential explanations and implications for the results, limitations of the study, and directions for future research are discussed.

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CHAPTER 1

INTRODUCTION

Statement of the Problem

"Time is nature's way of keeping everything from happening at once" (source unknown). While this statement may be true, time involves much more than is implied in this definition. Although many individuals are able to plan their tasks and complete them in a timely fashion, others experience greater difficulty and subsequent lack of accomplishment when their tasks go uncompleted. Perhaps no concept is as central to human life and yet so poorly understood as the perception of time (Zakay, 1989). The topic of this paper explores the question of individual differences in time estimation. Specifically, what makes one individual better able to judge the amount of time needed to perform a particular task than another?

Research Need

The ability to estimate accurately the amount of time necessary to perform particular tasks is an important skill in work behavior, academic settings, and clinical contexts. For instance, workers assigned tasks with deadlines must be able to estimate how long it will take to complete a task to meet the deadline. Inaccurate estimates can result in decreased organizational productivity and misallocation of resources. Accurate time estimation is also

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important in academic settings where students must allocate time resources to various competing activities and interests. Accurate time estimation may also be important in clinical settings. Some clients beginning therapy appear to have little conception of how long it takes for therapy to yield results. Many terminate therapy prematurely because they feel that enough time has passed for them to have improved, or because they do not feel that they can allocate the necessary time to therapy amidst competing demands on their time (Martin, McNair, & Hight, 1988).

Time estimation, be it in a clinical or nonclinical setting, appears to be influenced by personality characteristics (i.e., Kirkcaldy, 1984; Rammsayer, 1997; & Zimmerman, Ledbetter, & Ball, 1979). Although studies have identified several personality traits which relate to time estimation accuracy, predicting task duration has not been explored in relation to any aspect of the Five Factor Model (FFM) of Personality (Costa & McCrae, 1992). Hence, as a departure from previous research, this dissertation will explore how the FFM construct of conscientiousness affects prediction of task duration. The results of this study may be beneficial to students, clinicians, and individuals in work settings.

Review of the Literature

To familiarize the reader with predicting task duration and conscientiousness, each critical variable included in the present study will be discussed. Predicting task duration will be reviewed by a discussion of the following: (1) task duration research and (2) the theoretical model proposed by Brown (1990) of predicting duration. Definitions and available research on conscientiousness will be outlined by discussing the following: (1)

reliability and validity of measures of conscientiousness, (2) how conscientiousness relates to other personality variables, and (3) relationships between conscientiousness and task approach. Last, a rationale, hypotheses, and the methods used in the present study are described.

Predicting Task Duration

The prediction of task duration has been briefly discussed in the literature (cf., Brown, 1990). Little empirical investigation of predicting task duration exists. Perhaps one reason that this concept has been infrequently researched is the inherent difficulty involved in measuring future time orientation. One method of studying future orientation to time involves the accuracy with which individuals can predict the duration necessary to complete a particular task.

A Review of Task Duration Research. Relatively few studies have examined the predictive estimations of task duration. Most studies have investigated how knowledge of task duration affects the experience of physical fatigue (cf., Rejeski & Ribisl, 1980; Vidacek & Wishner, 1971; and Walster & Aronson, 1967). Only two studies specifically examining the prediction of task duration could be located at the time of this comprehensive literature review. McCown, Petzel, and Rupert (1987), investigated predictive estimations of task completion and procrastination. Two-hundred undergraduate students were instructed to read a passage. Prior to reading the passage the students were asked to inspect the passage and estimate the anticipated duration necessary to read the passage. Participants then read the passage and the actual time needed to complete the passage was recorded. Results

indicated that procrastinators had a mean estimation time of 180 seconds, while non-procrastinators had a mean estimation time of 217 seconds. The difference was significant, $F (1,76) = 20.89$, $p < .01$. It was concluded that non-procrastinators tend to err on the side of allowing themselves extra time to complete projects. No gender differences were noted. Accuracy of participants' predictive estimations of task duration were not reported.

Another project included several experiments examining accuracy of task duration predictions. Josephs and Hahn (1995) asked undergraduates to predict the duration necessary to complete several academic-related tasks including writing a manuscript, problem solving, and reading a manuscript. The results of Josephs and Hahn (1995) indicate that individuals generally underestimated the time necessary to complete tasks. Further, it appears that the apparent amount of work needed to complete a task influences predicted duration judgements. Participants asked to read a 45 page manuscript predicted significantly greater amounts of time required to complete the reading than individuals presented with the same material formatted as a 12 page manuscript.

Josephs and Hahn (1995) also investigated accuracy of the predicted duration of a reading task. Results suggest that the apparent amount of material involved in the task influences accuracy. Although both experimental groups underestimated the amount of time needed to complete the manuscript, individuals asked to predict the duration needed to read the 45 page manuscript were somewhat more accurate ($M = -.29$ seconds) than individuals asked to complete a 12 page version of the same manuscript ($M = -.43$ seconds). However, the difference between predicted accuracy of the short versus long manuscript groups failed to reach significance [$F (1, 17) = 2.31$, $p = .15$]. Reading speed also appeared to influence

accuracy. Fast readers, as determined by a median split in the sample, were significantly more accurate in their predictive duration judgements than those identified as slow readers. Correlations between self-reported grade point average and accuracy failed to reach statistical significance. However, the correlation was in the hypothesized direction, with grade point average being positively correlated with estimation accuracy. It is important to note that this failure to attain statistical significance may have been the result of a small sample size ($\underline{N}$=19) and lower power. Gender was not found to affect estimation accuracy. Josephs and Hahn (1995) did not include any measures of individual differences, other than reading speed. The authors suggested that other variables, such as motivational aspects, might affect accuracy judgements.

A Theoretical Framework for Predicting Task Duration. "Within the now there is also a direction toward the future" (Brown, 1990, p. 159). With this statement, Brown begins the outline of a theoretical framework for the prediction of duration. According to Brown's (1990, 1996) assertions regarding expectation and future duration judgement, expectation develops from the need to fulfill incompleteness; expectation does not directly affect the experience of time. In other words, predictions of a duration made during the present do not lead to experiencing that same duration during the predicted event. A task may be predicted to occur at a certain rate. However, the actual experience of that duration is not necessarily related to the predicted duration. Perhaps the experience of participating in a task might somewhat alter further predictive estimates, resulting in more accurate predictions. For example, in one study, individuals identified as fast readers who

recalculated their task duration predictions after 10 minutes of reading, produced more accurate predictive estimates than those identified as slow readers (Josephs & Hahn, 1995). The authors of that study suggested that motivational factors may have influenced slow readers' inability to produce more accurate predictions. It follows then that individuals who are more motivated to complete a task may be more accurate in their predictions of task duration.

From studies of patients with frontal lobe damage, Brown (1990) suggests that being able to recall events from the past does not correlate with the ability to predict events in the future. Hence, individuals with frontal lobe damage may not use past experience in making predictive estimates. Brown (1990) generalizes his postulates regarding time prediction among individuals with frontal lobe damage to the population as a whole.

Individuals possessing self-efficacy in their ability to carry-out events in the future leads to their expectation of these events occurring and thus, lengthens expected duration (Brown, 1990, 1996). The expectation of the future, according to Brown (1990), develops from "the surge of the present out of the past" (p. 160). Thus, the events which unfold in the present lead to an anticipation of a future just beyond the present. In other words, the self continues to actively pursue events leading to the future in an attempt to attain fulfillment. Anxiety, events which are feared, or events to which one is ambivalent diminishes the anticipated duration of the future, while events that are desired, or are pleasant, lengthen it (Brown, 1990, 1996).

The above discussion illustrates a variety of perspectives regarding time estimation and identifies variables influencing accuracy of the prediction of duration. Relatively little

is known regarding the relationship between individual difference variables (such as personality) and predicting task duration. Theoretically, the personality factor of conscientiousness may be related to time estimation accuracy.

Conscientiousness

Conscientiousness is a primary factor of the Five-Factor Model (FFM) of Personality (Costa and McCrae, 1992). Essentially, the FFM asserts that there exist five basic factors of personality which are: neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness. Since conscientiousness is the primary factor of this study, the other four factors will not be discussed here.

Definition of Conscientiousness. Although there is no universally accepted definition of conscientiousness, there are specific traits which are typically used to delineate this construct. In accordance with the developmental methods of the FFM, these traits are composed of adjectives used to describe particular behaviors. In most research conscientiousness is differentiated by quantity (i.e., conscientiousness is separated into high, low, and average scores on this trait configuration). High conscientiousness is used to describe an individual who displays such characteristics as being purposeful, strong-willed, determined, careful, future-oriented, and motivated to accomplish goals (Costa & McCrae, 1992; Digman & Inouye, 1986). Individuals low in conscientiousness are described as lackadaisical in working towards goals and hedonistic. Individuals who are average on conscientiousness do not report excessive possession of the traits which identify individuals either high or low in conscientiousness.

Development of the Construct of Conscientiousness. Thorough descriptions, reliability coefficients, and validity information of all five factors included in the FFM can be found elsewhere (cf., Costa & McCrae, 1992). However, a brief discussion of the development of the FFM model of personality is needed to enhance the reader's understanding of conscientiousness.

The FFM was largely developed through the factor analysis of self-ratings and peer-ratings of adjectives in the English language which are used to describe individuals. Words such as nervous, energetic, original, and careful evolved over centuries to allow individuals to describe themselves and others. Using factors to describe personality was first suggested by theorists such as Norman (1963). It has been suggested that these five factors are sufficient to describe human personality (Costa & McCrae, 1985). Each primary factor is further subdivided into facet scales. By definition, personality traits are pervasive patterns of inner experience and behavior. Thus, the underpinning aspects of conscientiousness should show consistency over time. Indeed, reliability coefficients of conscientiousness have been shown to be the highest of the FFM at both three month ($r = .83$) and six year ($r = .79$) follow-ups (Costa & McCrae, 1988; 1992).

Conscientiousness has been found to be stable across situations (Hendriks, 1996) and somewhat universal across cultures (Paunonen, Keinonen, Trzebinski, & Forsterling, 1996). The existence of conscientiousness appears unaffected by adverse motivational conditions (Montag & Comrey, 1990). In addition to support for the reliability of conscientiousness, the research on conscientiousness has thoroughly supported its content, construct, and criterion-related validity (Costa & McCrae, 1992). Much of the available

literature has been concerned with the validity of the construct. There exist five overall research themes in the literature. These themes include (1) defining and clarifying what traits are subsumed by conscientiousness, (2) research regarding the facets of conscientiousness, (3) the relationship of conscientiousness to other personality traits, (4) how conscientiousness affects work behavior, and (5) time and task approach in relation to conscientiousness.

Facets of Conscientiousness. A better understanding of conscientiousness can be gleaned through a discussion of its six sub-factors, or facets. The facets of conscientiousness include (1) competence, (2) order, (3) dutifulness, (4) achievement striving, (5) self-discipline, and (6) deliberation. Competence refers to a feeling that one is capable, sensible, prudent, and effective. High scorers on this factor typically have a higher self-esteem and feel that they are capable to deal with life. High scorers on order are often neat, tidy, and well-organized. Those who score high on dutifulness tend to strictly adhere to their principles and feel a sense of duty to fulfill obligations. Those scoring high on achievement-striving tend to be ambitious and work diligently to achieve their goals. Individuals scoring overly high on achievement-striving are sometimes described as workaholics, while those scoring low are often described as lazy. High scorers on self-discipline possess the self-control to motivate themselves and complete a task despite boredom and other distractions. Deliberation, the final facet of conscientiousness, usually describes an individual who is cautious, deliberate, and planful.

Since the facet scales of conscientiousness are a relatively recent development, they have had limited empirical validation. Two studies have examined the construct validity of

the facet scales. Costa, McCrae, and Dye (1991) investigated the validity of the conscientiousness facets through the use of self-reports using the Adjective Check List. Piedmont and Weinstein (1993) attempted to assess validity for the facet scales of conscientiousness from a source other than the individual in question. They administered the NEO-PI-R (Costa & McCrae, 1992) to 236 employees. The Adjective Check List was provided to the employees' supervisors who were instructed to rate the employees. Overall, the construct validity of the facet scales appear to be supported by these two studies from both the individual's and others' viewpoints.

