AN ABSTRACT OF THE THESIS OF

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Abstract approved: 

Achievement motivation and critical thinking have been recognized as crucial elements contributing to work and academic success. Although a considerable body of research has addressed achievement motivation and critical thinking, no research has been conducted investigating the relationship between the two constructs. The present study was conducted to investigate the association between achievement motivation and critical thinking. The Work and Family Orientation questionnaire consisting of mastery, work and competitiveness scales were used to assess achievement motivation. Critical thinking was measured using Form A of the Watson-Glaser Critical Thinking Appraisal. Ninety-six students in Introductory to Psychology courses served as subjects. Data were analyzed using Pearson product moment correlations and descriptive statistics. Results clearly indicated no relationship between critical thinking ability and mastery or work. However a positive correlation between critical thinking ability and competitiveness was found.

AN INVESTIGATION OF ACHIEVEMENT MOTIVATION AND CRITICAL THINKING

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CHAPTER ONE

INTRODUCTION

A major aim of American higher education has been to improve students' ability to think critically, to reason, and to evaluate and weigh evidence judiciously in making decisions and choices among alternative courses of action. This cluster of intellectual skills has often been labeled critical thinking ability and has been identified as one of the major goals of higher education (Pascarella, 1989). Achievement motivation has also been a perennial topic of investigation. The implicit or explicit aim of most inquiries into achievement related motives has been to predict or to bring theoretical understanding to very limited types of real-world behaviors, namely those occurring in academic and vocational settings (Spence, 1983). As such, both achievement motivation and critical thinking have been recognized as crucial elements contributing to work and academic success. Although a considerable body of research has addressed the issues of both achievement motivation and critical thinking ability, and their role in academic achievement, there has not been any prior research conducted investigating the relationship between these constructs (Spence, 1983; Watson & Glaser, 1964; Pascarella, 1989). The present study attempts to assess that relationship.

The constructs of interest, achievement motivation and critical thinking ability will be presented first. Mastery, work orientation, and competitiveness, three underlying factors of achievement motivation (Spence, 1983), will then be discussed. In addition, the two tests that were employed in the present study, the Work and Family Orientation (WOFO) questionnaire, which assesses achievement motivation,

and the Critical Thinking Appraisal (CTA), will be presented.

Achievement Motivation

Achievement motivation (nAch) is a term that has been used in psychology to describe the personal striving of individuals to attain goals within their social environment (Cassidy & Lynn, 1989). Over the years, achievement motivation has been carefully researched, originating with the work of Murray (1938), taken up by McClelland and Atkinson in the 1950's, and continuing in the recent work of Hekhausen and Spence (Cassidy & Lynn, 1989).

The study of achievement motivation was greatly stimulated by the work of McClelland and his colleagues. In his general theory of motivation, McClelland (1951) had defined motives as tendencies that are learned and energize and direct behavior toward specific goals. However, it was Atkinson who made the first formal statement of a theory of achievement motivation. The basic theory, along with its revisions (Atkinson 1964; Atkinson & Feather 1966), predicts individual behavior in a given situation rather than long-term, task-oriented striving.

Atkinson's theory of achievement motivation defined the primary determinants of achievement behavior and specified a mathematical relationship between the components. The basic theoretical statement and its revisions concern the behavior of individuals in the psychological present, that is, achievement activities in immediate situations (Spence & Helmreich, 1978).

Since then, Spence (1983) has formulated basic assumptions of a theoretical model in the following way: achievement motivation is conceived as a series of more

or less independent motives, each reflecting general dispositional tendencies or traits that are relatively enduring over time and remain latent until engaged or aroused by particular tasks or situations. That is, achievement motivation does not follow from a general-trait approach that individuals are necessarily expected to show a high degree of behavioral consistency over all situations. Rather, achievement motives must be aroused or engaged to affect behavior and almost any situation can be turned into an achievement-oriented challenge by anyone interested in doing so.

Need for achievement was first inferred from the performance of school children. It was found that some people simply try harder than others because some children were much more successful in school than others who were equal in ability (Kalat, 1986). Over the years, advancements in research have allowed achievement motivation to be studied under a variety of situations.

Schroth & Andrew (1987) demonstrated that achievement motives were positively related to grade point averages (GPA) at all levels of educational aspirations and that, conversely, educational aspirations were positively related to GPA at all levels of achievement motives. High academic achievers, presumably through a combination of intellectual ability and motivation to learn, have demonstrated greater mastery of course material than those with lower grade point averages (McCutcheon, Hanson, Apperson, & Wynn, 1992). In other words, intellectual ability, in connection with motivation, has been cited as a contributing factor affecting behavior. Additionally, if achievement motivation affects performance levels, then it should be possible to measure and study this construct as a personality variable.