Conscientiousness in Relation to Other Personality Traits. In attempts to investigate and extend validity, conscientiousness has been investigated in relation to other personality characteristics. Generally, these investigations have supported the FFM, with conscientiousness being associated with other personality variables in predicted directions. For instance, Type-A individuals score significantly higher on conscientiousness than Type-B individuals (Ramanaiah, Sharpe, & Byravan, 1997). When evaluating the facets of conscientiousness, Ramanaiah et al. (1997) found that Type-A participants scored higher than Type B participants on the facets of competence, dutifulness, achievement striving, and self-discipline, but not order and deliberation.

Conscientiousness is negatively correlated with impulsivity (Costa & McCrae, 1992). Individuals higher in conscientiousness have been found to be more autonomous (Cappeliez, 1993) and more dominant than those low in conscientiousness (Costa & McCrae, 1992). Conscientiousness has also been studied in relation to the Three-Factor Theory of

personality (cf., Eysenck, 1991). The Three-Factor Theory asserts that all personality dimensions can be classified under three global factors which include neuroticism, extroversion, and psychoticism (Eysenck, 1991). In a study involving 453 adults, McCrae and Costa (1985) found that psychoticism (a trait involving tough-mindedness) was more prevalent in individuals lower in conscientiousness.

Since conscientiousness is often associated with precision and attention to detail, it seems reasonable to assume that individuals higher in conscientiousness would be more perfectionistic than those individuals lower in conscientiousness. Empirical evidence has provided some support for this assumption. A study conducted by Hill, McIntire, & Bacharach (1997) separated perfectionism into self-oriented and other-oriented perfectionism. It was found that high conscientiousness was related to self-oriented, but not other-oriented perfectionism which suggests that individuals higher in conscientiousness are more likely to respond to internally derived perfectionism than socially prescribed perfectionism.

Conscientiousness has been also studied in relation to procrastination. Johnson and Bloom (1995) surveyed 200 undergraduates and found a strong negative correlation between conscientiousness and procrastination ($r = -.72$, $p < .001$), indicating that procrastination tended to be associated with low conscientiousness. Further, the individual facets of conscientiousness were analyzed in relation to procrastination. All facets significantly correlated with procrastination at the $p < .001$ level. Self-discipline showed the strongest correlation with procrastination ($r = -.75$), while deliberation showed the lowest correlation ($r = -.38$). The results of this study appear to indicate that procrastination is correlated with low conscientiousness (Johnson & Bloom, 1995).

Conscientiousness and Work Behavior. Barrick and Mount (1991) claim that conscientiousness is related to job performance because it encompasses characteristics such as being "persistent, planful, careful, responsible, and hardworking which are important attributes for accomplishing work tasks in all jobs" (p. 5). Workers high in conscientiousness have been observed to have more positive work attitudes (Konovsky & Organ, 1996) and to successfully function in independent work groups (Thoms, Moore, & Scott, 1996), both of which are important in worker satisfaction and productivity (Cropanzano, James, & Konovsky, 1993). Previous research has found that conscientiousness is related to more efficient use of time at work (Konovsky & Organ, 1996). Hence, it stands to reason that such traits would be characteristic of a desirable worker.

A meta-analysis of 117 studies involving the FFM and job performance from several sources throughout the literature provides a good overview of this aspect of conscientiousness (Barrick & Mount, 1991). By analyzing three overall work performance criteria, including job proficiency, training proficiency, and personnel data, it was found that conscientiousness is a reliable predictor of all three criteria. This appears to be true for most workers regardless of occupation. Based on the results of occupational training studies, it has further been suggested that conscientiousness may contribute to the acquisition of knowledge regardless of cognitive ability (Barrick & Mount, 1991). One study evaluated work attitudes and behavior in 402 professional and administrative employees of a VA hospital in order to investigate more specific aspects of work behavior (Konovsky & Organ, 1996). It was found that conscientiousness affects adherence to organizational rules, the use of time at work, and respect for organizational property and resources.

Time and Task Approach in Relation to Conscientiousness. Few studies have examined the relationship between conscientiousness and task approach or time orientation. The only available study relating any aspect of time to conscientiousness indicated that time management behaviors such as making lists, planning, and prioritizing are associated with conscientiousness when compared to the other four factors of the FFM (Feig, 1995). A comprehensive literature review failed to locate any other studies examining conscientiousness and any aspect of time orientation. Indeed, the only other investigation regarding conscientiousness and time was pilot work for the current study by Kelly and Johnson (1998). Forty-eight undergraduates were asked to predict the duration necessary to read a series of passages and subsequently estimate the amount of time which elapsed during their reading. A one-way analysis of variance (ANOVA) found a significant main effect with individuals scoring in the average range of conscientiousness being the least accurate in predicting durations, high conscientiousness being the next least accurate group, and low conscientiousness being the most accurate, $F (2, 46) = 3.57$, $p < .04$. It should be noted, however, that Kelly & Johnson (1998) had a small sample and did not account for outliers in the average conscientiousness condition. This likely elevated the mean score of that condition above that of the high conscientious group. Neither did they account for possible confounds, such as motivation, anxiety, or interest in the material included in the passage.

In one of the few studies examining conscientiousness and task performance, Gellatly (1996) observed that high conscientious individuals set higher goals than those individuals low in conscientiousness. This finding appears to be true because individuals

higher in conscientiousness possess a higher self-efficacy for being able to attain these higher goals. It should be noted that the 117 undergraduates participating in Gellatly's (1996) study were asked to set goals for, and perform, routine tasks with which they were overly familiar (i.e., accounting majors were asked to use a calculator to solve simple math problems). It was acknowledged by the author of that study that in more interesting, intellectually challenging situations, or those situations with higher rewards, motivation might become more influential (Gellatly, 1996).

Rationale

Earlier studies examining the relationship between personality traits and predicting task duration, including a preliminary investigation conducted by Kelly & Johnson (1998), suggest that the personality construct of conscientiousness may be useful in explaining the prediction of task duration. Although the relationship between personality factors and perceptions of elapsed time has been investigated by other researchers (i.e., Kirkcaldy, 1984; Rammsayer, 1997; & Zimmerman, Ledbetter, & Ball, 1979), a comprehensive review of the literature failed to locate any published studies investigating conscientiousness and predicting task duration.

A pilot study by Kelly and Johnson (1998), which provides the only available data on this topic, suggests that individuals high in conscientiousness are less accurate in predicting duration in comparison to those low in conscientiousness. Further, Johnson and Bloom (1995) found that low conscientiousness was strongly related to procrastination. McCown et al. (1987) observed that procrastinators were less likely to overestimate,

and were thus more accurate in, their predictions of the amount of time required to read a passage as compared to individuals scoring low on procrastination. Individuals scoring higher on conscientiousness are more likely to score low on procrastination (cf., Johnson & Bloom, 1995). It seems reasonable that individuals higher in conscientiousness would be less accurate, by overestimating, the time needed to read a passage.

Individuals high in conscientiousness are generally more future oriented and more motivated to attain goals (Costa & McCrae, 1992). High conscientious individuals also have a higher self-efficacy that they can accomplish goals (Gellatly, 1996). Further, according to Brown (1990), looking forward to events with an anticipated favorable outcome lengthens predicted durations. Individuals high in conscientiousness are future oriented and concerned with accomplishing tasks (Costa & McCrae, 1992; Digman & Inouye, 1986). It follows that individuals high in conscientiousness would derive satisfaction from accomplishing a goal and might positively look forward to accomplishing that goal. It is reasonable to assume that individuals scoring high in conscientiousness might predict that a duration will be longer in a situation in which a specified, attainable goal is to be accomplished. The high conscientious individual's lengthened predictions of duration would lower accuracy, by overestimation, of predicting task duration when compared to their low conscientious cohorts.

Hypotheses

Based on the previous research, theoretical writings, and pilot work (Kelly & Johnson, 1998), several specific hypotheses were proposed. (1) Individuals scoring high on

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conscientiousness were expected to be less accurate than those scoring average or low on

conscientiousness in predicting the amount of time necessary to complete a specific task.

(2) There will be no difference between males and females in the prediction of the time

needed to complete a specific task. Two studies examining predictive duration have found

no gender differences in the prediction of the amount of time needed to complete tasks

(Josephs & Hahn, 1995; & McCown, et al., 1987). Hence, no gender differences in task

duration predictions are expected in this study. (3) State-anxiety will be significantly

negatively correlated with predictive estimates of task duration. Brown (1990) asserted that

the experience of anxiety lessens the predicted length of durations.

CHAPTER 2

METHOD

Participants

Ninety-eight students enrolled in introductory and advanced introductory psychology courses at a mid-size southern university volunteered to participate in this study. Data were collected over three weeks during one academic term. Participants were given extra credit for their psychology course. American Psychological Association ethical standards for the treatment of research participants were strictly followed. For instance, an optional extra credit assignment of equal duration and effort was always available to participants who chose not to participate. All information attained from participants remained confidential. Data from three cases were omitted due to participants' inability to follow instructions or incomplete materials. Hence, the final sample consisted of 95 participants. Totals did not always equal 95 however, because data were missing.

Participants ranged in age from 18 to 38 with a mean of 21.07 years ($\underline{SD}$ = 3.41). The average number of years in college was 2.58 ($\underline{SD}$ = 1.74). The average self-reported grade-point average (GPA) was 3.10 ($\underline{SD}$ = .52). Sixty-two percent (59) were female, while 38% (36) were male. There was no significant difference between the genders in age ($\underline{t}$ (93) = 1.58, $\underline{p}$ = .12), GPA ($\underline{t}$ (93) = .34, $\underline{p}$ = .73), or years in college ($\underline{t}$ (93) = 2.26,

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$p = .36$). Seventy-eight (82%) of the sample identified themselves as White, 15 (16%) as African American, one (1%) as Native American, and one (1%) as Asian.

Based on results and pre-established norms of the NEO-PI-R (Costa & McCrae, 1992), thirty-five (37%) of participants were classified as low in conscientiousness, 43 (45%) were average in conscientiousness, and 17 (18%) were high in conscientiousness. The pre-established norms of the NEO-PI-R are located in Table 1. There were no significant differences among conditions of conscientiousness (low, average, and high) for age [F (2, 94) = .66, $p = .52$], years in college [F (2, 94) = 1.04, $p = .36$], or GPA [F (2, 94) = 1.94, $p = .15$]. These results can be found in Tables 2, 3, and 4, respectively.

Predictor Variables

Conscientiousness and gender were the primary predictor variables used in this study. Conscientiousness was measured by combining the six conscientiousness subscales of the Neuroticism-Extroversion-Openness to Experience Personality Inventory-Revised (NEO-PI-R; Costa & McCrae, 1992). The NEO-PI-R is the standard assessment instrument for conscientiousness. Gender was measured by self-report on a demographics survey.

Measuring Conscientiousness: The NEO-PI-R

The NEO-PI-R (Costa & McCrae, 1992) is a 240 item self-report instrument designed to assess personality factors of the FFM. Costa and McCrae (1992) describe the NEO-PI-R as a measure of nonpathological, or normal, personality. The NEO-PI-R is a research instrument designed to describe and predict behavior based on personality traits.

TABLE 1

Classification Criteria for Conscientiousness

Classification	Gender	Age	Conscientiousness Score
Low	Female	<21	<105
	Female	>20	<113
	Male	<21	<103
	Male	>20	<115
Average	Female	<21	105 to 124
	Female	>20	113 to 32
	Male	<21	103 to 124
	Male	>20	115 to 133
High	Female	<21	>124
	Female	>20	>132
	Male	<21	>124
	Male	>20	>133

Note: Conscientiousness scores indicate the score range for each level of conscientiousness based on pre-established norms established by Costa & McCrae (1992).

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TABLE 2

ANOVA of Age by Conscientiousness Level

Source	df	Sum of Squares	Mean Square	F
Conscientiousness Level	2	15.67	7.83	.66
Residual	94	1078.82	11.73	
Total	94	1094.48		

TABLE 3

ANOVA of Years in College by Conscientiousness Level

Source	df	Sum of Squares	Mean Square	F
Conscientiousness Level	2	6.25	3.13	1.04
Residual	92	276.90	3.01	
Total	94	283.16		

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TABLE 4

ANOVA of GPA by Conscientiousness Level

Source	df	Sum of Squares	Mean Square	F
Conscientiousness Level	2	1.04	.52	1.94
Residual	92	24.64	.27	
Total	94	25.68		

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A further use of the NEO-PI-R is assisting individuals in counseling settings to learn more about themselves. The NEO-PI-R is also used as a selection tool in the prediction of job performance (cf., Hough & Schneider, 1996).

Previous research findings indicate that reliability coefficients of the conscientiousness scale of the NEO-PI-R are adequate at both three month ($r = .83$) and six year ($r = .79$) follow-ups (Costa & McCrae, 1988; 1992). Validity of the conscientiousness scale of the NEO-PI-R has been demonstrated through correlations with established instruments measuring theoretically similar constructs. For instance, Costa and McCrae (1992) reported correlation coefficients of .71 between the order subscale of conscientiousness on the NEO-PI-R and the order scale on the Personality Research Form (PRF; Jackson, 1984). Further, Costa and McCrae (1992) reported a .64 correlation between the NEO-PI-R facet of deliberation and the deliberation scale of the Interpersonal Style Inventory (ISI; Lorr, 1986).

Each item is answered in a 5-point Likert scale format in which the individual scale points range from "strongly disagree" to "strongly agree" for each item. Conscientiousness consists of 48 NEO-PI-R items. A sample question from the conscientiousness scale of the NEO-PI-R is the following: "I try to do jobs carefully, so they don't have to be done again."

Each answer sheet was hand-scored by either the experimenter or a graduate assistant and then re-scored by the other. Although only the factor of conscientiousness was used for this study, participants completed the entire NEO-PI-R in order to maintain reliability and validity from the normative sample (Costa & McCrae, 1992). Also, as described in the manual, all participants completed the NEO-PI-R within 30 minutes.

Classification of Respondents by Conscientiousness

Individuals were classified as low, average, or high in conscientiousness based on the pre-established norms and scoring criteria provided by Costa and McCrae (1992). These classifications are separated by gender, age, and conscientiousness score (see Table 1).

Outcome Variables

The primary outcome variable for this study is the prediction of task duration. Motivation to perform well on the task, interest in the material, and anxiety are also discussed in this section. GPA was self-reported on the demographics sheet.

Motivation and Interest Instrumentation

Motivation to perform well on the task and interest in material were measured on the post-experimental questionnaire using Likert scale questions with scale points ranging from "not at all" to "very" (range = 1 to 7) interested in the material or motivation to perform well. A replication of the post-experimental questionnaire used in this study is located in Appendix A. The use of single question assessments of motivation and interest have been used by previous researchers (cf., Hamenover, Caster, Mizumoto, 1999). Single item assessments have been found to be more reliable than longer, more comprehensive assessments when participants were asked to make summary judgements about their own experience or affective reactions to environmental stimuli (Bretz & Judge, 1994; Scarpello & Campbell, 1983). The single question assessments of motivation and interest used in the present study have been found to possess satisfactory test-retest reliability. Kelly (1999) administered the same questions located on the present study's post-

experimental questionnaire following a reading and comprehension task to 65 university students and then re-administered the task and questions at a one week follow-up.

The sample used by Kelly (1999) had a similar demographic make-up as the present study. For instance, the average age of participants in that study was 22.97 years (sd = 2.66), ranging from 20 to 33 years, while the average age in the present study was 21.07 years. Kelly (1999) found test-retest reliability to be .82 (p < .0001) for interest in the material and .67 (p < .0001) for motivation to perform well on the task. The one-question assessments were deemed somewhat valid because both interest (r = 50, p < .0001) and motivation (r = .30, p < .007) significantly correlated with correct responses on a reading comprehension test used in the study. Thus, some evidence for criterion-related validity was found under the auspices that individuals higher in motivation and interest in a task perform better on that particular task than those lower in interest and motivation (Atkinson & Raynor, 1978; Geen, Beatty, & Arkin, 1984).

Anxiety Instrumentation

An anxiety score was derived by adding the Likert-scale scores from each item of the State-Trait Anxiety Inventory - State (STAI; Spielberger, 1983). The STAI is a twenty-item self-report instrument designed to assess current anxiety. The STAI is set on a continuous scale. The STAI is used in both clinical and research settings. Several studies have supported the reliability and validity of the STAI (i.e., Kaplan, Smith, & Coons, 1995; Metzger, 1976; Ray, 1984; Rule & Traver, 1983).

Ray (1984) reported a Coefficient Alpha reliability estimate of .91. Validity studies have correlated the STAI with other instruments which have been shown to measure

anxiety. For instance, Kaplan, et al. (1995) found correlations of .74 between the STAI and the Multiple Affect Adjective Checklist (MAACL; Lubin, Zuckerman, Hanson, & Armstrong, 1986). Further, the STAI has been found to adequately discriminate between individuals in stressful and non-stressful conditions (Metzger, 1976). Administration of the STAI included instructions to answer each item on a four-point Likert scale which ranged from "not at all" to "very much so" (range = 1 to 4). A sample item from the STAI is the following: "I am tense." As described in the manual, all participants completed the STAI within 8 minutes.

In addition to the STAI, individuals were asked a single question on the post-experimental questionnaire designed to assess whether or not the task used in the present study elicited anxiety. The question was "Did the task make you feel anxious?" The question was answered on a forced-choice Likert scale with possible responses ranging from "not at all" to "very anxious." As stated previously, single item assessments have been found to be reliable when making summary judgements about affective reactions to external stimuli (Bretz & Judge, 1994; Scarpello & Campbell, 1983). Kelly (1999) used this anxiety assessment item in a study similar to the present one and found test-retest reliability to be .75 ($p < .0001$). Further, a significant correlation between STAI scores and the single question assessment of anxiety was found ($r = .30$, $p < .01$) indicating some degree of construct-validity for this single question assessment of anxiety (Anastasi, 1988; Kelly, 1999). It should be noted, that the correlation between the single question assessment of anxiety and the STAI may have been lowered due to methodological issues. For instance, the STAI was presented to participants in Kelly's (1999) study before the

task and the single question was presented to participants following the task. The post-experimental questionnaire, demographics questionnaire, and comprehension test are located in Appendix A.

Prediction of Duration Task

Before beginning each passage, participants were allowed five seconds to briefly inspect the passage, they then estimated, and recorded on the answer sheet provided in their packet an estimation of how long they estimated it would take to read the passage.

Predictive Duration Calculations

Predictive estimations of task duration and actual measures of elapsed time were calculated by converting individuals' and the examiner's clocked assessments to seconds. Predictive accuracy estimates were calculated by subtracting actual times (times monitored from a stop-watch by the researcher and a graduate assistant) from the individuals' estimates. An overall predictive accuracy score was obtained by adding the scores from each of three stories read by participants.

Apparatuses

Passages

One passage, discussing important Greek historical figures, was short (175 words - one paragraph); one passage, discussing "Christmas Tree" legislation, was of a moderate length (376 words - five paragraphs); and one passage, which discussed the Homo Sapiens, was longer (510 words - eight paragraphs). The passages were selected from several used

by Walczyk, Kelly, Kelly, & Meche (1999) from their work on compensatory strategies and reading skills. Readability of the passages was analyzed using the Corel WordPerfect Suite 8 Grammatik Program (Corel Corporation, 1997). The Corel Grammatik Program calculates reading level using the Flesch-Kincaid formula (Corel Corporation, 1997). This program also indicates categories of sentence and vocabulary complexity ranging from "very easy" to "very difficult" depending upon preset scores.

The Greek historical figures passage was found to be written at a 10.77 grade level, with a "very difficult" sentence complexity (8 on a 100 point scale - lower numbers denote more difficulty) and a "fairly difficult" vocabulary complexity (53 on a 100 point scale). The Christmas Tree legislation passage was found to be written at a 13.00 grade level, with a "fairly difficult" sentence complexity (54 on a 100 point scale) and a "difficult" vocabulary complexity (47 on a 100 point scale). The Homo Sapiens passage was found to be written at a 11.98 grade level, with a "difficult" sentence complexity (39 on a 100 point scale) and a "difficult" vocabulary complexity (44 on a 100 point scale). According to the Corel Grammatik Program, the most difficult of the passages had a similar complexity and grade level to the Gettysburg Address (Corel Corporation, 1997). Considering that the highest grade level of the passages and the lowest grade level of participants was 13 (college freshmen), the passages were considered readable and appropriate for participants' reading level. A summary of findings of the Corel Grammatik analyses is located in Table 5.

Although no published studies were located on order effects in investigations of predicting task duration, it is conceivable that such an effect might have occurred in this study because three reading passages were used. The term order effect typically refers to

the impact of a specific procedural antecedent to subsequent phases of a study (Nation, 1997). Order effects often result from priming, boredom, or fatigue. In attempts to minimize order-effects in this study, the order of the three reading passages were alternated for each group of participants. Participants were instructed to read the passages in the order which they appeared in the packet. They were instructed to read the passages one at a time and to begin reading only when the experimenter had instructed them to do so. The passages used in this study can be found in Appendix B.

Comprehension Test

A 12-item comprehension test developed by Walczyk, et al. (1999) assessing the content of the passages was also included. The comprehension test consisted of four items from each of three passages which are described later. The comprehension test was used as a manipulation check to determine if participants read the passages and was not used in any of the major statistical analyses. Nevertheless, the psychometric properties of the comprehension test were explored. Test-retest reliability of the comprehension test was estimated at .60 ($p < .0001$) by Kelly's (1999) study. An equal length Spearman-Brown reliability test was conducted using the sample of the present study. Split-half reliability estimates were estimated at .52 ($p < .00001$) which was deemed adequate for a test of twelve items administered to a small sample (Anastasi, 1988).

Using the method suggested by Drummond (1992), Kelly (1999) instructed four assessment "expert-raters" consisting of an educational psychologist, a social studies educator, and two professional test development consultants (all holding academic

TABLE 5

Analyses of the Reading Passages

	Grade level	Words	Average syllables/word	Sentences	Average words/sentence
Greek passage	10.77	175	1.81	14	12.50
Christmas Tree passage	13.00	376	1.73	18	20.88
Homo Sapiens passage	11.98	510	1.76	30	17.00

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positions) to assess the content validity of the comprehension test. All four raters expressed that the comprehension test adequately represented the content of the reading passages. For instance, when Kelly (1999) asked the panel of raters on a seven-point Likert scale (1 = very poor, 7 = very good) to "rate the content-related validity of the test," the score assigned by all four raters was 6.00. Data from the present study were analyzed to determine homogeneity of the test items. All 12 items significantly correlated with the overall test score. Further, data from the present study indicated that at least half of the sample correctly answered each test item; indicating an increased likelihood that the test items adequately represented the material contained in the passages. Readability of the comprehension test was estimated using the Corel Grammatik program (Corel Corporation, 1997). The Corel program estimated the comprehension test to be at the 3.78 grade-level.

Procedure

To increase the accuracy of the researcher's tracking of participants' estimates, participants were tested in groups of not more than 5 individuals. The experiment was conducted in a single quiet, well lit room, free from distractions. All materials were numerically pre-coded to protect the anonymity of respondents. Participants were asked to sign an informed consent form, indicating the general nature of the study and participants' freedom to withdraw from the study at any time. The consent form used in this study can be found in Appendix A. After participants signed and returned the informed consent form, they were asked to remove their watches and any other timepieces they had and put them out of sight. Participants were then administered a packet of materials consisting of (1) a

brief demographic questionnaire developed by the researcher, (2) the State-Trait Anxiety Inventory (STAI; Spielberger, 1983), (3) the three reading passages, (4) a comprehension test over the passages, (5) a time-estimation answer sheet, (6) the NEO-PI-R (Costa & McCrae, 1992), and (7) a post-experimental questionnaire designed to assess motivation and understanding of the experimental procedures. To increase the likelihood that participants read the passages, they were told that they would have to complete a brief questionnaire about the reading materials.