Originally, achievement motivation was conceptualized as a unitary construct, but recent research has suggested that it is based on a number of underlying factors (Adams, Priest, & Prince, 1985). Three variables cited by Spence (1983) as underlying factors of achievement motivation are mastery, work orientation, and competitiveness. The relationship between these three factors has been suggested by Spence (1978) as being three important determinants of work effort.

Mastery

The mastery factor reflects a preference for difficult, challenging tasks and for meeting internally prescribed standards of performance excellence. It reflects the preference for difficult tasks and one's internal standards of performance excellence (Scroth & Andrew, 1987). Need for mastery also relates to the desire for intellectual challenge (Johnson & Perlow, 1992).

Work

The work factor represents an effort dimension, the desire to work hard and to do a good job (Spence, 1983). It reflects positive attitudes toward work (Adams, et al., 1985). The need for work refers to the individuals's desire to work hard.

Competitiveness

The competitiveness factor describes the enjoyment of interpersonal competition, the desire to win and be better than others (Spence, 1983), and the desire to surpass others (Adams, et al., 1985). Unlike mastery, which involves a task-oriented standard of excellence, competitiveness involves pitting oneself against other individuals (Spence, 1983).

Mastery, work and competitiveness deal with attitudes toward achievement-related activities, yet they are relatively independent motives (Spence, 1983). A series of studies involving measures of academic performance in elementary school children and college students, measures of salary in businesspersons, and measures of number of citations to published work of scientists has revealed an interactive relationship between achievement motives and performance (Spence, 1983). Investigations have found that whereas strength of mastery and work motives are positively associated with quality of performance, competitiveness tends to detract from it, particularly when combined with a high degree of work and mastery (Spence, 1983).

Critical Thinking

Critical thinking is defined as the reasoning done in order to determine whether a claim is true. It involves the ability to use reason in examining evidence (McCutcheon et al., 1992). It is also viewed as a composite of attitudes, knowledge, and skills (Watson & Glaser, 1964). This composite includes the attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is asserted to be true, knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidence are logically determined, and lastly, skills in employing and applying the above attitudes and knowledge (Watson & Glaser, 1964). Ennis, a long-standing authority in critical thinking, defines critical thinking generally as "reflective and reasonable thinking that is focused on deciding what to believe or

do (1985, p.45)." McMillian (1987) reported that greater attention needed to be devoted to the measurement of critical thinking skills of college students and to demonstrating the conditions that maximize positive change in these skills. He reviewed 27 studies investigating the effect of instructional methods, courses, programs, and general college experiences on changes in college students' critical thinking. The largest number of studies (13) compared classes differing in one or two ways with respect to how the classes were taught. Six of the studies reported no significant differences and three studies reported mixed findings. Of the four studies that reported significant differences, Fishbein (1975) found that students grouped in classes on the basis of personality variables outgained students assigned randomly. The results showed that critical thinking, as measured by the Watson Glaser CTA increased significantly if students were put in homogeneous or heterogeneous groups, as compared to grouping students without regard to personality traits (McMillian, 1987). McMillian concluded that the best work in the area of critical thinking was provided by Dressel and Mayhew (1954) who examined the impact of participation in one or more years of a specific program on critical thinking. They reported significant gains for students whose entering scores were low, whereas students scoring high initially showed little or no gain. They also showed that, among upper-class students, critical thinking in social science increased as students progressed through their course of study.

According to Pascarella (1989), students who attended college for one year scored higher in critical thinking than a matched group of students who did not attend

college. Students with one year of college had significantly higher total critical thinking scores and significantly higher scores on the interpretation and evaluation of arguments subscales. In addition, Pascarella found that a composite measure of intellectual and social involvement during the freshman year did have positive partial correlations with critical thinking. In other words, critical thinking ability is linked to education level and environment. If this is true, then striving to achieve a higher level of education should be considered an achievement-related motive.