Participants completed the demographic questionnaire followed by the STAI. Participants predicted the duration needed to complete each of the passages as described previously. Participants were instructed to raise their hands as soon as they had completed reading a passage in order to notify the researcher and graduate assistant proctoring administration. The researcher and a graduate assistant recorded each participant's actual reading time with a stop-watch. Participant's actual reading times were noted by the researcher and an assistant. If recorded reading times differed between the researcher and graduate assistant, the average reading time was used as the participants' actual reading time. It was reasoned that the principle researcher's participation in the administration and timing would not produce a substantial expectancy effect since the researcher was unaware of the participant's conscientiousness score until after the experiment, essentially creating a double-blinded study. Further, the graduate assistant co-proctoring the administration was unaware of the hypotheses.

After completing all of the passages, participants completed the comprehension test. Finally, they completed the NEO-PI-R. Following completion of the NEO-PI-R,

post-experimental questionnaires were distributed. In addition to assessing motivation and interest level, the post-experimental questionnaire included a request for participants to paraphrase a brief description of the instructions for the study. The researcher then collected all materials, distributed forms debriefing participants about the nature of the experiment, and provided the opportunity for participants to ask questions about the study. The entire procedure took approximately one hour to complete per each group of five participants. Appendix A contains all of the questionnaires (except those which are copyrighted) and materials which were used in this study. Appendix C contains the complete verbal instructions read to participants and the debriefing statement distributed to participants following completion of the study.

CHAPTER 3

RESULTS

An alpha level of .05 was set for all analyses, as .05 has been the most common alpha level used in the behavioral sciences (Keppel, 1991). To explore and identify covariates for the analyses involving predictive accuracy of durations, correlations were calculated between (1) accuracy of predicted duration, (2) self-reported grade-point average (GPA), (3) self-reported motivation to do well on the task, (4) years in college, (5) self-reported interest in the reading material, and (6) participants' perceived accuracy in time predictions. This correlation matrix can be found in Table 6. The only variable which significantly correlated with predictive accuracy was participants' perceived accuracy of time predictions ($r = -.22$, $p = .03$). It was assumed that self-perceived accuracy of duration predictions after the task would not cause substantial variance in predictive accuracy judgements. Thus, no covariates were identified from the aforementioned correlational analysis.

Because the target task involved reading, it was first necessary to compare participants identifying themselves as having a reading/learning disability and those identifying themselves as having had previous training in speed reading to the remainder of the sample with regards to accuracy of predictive duration estimates. It was assumed that

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TABLE 6

Correlations of Accuracy Scores and Personal Variables

	GPA	Level of Interest	Level of Motivation	Predictive Accuracy	Years of College	Perceived Prediction
GPA	1.00					
Level of Interest	.03	1.00				
Level of Motivation	.25**	.56***	1.00			
Predictive Accuracy	-.01	.03	-.18	1.00		
Years of College	.02	.16	.13	-.13	1.00	
Perceived Prediction	-.07	.08	.14	-.22*	.06	1.00

* $p < .05$.   ** $p < .01$.   *** $p < .0001$.

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speed reading training and reading/learning disabilities could affect reading speed and perhaps the ability to accurately predict duration of a reading task. Three participants identified themselves as having a reading/learning disability. There was no significant difference between participants identified with or without a reading disability on predictive duration accuracy. (t (93) = 1.55, p = .13). Seven participants reported they had previous training in speed reading. There were no significant differences between individuals reporting having had training in speed reading and those not reporting such training on predictive duration accuracy (t (93) = .33, p = .73). Subsequently, data were collapsed across conditions of reading/learning disabilities and speed reading for all analyses.

<u>Conscientiousness and Predicting Task Duration</u>

Mean predictions of task duration accuracy by conscientiousness condition are located in Table 7. Smaller means indicate more accurate predictions. To test hypothesis 1, a one-way Analysis of Variance (ANOVA) was calculated to assess the main effect of conscientiousness on accuracy of predicting task duration. A significant main effect was found for conscientiousness on accurate prediction of task duration [F (2, 94) = 3.58, p < .03]. The F table appears in Table 8.

A Tukey post-hoc test was used to determine which classifications of conscientiousness were significantly different from the others. To reduce the likelihood of making a type I error, Tukey was selected for all post-hocs because of its statistically stringent, conservative nature (Keppel, 1991). Tukey's comparisons indicated that the high conscientiousness group (mean = 222.35 seconds) significantly overestimated the amount

TABLE 7

Mean Prediction of Task Duration Accuracy by Conscientiousness

Conscientiousness Level	Low			Average			High		
	M	SD	n	M	SD	n	M	SD	n
Predictive Duration Accuracy	99.17	113.11	35	182.30	221.34	43	222.35	135.96	17

TABLE 8

ANOVA of Accuracy of Task Duration Predictions by Conscientiousness Level

Source	df	Sum of Squares	Mean Square	F
Conscientiousness Level	2	216858.71	108429.35	3.58*
Residual	92	2788369.92	30308.37	
Total	94	3005228.63		

* $p < .03$.

of time needed to read the passages when compared to the low conscientiousness group (mean = 99.17 seconds). No other comparisons were statistically significant. Tukey's comparisons results are reported in Table 9. There were no significant differences among levels of conscientiousness for participants' self-perceptions of accuracy of predictive duration estimates [F (2, 92) = .26, p = .77].

The relations among the six facets of conscientiousness and accurate prediction of task duration were explored by a stepwise regression analysis with accuracy of prediction estimates as the criterion. Self-discipline was the sole facet which entered into the equation and accounted for a significant proportion of the variance among the six facets of conscientiousness in accurate prediction of task duration [F (1, 93) = 6.58, p < .01]. Regression results appear in Table 10.

Pearson's correlation coefficients indicated that individuals scoring higher on self-discipline were more likely to overestimate the time needed to complete the task (r = .26, p < .01). The facets of achievement striving, competence, order, dutifulness, and deliberation were not significantly correlated with accurate prediction of task duration. Correlation results for each facet of conscientiousness and accurate prediction of task duration are presented in Table 11. There were no significant differences among the levels of conscientiousness for actual reading speed [F (2, 94) = 1.16, p = .32].

Gender and Prediction of Task Duration

Mean accuracy of task duration prediction scores by gender are provided in Table 12. To test hypothesis 2, a one-way ANOVA was calculated to assess the main effect of

TABLE 9

Tukey's Comparisons of Task Prediction Accuracy by Conscientiousness

	Low	Average	High
Means	99.17	182.30	222.35
Differences of Means Low		83.13	123.18*
Average			40.05

* $p < .05$

TABLE 10

Step-Wise Regression of the Six Facets of Conscientiousness and Predictive Accuracy

Variable(s) Entered on Step Number

1. Self-Discipline

Multiple R	.26
R Square	.07
Adjusted R Square	.06
Standard Error	173.72

---------------------------Analysis of Variance---------------------------

	DF	Sum of Squares	Mean Square
Regression	1	198597.96	198597.96
Residual	93	2806630.67	30178.82

$F = 6.58071$ Signif $F < .01$

------------------------- Variables in the Equation -------------------------

Variable	B	SE B	Beta	T	Sig T
Self-Discipline	8.41	3.28	.26	2.565	.01
(Constant)	-.595313	64.65		-.009	.99

------------------------- Variables not in the Equation -------------------------

Variable	Beta In	Partial	Min Toler	T	Sig T
Competence	-.01	-.004	.67	-.04	.96
Order	-.07	-.06	.91	-.65	.52
Dutifulness	-.05	-.04	.57	-.35	.73
Achievement Striving	.07	.05	.60	.51	.61
Deliberation	.05	.05	.84	.47	.64

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TABLE 11

Conscientiousness Facets and Predictive Accuracy Correlations

Facet	Pearson's r
Competence	.14
Order	.02
Dutifulness	.14
Achievement striving	.20
Self-discipline	.26*
Deliberation	.15

* $p < .01$.

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TABLE 12

Mean Prediction of Task Duration Accuracy by Gender

Gender	Female			Male		
	M	SD	n	M	SD	n
Predictive Duration Accuracy	182.83	184.98	59	119.53	163.11	36

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gender on accuracy of predictive duration. A significant main effect for gender on predictive duration estimation was not obtained [F (1, 94) = 2.86, p = .09]. These results have been reproduced in Table 13. Males scored significantly higher on interest in the task [F (1, 93) = 5.57, p < .02] and motivation to perform well on the task [F (1, 93) = 6.01, p < .02]. Means and ANOVA results for interest can be found in Tables 14 and 15, while means and ANOVA results for motivation appear in Tables 16 and 17.

Anxiety and the Prediction of Task Duration

To test hypothesis 3, Pearson's Product Moment correlations were calculated between STAI scores and predictions of task duration. The result failed to reach statistical significance (r = - .05, p = .62). To further evaluate anxiety and predictive duration estimates, Pearson's correlations between STAI scores and predictive duration estimates were analyzed separately by level of conscientiousness to determine the relationship between these two variables in theoretically diverse groups as suggested by Sirotnik (1980). None of the conscientiousness groups' correlations attained statistical significance. The correlations between STAI scores and predictions of duration were negative for the low conscientiousness group (r = - .29, p = .09) and the high conscientiousness group (r = - .24, p = .36). The average conscientiousness group had a positive correlation between STAI scores and predictions of duration (r = .12, p = .46). There were no significant differences across levels of conscientiousness for STAI scores [F (2, 93) = 1.17, p = .32]. The sample was asked on the post-experimental questionnaire whether or not the task provoked anxiety on a Likert scale of one to five. The average score was 2.91 (sd = 1.03), indicating that the task neither made them feel anxious nor relaxed.

TABLE 13

ANOVA of Accuracy of Task Duration Predictions by Gender

Source	df	Sum of Squares	Mean Square	F
Gender	1	89593.35	89593.35	2.86
Residual	93	2915635.27	31350.92	
Total	94	3005228.63		

TABLE 14

Mean Interest Scores by Gender

Gender	Female			Male		
	M	SD	n	M	SD	n
Interest Score	2.45	1.16	58	3.03	1.16	36

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TABLE 15

ANOVA of Interest Scores by Gender

Source	df	Sum of Squares	Mean Square	F
Gender	1	7.46	7.46	5.57*
Residual	92	123.32	1.34	
Total	93	130.78		

* $p < .02$.

TABLE 16

Mean Motivation Scores by Gender

Gender	Female			Male		
	M	SD	n	M	SD	n
Motivation Score	3.16	1.11	58	3.75	1.20	36

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TABLE 17

ANOVA of Motivation Scores by Gender

Source	df	Sum of Squares	Mean Square	F
Gender	1	7.86	7.86	6.01*
Residual	92	120.35	1.31	
Total	93	128.21		

* $p < .02$.

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Conscientiousness, Motivation, and Interest

As discussed previously, it may be that motivation to perform well on a task and interest in the task affect predictive duration. Therefore, two analyses were conducted to verify that there were no significant differences among levels of conscientiousness for interest in the material and motivation to perform well on the task. A one-way ANOVA revealed no significant difference among levels of conscientiousness for interest in the material [F (2, 93) = .31, p = .74]. The low conscientiousness group had a mean interest level of 2.69; the average conscientiousness group had a mean interest level of 2.74; and the high conscientiousness group had a mean interest level of 2.47. A second ANOVA failed to identify significant differences among levels of conscientiousness in motivation to perform well on the task [F (2, 93) = .07, p = .94]. The low conscientiousness group had a mean motivation level of 3.34; the average conscientiousness group had a mean motivation level of 3.38; and the high conscientiousness group had a mean motivation level of 3.47.

CHAPTER 4

DISCUSSION

Before discussing the major findings of this study, it is interesting to note the slightly higher than expected percentage of individuals in this study scoring low on conscientiousness (37%). Based on pre-existing norms for the NEO-PI-R, about 31% of individuals were expected to score in the low range of conscientiousness (Costa & McCrae, 1992). One explanation for this finding is that the project was conducted towards the end of an academic term. Since extra credit was offered for participation, it is possible that the individuals lower in conscientiousness volunteered to participate as a way to increase their grades more than individuals scoring high on conscientiousness. This explanation assumes that high conscientious individuals would have earned higher class grades earlier in the term than low conscientious individuals, and thus were not as much in need of extra credit. Results of a z test did not indicated a significant difference ($z = 1.95$) between the samples used in this study and the normative sample used by Costa & McCrae (1992).

Conscientiousness and Predicting Task Duration

Regarding Hypothesis 1, the results were in the predicted direction; that is individuals scoring high on conscientiousness overestimated how long it would take to complete a specific task as compared to individuals who score low on conscientiousness.

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For example, a high conscientiousness individual might predict that it would take 15 minutes to read a chapter, while a low conscientious individual might predict that it would take seven minutes to read the same chapter. Yet, for both individuals it would actually take only five minutes to read the chapter. Although the differences between the high and average conscientiousness groups were in the expected direction, the difference was not statistically significant. A statistically significant difference between the high and low conscientiousness groups, however, was found. A lack of significance between the high and average conscientiousness groups seems reasonable considering that the descriptions of high, average, and low conscientiousness could readily be placed on a continuum ranging from low to high. Hence, differences on a particular construct or task (i.e., time prediction) would be greater between individuals scoring as high and low conscientiousness than those scoring high and average or low and average. It is also possible, however, that further significant differences were not found due to low statistical power and a modest sample size.

A possible explanation for the finding of statistical significance between the high and low conscientiousness groups was the possibility that highly conscientious individuals allowed themselves more time to complete tasks than individuals scoring low on conscientiousness. The findings of this study are consistent with previous related research which indicated that individuals high in procrastination, a trait associated with low conscientiousness, were more accurate in predicting the duration of a task than those scoring as low in procrastination (McCown, et al., 1987). In the rationale section it was hypothesized that, according to the theoretical framework of Brown (1990), individuals scoring high on conscientiousness would be more motivated to perform well and thus might

lengthen predictions of duration. Although there were no significant differences among levels of conscientiousness in motivation to perform well on the task, the results of this study support the assertion that conscientious individuals are more likely to overestimate the amount of time needed to complete a task. For example, highly conscientious students assigned reading materials would likely predict that they needed more time to complete the reading than they actually needed, thus allowing themselves extra time to complete the task. Whereas, low conscientious individuals assigned the same reading would likely predict that they needed an amount of time which was closer to the actual time needed to complete the reading, thus allowing a smaller margin for error in their predictions.

The role of attention in time estimation has been discussed previously (i.e., Zakay & Block, 1996). To estimate how much time has passed during an interval, Zakay and Block (1996) found that greater attention to the passing duration resulted in more accurate time estimation. A similar process might have occurred in predicting duration. For instance, individuals scoring high on conscientiousness might have persisted and applied greater effort in their predictive estimations than those scoring low on conscientiousness. Persistence and increased effort may have created the perception among the high conscientiousness group that there was more material to read.

The above explanation has been partially substantiated by two previous studies. Sansone, Wiebe, and Morgan (1999) found that individuals scoring high on conscientiousness were more likely to persist and provide greater effort and attention in a task than those scoring low in conscientiousness. In another study, Sawyer, Meyers, and Huser (1994) observed that the more effort and attention individuals allocated to a

task, the less accurate they were in reproducing a time interval; that is, judging when a particular amount of time had elapsed. Reproduction of an interval is similar to predictive duration in that in both instances individuals begin an interval with the knowledge that a pre-established amount of time might pass.

Another explanation for the higher predictive estimations of individuals scoring high in conscientiousness has to do with the perceived amount of material. It is conceivable that individuals scoring high on conscientiousness perceived the task as more complex and longer, and thus predicted a longer amount of time needed to perform it than individuals scoring low on conscientiousness. The perception of a task as more complex and long is consistent with several previous research findings. For instance, it has been demonstrated that individuals perceiving a greater amount of material involved in a task are more likely to predict a longer duration would be required to complete the task than those perceiving a simpler task (Barrick & Mount, 1995). Individuals scoring higher on conscientiousness apply greater effort and often perceive that more work must be done and work longer to complete a task and thus, provide longer estimates of the duration necessary to complete the task than those scoring low on conscientiousness (Costa & McCrae, 1992; Dollinger & Orf, 1991; Rejeski & Ribisl, 1980; Sansone, Weibe, & Morgan, 1999).

Self-Discipline and Prediction of Task Duration

Self-discipline was the only facet of conscientiousness significantly correlated with accurate predictive duration estimates. An exploration of variables correlated with self-discipline adds some clarity to this result. For instance, self-discipline has been found to be

highly related to efficiency and "clear thinking" (Piedmont & Weinstein, 1993). Cognitive

clarity (having clear and unconfused thoughts) has been clearly associated to attention

(Woolfolk, 1993). As discussed previously, attention has been implicated by numerous

researchers in duration estimation (i.e., Sawyer, et al., 1994). Further, individuals scoring

higher in self-discipline have been found to be thorough and organized, traits which on a

cognitive level would appear beneficial in the brief analysis of the reading passages which

participants were asked to do before estimating the length of time needed to read the

passages (Costa & McCrae, 1992; Watson & Clark, 1992). The heightened cognitive

organization skills and ability to focus on the task may have prompted the highly self-

disciplined individuals in this study to assess that more time was needed to complete the task

and thus overestimate their predictive duration estimates.

Gender and Prediction of Task Duration

As predicted, the analyses resulted in no significant differences between the genders

in the accurate prediction of task duration. The finding of no significant difference between

genders is consistent with the findings of earlier studies (cf., Josephs & Hahn, 1995; &

McCown, et al., 1987). While the sample size of this study was sufficient to detect a large

or medium effects size, it was not sufficient to detect a small effects size (Keppel, 1991).

Hence, the small sample may have precluded the finding of a statistically significant

difference between genders due to a lack of statistical power. Although not statistically

significant (i.e., less than a .05 significance) in this study, the females were marginally more

likely to overestimate time predictions than males. One possible explanation for this

difference between the genders involves a possible gender bias in the materials used. Males reported significantly greater interest in the reading material and motivation to perform well on the task than females. This lessened interest and motivation may have somehow differentiated the experience for male and female participants and thus created a small difference in their predictive accuracy scores. Of course, because this finding was only marginal, and not statistically significant, it should be replicated in other studies before this interpretation is credible.

Anxiety and Prediction of Task Duration

Hypothesis three predicted that there would be a significant negative correlation between predictive duration estimates and STAI scores. While a negative correlation was obtained, it was too slight to attain statistical significance. Brown (1990) asserted that increased anxiety would decrease predictive duration estimates. Previous research partially supported Brown's assertion by suggesting that heightened anxiety is associated with lowered cognitive processing ability and thus attenuated duration estimates (Anderson, 1990; Hicks, Miller, & Kinsbourne, 1976).

The degree of anxiety provoked by the task in this study could explain why hypothesis number three was not supported. The sample indicated on the post-experimental questionnaire that the task neither provoked anxiety or relaxation. It is possible that the task did not provoke sufficient anxiety to invoke any effects on predictive duration estimates. A situation evoking a more stressful reaction from the participants might have supported the hypothesis that heightened anxiety lessens predictive duration estimates. Future research

might more adequately test hypothesis three by experimentally manipulating the amount of anxiety experienced by participants before the prediction of duration.

Implications

The results of this study have specific applications for professionals in the following settings: (1) academic, (2) clinical, and (3) organizational.

Academic Implications

Academic performance may be adversely affected due to mis-allowance of the amount of time needed to study. Students often mis-allocate time in two ways: (1) setting aside insufficient time to allow for adequate preparation and/or (2) targeting too much time for a given task, thus not allowing enough time to study and prepare for other learning tasks (Mazzoni & Cornoldi, 1993; Nelson, 1993). Results of the present study suggests that the first method of time mis-allocation may occur more often for individuals lower in conscientiousness. The low conscientious group allowed themselves only slightly more time than needed to complete the task; whereas, the high conscientious group allowed a greater margin of error in the amount of time needed to complete the task. Therefore, individuals scoring higher on conscientiousness, according to the present study, are more prone to the second type of time mis-allocation: allowing too much time for a given task which may lessen the amount of time allowed for other important tasks.

Application of the results of the present study to improve study approaches might involve several steps. An initial step includes students' gaining self-knowledge of their conscientiousness level. Subsequent steps in developing an improved study approach should

depend upon students' conscientiousness level. Individuals low in conscientiousness might benefit by allowing themselves more time to study and complete assignments than they would ordinarily allow. The results of the present study suggest that individuals low in conscientiousness could, on the average, allow themselves twice the amount of time to complete a task than they would ordinarily and still not allow themselves as much time as individuals high in conscientiousness. In other words, consistent with McCown, et al.'s (1987) view of procrastinators, it may be helpful for individuals low in conscientiousness to increase the amount of time they allocate to study or complete tasks.

Conversely, students high in conscientiousness may benefit, if made aware of their tendency to overestimate, by slightly decreasing the amount of time they allocate to a particular task. Initially, this recommendation may appear counterintuitive. However, by limiting the amount of time allowed for one particular task, individuals high in conscientiousness might allow greater amounts of time for other studies. An approach which more closely matches the actual amounts of time needed to study might benefit students' overall academic performance more than focusing the majority of their attention on one particular task, or group of study materials. Regardless of conscientiousness level, it would behoove students to learn to be more accurate in predicting the time needed to study and complete assignments as more superficial calculations tend to result in less efficiency in time prediction (Josephs & Hahn, 1995).

Results of the present study have implications for instructors as well. To accommodate students at all conscientiousness levels, it might be useful to separate large assignments into smaller subtasks. Thus, students could judge more accurately the

amount of time needed to complete each subtask (cf., Josephs & Hahn, 1995). As a result, students could complete tasks from the multitude of courses in which students are often enrolled. Of course, more research replicating the findings of this study must occur before these recommendations can be taken seriously.

Clinical Implications

It has been observed that many clients terminate therapy prematurely because they feel that sufficient time has elapsed for their improvement or because they do not feel they can allocate the necessary time to therapy due to competing demands on their time (Martin, et al., 1988). Miller (1991) asserted that low conscientious clients have poor therapeutic outcomes due to the client's unwillingness to undertake the work of psychotherapy, increased likelihood to miss appointments, and proneness to terminate psychotherapy prematurely. It could be speculated that one reason low conscientious clients might terminate psychotherapy prematurely is the belief that they do not have sufficient time to attend therapy sessions. One potential intervention early in the clinical relationship, therefore, might be to assist low conscientious clients in structuring their time more efficiently to allow more time for therapy. This intervention may assist in the prevention of premature termination and allow the client to remain in therapy long enough to derive benefits from it.

The results of this study indicate that individuals high in conscientiousness overestimate the amount of time needed to complete a task. If this finding generalizes to counseling, it can be reasoned that individuals high in conscientiousness believe

that they will require more time in counseling than they actually need. If it was predicted at the beginning of counseling that more time would be spent in counseling than actually needed, the client would likely continue the belief throughout the counseling experience unless otherwise corrected (Beck, 1976).

Therefore, clients, specifically high conscientious clients, believing that they would have an extended time in therapy might not aggressively pursue change as much as an individual foreseeing a shorter duration of therapy (Budman & Gurman, 1988). A possible remedy for the preconception of an extended therapy experience is to provide some initial structuring of the counseling experience (cf., Budman & Gurman; Byers, Soper, Miller, & Springer, 1984; & Kelly & Miller, 1999). Structuring allows clients to predict, understand, and make decisions about the course of therapy and successfully move through the stages of change (Prochaska, DiClemente, & Norcross, 1992). Regardless of the level of conscientiousness, in order to maintain client effort and prevent premature termination, the clinician should place a strong emphasis on the therapeutic relationship (DiMatteo & DiNicola, 1982).