The present study examines the relationship between achievement motivation and critical thinking ability. Since research has indicated academic success is connected to both critical thinking ability and achievement motivation, both constructs should be investigated to determine the exact nature of their relationship to one another. Spence (1983) argued that nAch, as a multidimensional construct, should be examined to identify the underlying factors of nAch. She identified the factors of mastery, work and competitiveness. However, the purpose of the current study is to determine whether achievement motivation and critical thinking ability have any correlation to one another. In addition, this study presents the hypothesis that individuals who score high on the Critical Thinking Appraisal will also have higher scores on the mastery scale and work scale on the Work and Family Orientation. They will not score high on the competitiveness scale since competitiveness detracts from mastery and work (Spence, 1983). In other words, subjects are predicted to score lower on the competitiveness scale than on either the mastery or work scale.

Work and Family Orientation

The Work and Family Orientation Questionnaire (WOFO) assesses attitudes towards achievement-related motives (Spence, 1983). It is comprised of three scales: work orientation, mastery, and competitiveness. These scales deal respectively with desire to work hard, desire for intellectual challenge, and desire to succeed in competitive, interpersonal situations (Helmreich & Spence, 1978a).

Critical Thinking Appraisal

The Critical Thinking Appraisal (CTA) is one of the most commonly used measures of critical thinking, being the instrument of choice in 16 of the 27 studies reviewed by McMillan (Pascarella, 1989). In his review, McMillan (1987) concluded that improvement in critical thinking is due to overall college experience; the more time students spend in college, the better their critical thinking. The CTA assesses abilities thought to be important in critical thinking (Watson & Glaser, 1964). It seeks to provide an estimate of an individual's standing of abilities by means of five subtests, each designed to tap a somewhat different aspect. The five subtests include inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments.

Summary

Critical thinking ability applies a cluster of intellectual abilities often involved in problem-solving situations. Moreover, people with high achievement needs tend to place special emphasis on finding solutions to problems. They are involved in applying problem-solving skills to problem areas. Based on these two statements, it

seems reasonable that both constructs are connected to problem-solving. Furthermore, both constructs play a role in overall success in academics.

As previously discussed, grade point averages (GPA) for first year college students were affected by the ability to comprehend abstract concepts. In other words, critical thinking ability affected GPA scores. By taking this concept one step further, one may assume that the motivational striving achieved to attend college is achievement-related in itself. For example, those subjects who did not aspire to higher education may not have the motivation or ability to achieve based on their attitudes towards educational aspiration.

The present study will examine the association between achievement motivation and critical thinking ability. Specifically, it is predicted that (1) people with a higher need for mastery will have a higher critical thinking ability than those with a lower need for mastery, (2) people with a higher need for work will have a higher critical thinking ability than those with a lower need for work, and finally (3) need for mastery and need for work are more strongly related to critical thinking ability than competitiveness.

CHAPTER TWO

METHODS

Subjects

Ninety-six students in Introduction to Psychology courses from a small midwestern university served as subjects. The sample included freshmen and sophomore students who chose to volunteer.

Instruments

Work and Family Orientation (WOFO)

The Work and Family Orientation is an objective self-report instrument developed to tap multidimensional aspects of achievement motivation (Helmreich & Spence, 1978a; Adams et al., 1985). The reliabilities, expressed in alpha coefficients, range from .61 to .76. Adams, et al., (1985) reported that these reliability scores are satisfactory for a scale of this length. Together with the factor matching results, it suggests that the WOFO has construct validity even when used in a relatively high achievement sample.

The WOFO is a 23-item measure of achievement motivation and attitudes toward family and career (Helmreich & Spence, 1978a). It consists of two parts. The first part contains 19 items dealing with achievement motives. Scales derived from these analyses were designated work, mastery, and competitiveness. In the scoring of these scales, items are keyed so that high scores reflect a high degree of work, mastery, or competitiveness (Helmreich & Spence, 1978b).

The second part contains four additional questions that are mixed in content.

These items inquire about the respondents' educational aspirations, the relative importance of work versus marriage as anticipated sources of life satisfaction and extrinsic goals such as the desire for pay, prestige, or job advancement for oneself (Spence, 1983).

Critical Thinking Appraisal

The CTA is a power test designed to assess abilities thought to be important in critical thinking. It measures the extent to which examinees have mastered certain critical thinking skills and thus provides a practical estimate of the extent to which this objective of instruction has been achieved (Watson & Glaser, 1964). The test contains 100 items and is usually completed in about 50 minutes (Mines, King, Hood & Wood, 1990). The CTA yields a total score with internal consistency reliabilities in the .70 to .85 range, and test-retest reliabilities in the .70 to .75 range. It also yields five subscores with test-retest reliabilities ranging from .45 to .69. Subscores are weighted equally in deriving the total score (Watson & Glaser, 1980).