Organizational Implications

The ability to predict accurately task duration has implications for work behavior. Individuals typically must plan and carry out tasks at work and be able to efficiently allocate the time necessary for the attainment of goals. When generalized to the work situation, the results of the present study suggest that low conscientious workers allow themselves just enough time to complete tasks whereas high conscientious workers project that they require over twice the amount of time to complete a task than they actually need.

The implications of these results in organizational settings depend largely upon the degree to which employees are able to set their own schedule and work at their own pace. For instance, employees whose time is strictly governed by managers and whose work situation is laden with numerous externally imposed deadlines would likely have little decision regarding projecting the length of time needed to complete work assignments. However, individuals in settings which allow some degree of autonomy in scheduling and setting deadlines would likely require greater skill in estimating task duration in order to maintain efficiency. Although the following implications may apply to workers in both work situations, the majority of the implications discussed here are designed for individuals who have some degree of control in their scheduling of tasks.

It was suggested previously that high conscientious students should lessen the amount of time they project to complete tasks in order to delegate appropriately enough time to complete multiple tasks. To some degree it may be necessary for employees to lessen the amount of time allocated to particular tasks as well. However, the effects of lessening the amount of time needed to complete a task on employees' wellness and job satisfaction should be considered. High conscientious individuals who complete tasks early may use the unused time to either relax or begin the next activity (Burt & Kemp, 1994; Francis-Smythe & Robertson, 1999). The early completion of tasks might enhance employees' overall wellness by allowing an increased feeling of control over their time (Adams & Jex, 1999; Lengfelder, 1987). Employee wellness has been associated with job satisfaction, increased productivity, and fewer absences (Moorhead & Griffin, 1989). Therefore, allowance of increased predicted task durations by high conscientious

employees may yield more productivity for the organization through increased employee wellness and job satisfaction.

Employees low in conscientiousness may experience the reverse effects as those high in conscientiousness by allowing only enough time as necessary to complete tasks. For instance, employees projecting only enough time to complete a task before moving to the next task may experience stress when they must quickly transition to the next task (Moorhead & Griffin, 1989). Increased stress results in decreased work performance (George, 1996). It is therefore suggested that individuals low in conscientiousness follow similar guidelines as low conscientious students. For example, low conscientious employees should be encouraged to increase the amount of time they allow themselves to complete tasks.

It may also be beneficial for low conscientious workers to be more planful and cautious when calculating the needed length of duration to complete a task. This increased planfulness may be accomplished by open discussions among managers and employees about how long work tasks will take (cf., Wexley & Baldwin, 1986). Low conscientious workers who then successfully finish tasks early may develop an enhanced sense of self-efficacy and control over their time (Francis-Smythe & Robertson, 1999). Increased employee self-efficacy and a sense of control has been suggested to be helpful for managers attempting to develop more high conscientious behaviors among their employees (Gellatly, 1996).

General Implications

The possibility that a measure of conscientiousness is a mediator of the accuracy of duration prediction suggests problem-focused and precise interventions by students,

clinicians, managers, and individuals in their daily lives. Specifically, the facet of self-discipline, which the present study addresses, accounts for unique variance among the facets of conscientiousness in predicting task duration, can be targeted for intervention. Conscientiousness includes the traits of organization, being energetic, thorough, efficient, and industrious; it is negatively correlated with absent-mindedness and laziness (Costa & McCrae, 1992).

Interventions for conscientiousness and time management, in general, include attempts at increased organization and routine. Such attempts might include external structuring. For instance, following a daily routine, maintaining a list of prioritized tasks and carefully calculating estimates of the amount of time required to complete each task might be beneficial to individuals who struggle with, and become overwhelmed with time management difficulties (Bond & Feather, 1988).

Limitations of the Present Study

There are several limitations of the present study. The small sample size is the most obvious limitation. While the number of participants was large enough to find a statistically significant difference when there was a large or even medium effects size, it was not sufficient to detect a small effects size. Another limitation which affects the generalizability of the results is the type of task involved. It is possible that variability in reading skills would elicit different estimation abilities than would other types of tasks requiring different cognitive processes, such as sorting cards (Robeck & Wallace, 1990). The reading task has been used in previous studies, however, especially studies involving predicting duration of a task (cf., McCown, et al., 1987; Josephs & Hahn, 1995).

Another limitation involves the possible gender bias of the task. Although there were no significant gender differences in predictive duration estimates, the significant differences between genders in interest level and motivation may have in some way affected duration estimates. Another limitation involves the limited, possibly insufficient, measures used in this study. For instance, while some degree of reliability and validity of the motivation and interest assessments was demonstrated by Kelly (1999), it is possible that using one question to measure motivation to perform well and interest in the task is not as reliable and valid as is needed for an extensive understanding of the role of these variables in time prediction. A more detailed, longer, measurement of these constructs may have provided better reliability and validity. The use of a more valid and reliable instrument to measure comprehension of the passages may have also provided helpful information regarding how the different conscientiousness groups processed the information included in the passages.

Another design limitation involves the sample. This study was conducted using college students. Consequently, the results should only be generalized with caution to populations other than post-secondary institutions and young adults until similar research involving other populations is conducted. There may have also been a self-selection bias. Since the study was conducted towards the end of an academic term, there was a possible selection bias. For example, there is a slightly higher percentage than expected of individuals scoring low on conscientiousness. A similar selection bias may have been active regarding prediction of duration skills. Participants with time estimation skills different from those of this sample might have been tested earlier in the academic term. Additionally, the study was correlational. Hence, causation can only be suggested and not empirically demonstrated.

However, it should be noted that, by definition, experimental manipulation of personality traits is not possible. Thus, the use of correlational research when studying personality traits is the only option.

Future Research

Future research should involve larger sample sizes in order to detect more subtle effects among variables. In addition, future researchers should attempt to eliminate several of the weaknesses previously mentioned, including possible gender bias in the reading material used, short and possibly unreliable measures of motivation and interest levels, and using samples in addition to a college student population. Additionally, future researchers should use other tasks in addition to reading. Tasks used in future research should be more neutral, in that a similar response would be elicited by either gender or level of conscientiousness. One task that has been used in previous studies involves sorting a deck of cards by color. A comparison between that task, or a similar task, and a reading task would be of use in observing if different tasks affect the ability to judge duration and predict the time necessary to complete a task.

Future research should include a means of determining the cognitive mechanisms used by different levels of conscientiousness that affect duration judgements. One suggestion for this type of study would involve whether or not individuals scoring higher on conscientiousness use different cognitive methods of organizing the material from which they will form predictive estimates. Based on the results of this study and the other studies discussed in this manuscript, it seems possible that the difference in predictive duration

accuracy results from the perceptions of either the amount of time needed to perform a set task or the amount of material the task involves. Future research should investigate these possibilities. Most of the current research on predicting task duration has tested traditional college students in a one-shot manner. Future investigations might explore developmental aspects of individual differences in time perspective. For instance, many young adults are more concerned with the future, whereas many older adults are more concerned with the past (Carstensen, Isaacowitz, & Charles, 1999). Future studies should explore how older adults predict duration and how those predictions are different from young adults. Time prediction in counseling should also be addressed in future research. For instance, future research should explore whether or not high and low conscientious individuals differ at the beginning of counseling in their predictions of how long it will take for counseling to be effective and how these predictions affect clients' approach to counseling.

Summary

This study investigated the relationship among conscientiousness, gender, and predicting the duration of intervals. The results suggest that individuals scoring high on conscientiousness significantly overestimate the amount of time necessary to complete a task as compared to individuals scoring low on conscientiousness. There was no significant difference in predictive accuracy of durations by gender. Further, anxiety had little effect on predictive duration estimates. This research partially supports the theory of Brown (1990), according to which, individuals possessing high self-efficacy and who positively anticipate events, such as those high in conscientiousness anticipating the attainment of a goal (Costa

& McCrae, 1992; & Gellatly, 1996), have longer duration estimates. However, the

prediction of Brown (1990) that anxiety would shorten predicted estimates of duration

was not supported.

APPENDIX A

HUMAN SUBJECTS CONSENT FORM

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The following is a brief summary of the project in which you have been asked to participate. Please read this information before signing the statement below.

TITLE: Personality characteristics and task performance.

PURPOSE OF STUDY/PROJECT: To determine the relationship, if any, between personality characteristics and estimation of time needed to complete tasks.

PROCEDURE: Participants will be asked to estimate the time needed to perform simple tasks. They then will complete that task. Participants will voluntarily complete a packet of self-report inventories. Data will then be analyzed to determine the relationship among these variables. The experiment will not take place during class.

INSTRUMENTS AND MEASURES TO INSURE PROTECTION OF CONFIDENTIALITY/ANONYMITY. The instruments used to collect data for this study are personality instruments and a brief survey of estimated time. All information will be held confidential.

RISKS/ALTERNATIVE TREATMENTS: There are no risks associated with participation in this study. Participation is voluntary.

BENEFITS/COMPENSATION: Participation in this study is strictly voluntary and is not part of my required coursework. At the discretion of the instructor, extra credit may be given for participation. If extra credit is given, an alternative extra credit opportunity involving equal effort and duration will always be provided.

I,_____, attest with my signature that I have read and understood the description of the study, "Personality Characteristics and Task Performance", and its purpose and methods. I understand that my participation in this research is strictly voluntary and my participation or refusal to participate in this study will not affect my relationship with Louisiana Tech University or my grades in any way. Further, I understand that I may withdraw at any time or refuse to answer any questions without penalty. Upon completion of the study, I understand that the results will be freely available to me upon request. I understand that the results of my survey will be confidential, available only to the researchers, myself, or a legally appointed representative. I have not been requested to waive nor do I waive any of my rights related to participation in this study.

_____   _____
Signature of Participant   Date

CONTACT INFORMATION: The researchers listed below may be reached to answer questions about the research, subjects' rights, or related matters.

William Kelly   257-4315
Dr. Judith Johnson   257-4315

The human subjects committee of Louisiana Tech University may also be contacted if a problem cannot be discussed with the researchers.

Dr. Mary Livingston   257-4315
Dr. Terry McConathy   257-2924
Deby Hamm   257-2924

APPENDIX B

DEMOGRAPHICS

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Please fill in the blank or circle the answer which best describes you.

Age: _____

1. Gender: (A)Male   (B)Female

2. Race: (A)White/Caucasian   (B)American Indian or Alaskan Native

             (C)Black   (D)Hispanic   (E)Asian or Pacific Islander

3. Marital Status: (A)Single   (B)Married   (C)Engaged

4. GPA: _____

5. Years of college: _____

6. Do you have a reading or learning disability?   (A) Yes   (B) No

7. Have you ever had any special training in speed reading?   (A) Yes   (B) No

APPENDIX C

ANSWER SHEET

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Passage 1 Estimate: _____

Passage 2 Estimate: _____

Passage 3 Estimate: _____

APPENDIX D

COMPREHENSION TEST

1. The remains of Cro-Magnon were found in
   a. England
   b. Colorado
   c. France
   d. The article does not say

2. About what time did the Cro-Magnons replace the Neanderthals?
   a. 20,000 BC
   b. 35,000 BC
   c. 40,000 BC
   d. 50,000 BC

3. According to the article, Cro-Magnons formed into groups to
   a. Farm
   b. Gather
   c. Hunt
   d. None of the above

4. The invention that helped Cro-Magnons bring trees down was
   a. The stone axe
   b. A primitive hatchet
   c. Fire
   d. The lever

5. Which one was the physicist?
   a. Socrates
   b. Archimedes
   c. Plato
   d. Sophocles

6. The modern scholar who argues that all new ideas are just a rehashing of old ideas is
   a. Stanford
   b. Williams
   c. Penfield
   d. Kant

7. The individual who pioneered geometry was
   a. Pythagoras
   b. Aristophenes
   c. Sophocles
   d. Plato

8. The individual who wrote plays parodying Plato was
   a. Pythagoras
   b. Aristophenes
   c. Sophocles
   d. Aristotle

9. A "Christmas Tree" bill is one that
   a. Is passed around Christmas time
   b. Has a lot of unrelated amendments
   c. Is only backed by a few members of congress
   d. Is popular because it appeals to many political groups

10. Christmas Tree bills tend to be introduced
    a. When few congress people are in attendance
    b. During the Fall or Winter
    c. Just about any time
    d. Usually before the holidays

11. Which senator has openly spoken against Christmas Tree bills?
    a. Bob Dole
    b. Everett Dirksen
    c. Howard Metzenbaum
    d. R.C. Remy
    e. None of the above

12. Do congress people usually have enough time to investigate Christmas Tree bills?
    a. Yes
    b. No
    c. Maybe
    d. The article did not really comment on this.

APPENDIX E

POST-EXPERIMENTAL QUESTIONNAIRE

1. Please briefly summarize what you were asked to do for this study.

_____

_____

_____

2. Please circle the level describing how interested you were in material contained in the reading passages.

(Not at all)   1   2   3   4   5   (Very)

3. Circle the level describing how motivated you felt to read the passages and do well on the questions.

(Not at all)   1   2   3   4   5   (Very)

4. Do you think that you are generally pretty good at deciding how long it will take to complete a task?

(Not at all)   1   2   3   4   5   (Very)

5. How accurate do you think you were at deciding how long it would take to read the passages?

(Not at all)   1   2   3   4   5   (Very)

6. Did the task make you feel anxious?

(Not at all)   1   2   3   4   5   (Very)

7. I don't feel that I was reading at the same pace that I usually do.

(Much slower)   1   2   3   4   5 (Much faster)

Other comments:

_____

_____

_____

_____

_____

_____

_____

APPENDIX F

DEBRIEFING FORM

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This experiment is designed to investigate the effects of personality traits on approach to, and performance of tasks. Specifically, I am interested in whether or not the personality variable of conscientiousness affects an individual's estimation of the amount of time needed to perform a task. My hypothesis is that individuals scoring higher on conscientiousness will be less accurate in their estimation of how long it take to perform a task (i.e., read the passages). The results of this study may be useful in determining how some individuals can improve their functioning in environments and situations in which they may need to accurately estimate the amount of time necessary to complete tasks on time. If you have further questions about this research, contact Bill Kelly at 257-4315.

APPENDIX G

PASSAGES

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Passage 1

It may seem strange, but there are times in Congress when a bill that is passing through the legislature is looked upon as a "Christmas tree." Not only is such a bill an object to be admired, but it is also one on which members of Congress hang various "ornaments." But rather than tinsel, lights, garlands, and artificial snow, some Congress members adorn the "tree" with other ornaments - amendments that often have nothing to do with the bill to which they are attached. Not surprisingly, such amendments are called "Christmas tree" bills.

Christmas tree amendments tend to be proposed at times when members are in a rush to return to their home states - before elections and before the Easter and Christmas recesses, for example. At such times, members do not have the time to examine the proposed amendments carefully. As a result, Congress sometimes passes bills with Christmas tree amendments without really taking much note of them.

Sometimes Congress members try to attach minor changes that will benefit their constituents or special interests to important, well-studied bills. Other times they try to attach important legislation to unimportant bills. A good example of the first type took place in 1966 when one Senator added to a major investment bill an amendment designed to assist whiskey importers, hearse drivers, and mineral companies. Ater pushing his amendment through the Senate, he jokingly referred to it as his "Christmas tree" bill.

An example of the second type was former Senator Everett Dirksen's attempt to add a proposal for a constitutional amendment on congressional reapportionment to a resolution to create National American Legion Baseball Month.

Not every legislator approves of the practice of adding Christmas tree amendments. One such Congress member, Senator Howard M. Metzenbaum, took it upon himself to be the Senate's Christmas tree "watchdog." In the 1980's, while other Senators were busy preparing to leave the Capitol for pre-election campaigning, Metzenbaum stood guard in the half-empty Senate chamber, making sure that no "special interest legislation," as he called it, managed to get through. "It's a shame that we can't get through a bill to bring down interest rates," he said. "Instead we have to watch our for these Christmas trees."

Passage 2

About 40,000 years ago a new group of *Homo sapiens* arose. They are known as Cro-Magnons, after the rock shelter in France where their remains were the first found in the A.D. 1860s. Taller but less robust than the Neanderthals, the Cro-Magnons looked much like present-day people. Most anthropologists think that the Cro-Magnons first appeared in southwestern Asia and then spread into other parts of the world.

The fossil evidence found so far has been ambiguous about whether or not Cro-Magnons and Neanderthals lived in the same place at the same time, and researchers are uncertain why the Neanderthals disappeared. By about 35,000 B.C., however, the Cro-Magnon had completely replaced the Neanderthals, perhaps by conquest or because they were culturally more advanced. All people on Earth today probably are descended from the Cro-Magnons.

The many advances the Cro-Magnons made in their toolmaking technology transformed human life. They invented the knife and the chisel, and as a result they could

work with new materials, such as bone. Soon they were fishing with bone fishhooks and using bone needles to sew fitted leather clothes.

With their invention of the stone axe, Cro-Magnons could chop down trees and shape them into canoes. Soon they were traveling down rivers and along seacoasts. They even crossed 50 miles (80 kilometers) of open sea to reach Australia.

Cro-Magnon hunters also invented long-distance weapons-the spear-thrower and the bow and arrow. Now they could hunt several animals at once and larger animals, too, such as wooly mammoths and bison. The food supply increased and with it the number of people on Earth. Anthropologists estimate that by 20,000 B.C., the world population of human beings stood at 3 million.

The increased food supply had political and social consequences as well. Because it was not possible for a lone band of Cro-Magnons to carry out a big game hunt, it became necessary for four and five unrelated bands to cooperate, often for weeks at a time. The cooperating bands probably needed formal rules in order to get along, giving rise in turn to leaders who devised and enforced the rules. The evidence for Cro-Magnon leaders consists of high-status burials. Archaeologists have discovered certain Cro-Magnons buried with ivory daggers, amber beads, and other signs of high rank.

To their technological advances, the Cro-Magnons added accomplished artistry. They created cave paintings like those found at Lascaux, France. Researchers so far can only speculate on the purpose behind the mysterious wall images. Perhaps the scenes were educational. On the other hand, the Cro-Magnons painters may have been reaching out to the spiritual world, creating images meant to have powers that would help the hunters.

Archaeologists have discovered some Cro-Magnon figures sculpted from clay or carved from reindeer antlers. They have also found figures of ivory and bone decorated with animal-drawings and abstract designs. Some of these artifacts may well have been used in magic rituals and probably reflect Cro-Magnon beliefs about spirits that live in animals, plants, the earth, and the sky.

Passage 3

Plato was a pupil of Socrates. Aristotle was a pupil of Plato. Plato revered Socrates as a great and original thinker. Plato went on to found an original school of thinking called the Academy and collected in one place all of the great thinkers of the time. Pythagoras founded geometry. Archimedes, a physicist, was a discoverer of many principles of physics. He went on to design some of the most beautiful buildings in ancient Athens. Sophocles and Aristophenes became famous for writing plays. Aristophenes went on to write plays parodying Socrates. Plato's student, Aristotle, wrote original works in political science, philosophy, and logic. He went on to become one of the greatest thinkers of Western civilization. Plato added considerably to the academy with his philosophical dialogues. In them, Socrates had discussions with a variety of opponents concerning the nature of truth, justice, and many other topics. As testimony about how great these thinkers were, modern scholars, including Kant, have argued that modern ideas are just a rehashing of the works of the Ancient Greeks.

APPENDIX H

PROCEDURES AND INSTRUCTIONS

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As participants enter the room, they will be given pencils and an informed consent form and instructed to "Read and fill out this form. If you have any questions, please ask." Upon completion and return of the consent form, I will greet the participants, introduce myself, and thank them for coming. The participants will then be told, "As I mentioned in the consent form, I'm interested in people's approach to completing tasks and how that relates to personality traits. You will get a more detailed debriefing about the nature of the experiment once it is completed. Any questions?

First, there are some more forms I would like you to fill out." I will then distribute packets containing the demographics survey and the State-Trait Anxiety Inventory (STAI), as found in Appendix A. All materials will be numerically pre-coded and kept separate from the informed consent form in order to preserve anonymity of responding. After I have collected the STAI and demographics survey, participants will be administered the remainder of the materials in Appendix A and told "don't look through these materials until I tell you."

I will then tell the participants, "You will now be asked to estimate how long it will take to perform a reading task. After completing these tasks you will fill out some questionnaires. Are there any questions so far? Now I would like you to take off your watches or any other timepieces you may have and place them either in your pockets or somewhere else where no one can see them." (The experimenter watches to ensure that this last instruction is carried out.) "If you don't want to participate in this project, then feel free to go. If at any point during this project you decide that you don't want to participate, you may stop and leave."

"At this time take the packet that I gave you but don't open it yet. It contains three short passages for you to read. After you complete one passage, please don't look ahead to the other passages. After you read the passages there will be some questions for you to answer about what you've read. So, you do want to concentrate on what you're reading. Now, turn to the first passage. You will have five seconds to glance over this passage of one page" (or two pages, depending on the passage) "and decide how long you think it will take you to read and comprehend. Keep in mind there will be questions over this material. Go ahead and look over passage number 1" (once again the number will depend upon the passage). (Pause for five seconds) "Stop. Now write down how long you think it will take you to read it on the sheet called 'Answer Sheet' on the line beside the phrase 'Passage 1 Estimate.'" (Experimenter displays a sample answer sheet and points to the appropriate line.) "Try to be as exact and accurate as you can using minutes and seconds to estimate your time." Then the experimenter says, "Any questions? Do you understand what I'm asking you to do?" After all the participants have written down their estimated time, the experimenter states, "When I tell you to begin, I would like you to read the passage and raise your hand when you finish in order to let me and my assistant know that you're done. Any questions? Now, begin reading Passage 1."

Once participants have notified the experimenter one-at-a-time that they have completed the passage the experimenter notes the actual time it took and instruct each participant to "wait until the others have finished and we will begin the next passage." When all participants have finished and their actual times noted, the experimenter says, "Now turn to the next passage." The same instructions as those of the previous passage are then given.

After participants have finished reading the final passage, they will be instructed to "Answer the form called 'Questions' contained in your packet as best you can. It contains some questions to see how well you comprehended the reading passages."

Participants will then be instructed to fill out the NEO-PI-R and to be "as honest as you can when completing it." Lastly, the participants will be told, "There is one other thing I would like you to fill out before you leave." (Experimenter hands participants the post-experimental questionnaire). After each participants completes all materials, I will collect their materials and distribute debriefing forms. I will then answer any questions which participants may have regarding the experiment and thank them for their participation.

REFERENCES

Adams, G. A., & Jex, S. M. (1999). Relationships between time management, control, work-family conflict, and strain. Journal of Occupational Health Psychology, 4(1), 72-77.

Anastasi, A. (1988). Psychological testing (6th ed.). New York: Macmillan Publishing Company.

Anderson, K. J. (1990). Arousal and the inverted-U hypothesis. Psychological Bulletin, 107(1), 96-100.

Anderson, D. R., & Field, D. E. (1991). Online and offline assessment of the television audience. In J. Bryant & D. Zillmann (Eds.), Responding to the screen: Reception and reaction processes (pp. 199-216). Hillsdale, NJ: Erlbaum.

Atkinson, J. W., Raynor, J. O. (1978). Personality, motivation, and achievement. New York: Hemisphere Publishing.

Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. Personnel Psychology, 44, 1-26.

Beck, A. T. (1976). Cognitive therapy and the emotional disorders. New York: Penguin Books.

Bond, M. J., & Feather, N. T. (1988). Some correlates of structure and purpose in the use of time. Journal of Personality and Social Psychology, 55(2), 321-329.

Bretz, R. D., & Judge, T. A. (1994). Person-organization fit and the Theory of Work Adjustment: Implications for satisfaction, tenure, and career success. Journal of Vocational Behavior, 44, 32-54.