Watson and Glaser (1964) list five subtests: (a) inference, the ability to discriminated among degrees of truth and falsity of inference from given data; (b) recognition of assumptions, the ability to recognize unstated assumptions or presuppositions that are taken for granted in given statements or assertions; (c) deduction, the ability to reason deductively from given statements or premises, to recognize the relation of implication between propositions, or to determine what may seem to be an implication or a necessary inference from given premises is indeed such; (d) interpretation, the ability to weigh evidence and distinguish between

generalizations from given data that are or are not warranted beyond a reasonable doubt; and (e) evaluation of arguments, the ability to distinguish between arguments that are strong and relevant and those that are weak or irrelevant to a particular question or issue.

Procedure

Data collection occurred in eight testing sessions with approximately 25 subjects in each group. All participants were required to attend two sessions and complete both the CTA and WOFO. Each participant completed one test in one testing session. Data collection lasted approximately three to four weeks. During the testing session, both tests were administered, with half of the subjects receiving one test and the remaining subjects receiving the other test. Participants were allowed to sit anywhere in the testing room, however, for those students sitting in rows one, three, and five, the WOFO was given. Students sitting in rows two, four, and six were given the CTA. Students read, signed, and dated the consent form before participating in the study. The experimenter then administered the WOFO questionnaire and CTA. Upon completion of the study subjects were debriefed and thanked for their participation.

Data Analysis

Descriptive statistics were used to calculate scores for each of the seven dimensions of achievement motivation as measured by the WOFO. Pearson product-moment correlations were then used to examine the magnitude of relationships between each of the seven achievement motivation dimensions with the CTA. The

seven dimensions on the WOFO were scored in the following manner: work (6 items), mastery (8 items), and competitiveness (5 items) (1=strongly agree, 5= strongly disagree); education level aspired (five categories from 1 = not graduating from college to 5= Ph.D); birth order (four categories from 1= only child to 4= last born); lowest starting salary accepted for first job (1= $11,000-$15,000 to 6= $36,000-$40,000), and importance of getting ahead in the business world (1= not important to 7= extremely important). These scores were then compared to the total number of correct responses on the CTA with 80 being the maximum raw score for Form A.

CHAPTER THREE

RESULTS

The variables of interest in the present investigation were critical thinking ability as measured by the CTA and achievement motivation as measured by the WOFO. Achievement motivation is based on three subscales: work, mastery, and competitiveness. The data were analyzed using Pearson product-moment correlations. The scores for work, mastery, competitiveness, education level aspired, birth order, lowest starting salary accepted for first job, importance of getting ahead in the business world, and CTA were calculated. The means and standard deviations of each group are presented in Table 1.

Inspection of Table 1 indicates a low CTA mean ($X=49$) which, according to Watson and Glaser (1964), is representative of a 26-34 percentile band for freshmen in a four-year college. Although there was a large deviation from the mean ($SD=9.67$), CTA scores still remained relatively low with the highest scores in the 61-69 percentile band. Based on these findings there is evidence to suggest that most of the respondents possessed lower than average critical thinking skills.

Pearson product-moment correlation coefficients were calculated for each dimension of the WOFO against the total CTA score. Table 2 presents these correlations. As Table 2 indicates, the correlations between work and CTA ($r=.0551$, $p<.05$) and mastery and CTA ($r=.0790$, $p<.01$) were not significant. Based on these findings, the hypotheses, stating (1) people with a higher need for mastery will have a higher critical thinking ability than those with a lower need for

Table 1

Descriptive Statistics for the CTA and WOFO Questionnaire

Variable	M	SD
CTA	49.00	9.67
Work	9.04	3.15
Mastery	21.83	5.08
Competitiveness	12.00	4.85
Birth	2.68	1.23
Business	4.58	2.03
Education	3.16	1.41
Salary	2.52	3.15

Key:

CTA=Critical Thinking Appraisal; **Work**=Work Scale; **Mastery**=Mastery Scale; **Competitiveness**=Competitiveness Scale; **Birth**=Birth Order (Note: Only child coded = 1; lastborns coded = 4); **Business**=Importance of getting ahead in the business world (Note: Not important coded = 1; Extremely important coded = 7); **Education**=Amount of education satisfied with (Note: Not graduating from college coded = 1; Ph.D coded = 5); **Salary**=Lowest starting salary acceptable for first job (Note: $11,000-15,000 coded = 1; $36,000-40,000 coded = 6).