Brown, J. W. (1990). Psychology of time awareness. Brain and Cognition, 14, 144-164.

Brown, J. W. (1996). Time, will, and mental process. New York: Plenum Press.

Budman, S. H., & Gurman, A. S. (1988). Theory and practice of brief therapy. New York: The Guilford Press.

Burt, C. D. B., & Kemp. S. (1994). Construction of activity duration and time management potential. Applied Cognitive Psychology, 8, 155-168.

Byers, D., Soper, B., Miller, M. J., & Springer, T. (1984). Structuring: A successful counseling technique in a medical setting. American Mental Health Counselors Association Journal, 6(3), 126-133.

Cappeliez, P. (1993). The relationship between Beck's concepts of sociotropy and autonomy and the NEO-Personality Inventory. British Journal of Clinical Psychology, 32(1), 78-80.

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. American Psychologist, 54(3), 165-181.

Corel Corporation (1997). Corel WordPerfect Suite 8 Grammatik [Computer Software]. Jericho, NY: Author.

Costa, P. T., Jr., & McCrae, R. R. (1985). The NEO Personality Inventory. Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., & McCrae, R. R. (1988). Personality in adulthood: A six-year longitudinal study of self-reports and spouse ratings on the NEO Personality Inventory. Journal of Personality and Social Psychology, 54, 853-863.

Costa, P. T., Jr., & McCrae, R. R. (1992). Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual. Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., McCrae, R. R., & Dye, D. A. (1991). Facet scales for Agreeableness and Conscientiousness: A revision of the NEO Personality Inventory. Personality and Individual Differences, 12, 887-898.

Cropanzano, R., James, K., & Konovsky, M. A. (1993). Dispositional affectivity as a predictor of work attitudes and job performance. Journal of Organizational Behavior, 14, 595-606.

Digman, J. M., & Inouye, J. (1986). Further specification of the five robust factors of personality. Journal of Personality and Social Psychology, 50(1), 116-123.

DiMatteo, M. R., & DiNicola, D. D. (1982). Achieving patient compliance: The psychology of the medical practitioner's role. New York: Pergamon Press.

Dollinger, S. J., & Orf, L. A. (1991). Personality and performance in "personality": Conscientiousness and openness. Journal of Research in Personality, 25(3), 276-284.

Drummond, R. J. (1992). Appraisal procedures for counselors and helping professionals (2nd ed.). New York: Macmillan Publishing Company.

Eysenck, H. J. (1991). Dimensions of personality: 16, 5, or 3? Criteria for a taxonomic paradigm. Personality and Individual Differences, 12, 773-790.

Feig, R. B. (1995). Construct validation of time management within the Five-Factor Model of Personality (Doctoral Dissertation, Hofstra University, 1995). Dissertation Abstracts International, 56-08B, 462.

Francis-Smythe, J. A., & Robertson, I. T. (1999). On the relationship between time management and time estimation. British Journal of Psychology, 90, 333-347.

Gellatly, I. R. (1996). Conscientiousness and task performance: Test of a cognitive process model. Journal of Applied Psychology, 81(5), 474-482.

Geen, R. G., Beatty, W. W., & Arkin, R. M. (1984). Human motivation: physiological, behavioral, and social approaches. Boston, MA: Allyn and Bacon.

George, J. M. (1996). Trait and state affect. In K. R. Murphy (Ed.)., Individual differences and behavior in organizations (pp. 145-171). San Francisco: Jossey-Bass Publishers.

Hemenover, S. H., Caster, J. B., & Mizumoto, A. (1999). Combining the use of progressive writing techniques and popular movies in introductory psychology. Teaching of Psychology, 26(3), 196-198.

Hendriks, A. A. J. (1996). The Big Five as tendencies in situations: A replication study. Personality & Individual Differences, 21(4), 527-535.

Hicks, R. E., Miller, G. W., & Kinsbourne, M. (1976). Prospective and retrospective judgements of time as a function of amount of information processed. American Journal of Psychology, 89(4), 719-730.

Hill, R. W., McIntire, K., & Bacharach, V. R. (1997). Perfectionism and the big five factors. Journal of Social Behavior & Personality, 12(1), 257-270.

Hough, L. M., & Schneider, R. J. (1996). Personality traits, taxonomies, and applications in organizations. In K. R. Murphy (Ed.). Individual differences and behavior in organizations (pp. 31-88). San Francisco: Jossey-Bass Publishers.

Jackson, D. N. (1984). Personality Research Form manual (3rd ed.). Port Huron, MI: Research Psychologists Press.

Johnson, J. L., & Bloom. A. M. (1995). An analysis of the contribution of the five factors of personality on variance in academic procrastination. Personality and Individual Differences, 18(1), 127-133.

Josephs, R. A., & Hahn, E. D. (1995). Bias and accuracy in estimates of task duration. Organizational Behavior and Human Decision Processes, 61(2), 202-213.

Kaplan, D. M., Smith, T., & Coons, J. (1995). A validity study of the subjective unit of discomfort score. Measurement and Evaluation in Counseling and Development, 27(4), 195-199.

Kelly, W. E. (1999). Reliability and validity of a reading comprehension test and related single question assessments of interest, motivation, anxiety. Unpublished manuscript, University of Nevada, Las Vegas.

Kelly, W. E., & Johnson, J. L. (1998). Conscientiousness and time estimation. Unpublished manuscript, Louisiana Tech University.

Kelly, W. E., & Miller, M. J. (1999). A discussion of worry with suggestions for counselors. Counseling and Values, 44, 55-66.

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

Kirkcaldy, B. D. (1984). Individual differences in time estimation. International Journal of Sport Psychology, 15, 11-24.

Konovsky, M. A., & Organ, D. W. (1996). Dispositional and contextual determinants of organizational citizenship behavior. Journal of Organizational Behavior, 17(3), 253-266.

Lengfelder, J. R. (1987). Leisure wellness and time management: Is there a connection? College Student Journal, 21(2), 180-183.

Lorr, M. (1986). Interpersonal Style Inventory (ISI) manual. Los Angeles: Western Psychological Services.

Lubin, B., Zuckerman, M., Hanson, P. G., & Armstrong, T. (1986). Reliability and validity of the Multiple Affect Adjective Check List - Revised. Journal of Psychopathology and Behavior Assessment, 8(2), 103-117.

Martin, G. A., McNair, D., & Hight, W. (1988). Contributing factors to early premature termination at a college counseling center. Journal of Counseling and Development. 66(5), 233-236.

Mazzoni, G., & Carnoldi, C. (1993). Strategies in study time allocation: Why is study time sometimes not effective? Journal of Experimental Psychology, 122, 47-60.

McCown, W., Petzel, T., & Rupert, P. (1987). An experimental study of some hypothesized behaviors and personality variables of college student procrastinators. Personality and Individual Differences. 8(6), 781-786.

McCrae, R. R., & Costa, P. T. (1987). Validation of the Five-Factor Model of Personality across instruments and observers. Journal of Personality and Social Psychology, 52(1), 81-90.

Metzger, R. L. (1976). A reliability and validity study of the State-Trait Anxiety Inventory. Journal of Clinical Psychology, 32(2), 276-278.

Miller, T. (1991). The psychotherapeutic utility of the Five-Factor Model of personality: A clinician's experience. Journal of Personality Assessment, 57, 415-433.

Montag, I., & Comrey, A. L. (1990). Stability of major personality factors under changing motivational conditions. Journal of Social Behavior and Personality, 5(4), 265-274.

Moorhead, G., & Griffin, R. W. (1989). Organizational Behavior (2nd ed.). Boston, MA: Houghton Mifflin Company.

Nation, J. R. (1997). Research methods. Upper Saddle River, NJ: Prentice Hall.

Nelson, T. O. (1993). Judgements of learning and the allocation of study time. Journal of Experimental Psychology: General, 122, 269-273.

Norman, W. T. (1963). Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. Journal of Abnormal and Social Psychology, 66, 574-583.

Paunonen, S. V., Keinonen, M., Trzebinski, J., & Forsterling, F. (1996). The structure of personality in six cultures. Journal of Cross-Cultural Psychology, 27(3), 339-353.

Piedmont, R. L, & Weinstein, H. P. (1993). A psychometric evaluation of the new NEO-PI-R facet scales for agreeableness and conscientiousness. Journal of Personality Assessment, 60(2), 302-318.

Prochaska, J. O., DiClemente, C. O., & Norcross, J. C. (1992). In search of how people change. American Psychologist, 47(9), 1102-1114.

Ramanaiah, N. V., Sharpe, J. P., & Byravan, A. (1997). Type A behavior and the five-factor model of personality. Psychological Reports, 81(2), 368-370.

Rammsayer, T. H. (1997). On the relationship between personality and time estimation. Personality and Individual Differences, 23(5), 739-744.

Ray, J. (1984). Measuring trait anxiety in general population samples. Journal of Social Psychology, 123(2), 189-193.

Rejeski, W. J., & Ribisl, P. M. (1980). Expected task duration ad perceived effort: An attributional analysis. Journal of Sport Psychology, 2, 227-236.

Robeck, M. C., & Wallace, R. R. (1990). The psychology of reading: An interdisciplinary approach (2nd ed.). Hillside, NJ: Lawrence Erlbaum Associates, Publishers.

Rule, W. R., & Traver, M. D. (1983). Test-retest reliability of the State-Trait Anxiety Inventory in a stressful social analogue situation. Journal of Personality Assessment, 47(3), 276-277.

Sansone, C., Wiebe, D. J., & Morgan, C. (1999). Self-regulating interest: the moderating role of hardiness and conscientiousness. Journal of Personality, 67(4), 701-733.

Sawyer, T. F., Meyers, P. J., & Huser, S. J. (1994). Contrasting task demands alter the perceived duration of brief time intervals. Perception & Psychophysics, 56(6), 649-657.

Scarpello, V., & Campbell, J. P. (1983). Job satisfaction: Are all the parts there? Personnel Psychology, 36, 577-600.

Sirotnik, K. A. (1980). Psychometric implications of the unit of analysis problem. Journal of Educational Measurement, 17(4), 245-282.

Spielberger, C. C. (1983). State-trait anxiety inventory. Palo Alto, CA.: Consulting Psychologists Press.

Thoms, P., Moore, K. S., & Scott, K. S. (1996). The relationship between self-efficacy for participating in self-managed work groups and the big five personality dimensions. Journal of Organizational Behavior, 17(4), 349-362.

Vidacek, S., & Wishner, J. (1971). Influence of expectation of task duration on efficiency of muscular activity. Journal of Applied Psychology, 55(6), 564-569.

Walczyk, J. J., Kelly, H. B., Kelly, K. E., & Meche, S. D. (1999). Compensatory strategies and less automated reading skills. Presentation held the annual meeting of the American Educational Research Association, Montreal, Quebec.

Walster, B., & Aronson, E. (1967). Effect of expectancy of task duration on the experience of fatigue. Journal of Experimental Social Psychology, 3, 41-46.

Watson, D. & Clark, L. A. (1992). On traits and temperament: General and specific factors of emotional experience and their relation to the Five Factor Model. Journal of Personality, 60(2), 441-476.

Wexley, K. N., & Baldwin, T. T. (1986). Posttraining strategies for facilitating positive transfer: An empirical exploration. Academy of Management Journal, 29(3), 503-520.

Woolfolk, A. E. (1993). Educational psychology (5th Ed.). Boston, MA: Allyn and Bacon.

Zakay, D. (1989). Subjective time and attentional resource allocation: An integrated model of time estimation. In I. Levin, D., & Zakay (Eds.), Time and human cognition: A life-span perspective (pp. 365-397). New York: North Holland Publishing Company.

Zakay, D., & Block, R. A. (1996). The role of attention in time estimation processes. In M. A. Pastor, & J. Artieda (Eds.), Time, internal clocks, and movement (pp. 143-164). New York: Elsevier.

Zimmerman, M. L., Ledbetter, W. B., & Ball, S. E. (1979). Time estimation as a personality indicator. Personality: A Quarterly Journal of Human Behavior, 16(1), 1-3.