Table 2

Correlation Coefficients for CTA and WOFO

	Birth	Busin	Comp	CTA	Educ	Mastery	Salary	WOFO	Work
Birth	1.00								
Business	.41**	1.00							
Competitive	.02	-.17	1.00						
CTA	.06	-.27**	.22*	1.00					
Education	.43**	.53	-.03	-.01	1.00				
Mastery	-.03	.00	.22*	.07	-.04	1.00			
Salary	.45**	.51	-.13	.00	.57*	.01	1.00		
WOFO	-.04	-.14	.63*	.15	-.08	.81**	-.09	1.00	
Work	.05	-.08	-.06	.05	.09	.38**	.06	.48	1.00

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

Key:

CTA=Critical Thinking Appraisal; **Work**=Work Scale; **Mastery**=Mastery Scale; **Competitiveness**=Competitiveness Scale; **Birth**=Birth Order; **Business**=Importance of getting ahead in the business world; **Education**=Amount of education satisfied with; **Salary**=Lowest amount of salary acceptable for first job.

mastery, and (2) people with a higher need for work will have a higher critical thinking ability than those with a lower need for work, were rejected. Although the hypotheses were not supported, two unexpected correlations were present.

The first one was the correlation between the CTA and competitiveness ($r=.2287$, $p<.01$). According to the third hypothesis, critical thinking ability would be more closely related to one's need for mastery and need for work than competitiveness. However, according to Table 2, a correlation between the CTA and mastery and work was not even present. As such, the correlation between the CTA and competitiveness was the only correlation found in regards to the hypotheses. This reveals that respondents who were competitive possessed better critical thinking skills. The second unexpected finding is the correlation between mastery and competitiveness. According to Spence and Helmreich (1979), the correlation between the two should not be significant. However, Table 2 indicates a significant correlation does exist ($r=.2287$, $p<.01$), suggesting that participants who had a high degree of mastery were also competitive.

Table 2 presents several other significant correlations. The correlations for birth order with business ($r=.4136$, $p<.01$), education ($r=.4363$, $p<.01$), and salary ($r=.4563$, $p<.01$) were all significant and positive. This indicates that lastborns are likely to be concerned with getting ahead in the business world and are more motivated to seek a high educational level and high starting salary. In other words, lastborns perceive themselves as more likely to achieve a higher educational level, succeed in the business world and expect a higher starting salary than only children or

firstborns. The correlations for business with education ($r=.5332$, $p<.01$) and salary ($r=.5121$, $p<.01$) were also significant. In other words, if getting ahead in the business world was important to the respondents, they were more likely to aspire to a higher educational level and expect a higher starting salary. A significant correlation between education and salary ($r=.5783$, $p<.01$) indicated that students who aspired to achieve a high educational level also expected a higher starting salary. Lastly, Table 2 reveals a negative correlation between the CTA and business. This indicates that subjects who expected to get ahead in the business world were likely to score lower in critical thinking ability.

CHAPTER FOUR

DISCUSSION

The purpose of this research was to determine the relationship between critical thinking and achievement motivation. This study addressed three predictions: (1) people with a higher need for mastery will have a higher critical thinking ability than those with a lower need for mastery; (2) people with a higher need for work will have a higher critical thinking ability than those with a lower need for work; and (3) need for mastery and need for work are more strongly related to critical thinking ability than competitiveness. These hypotheses were rejected. Results clearly indicated no relationship between critical thinking ability and mastery or work. However, a positive correlation between critical thinking ability and competitiveness did exist.

According to the findings, respondents possessing critical thinking skills tended to be competitive. One possible explanation can be drawn from this finding. Helmreich and Spence (1980) noted that there are two types of competitiveness. The first one is called mastery and is beneficial in that it drives one to succeed and meet internally prescribed standards. The other type, when taken to extremes, is overly concerned with overcoming others and winning. The second is self-defeating and unproductive because so much energy is wasted in trying to outdo others (D'Antonio, 1990). It would appear that those who compete with others spend more time competing than they do on their performance. By applying this concept to the present findings, it is possible that respondents did not reach the extreme competitive style because results indicated that being competitive was not destructive. Rather, it was

beneficial to the participants with respect to critical thinking ability.

According to the results, hypotheses one and two were rejected. In other words, the relationships between the CTA and mastery and work were not significant. A possible explanation for this finding may be the significant correlation between the CTA and competitiveness. Competitiveness tends to detract from performance, particularly when combined with a high degree of work and mastery (Spence, 1983). However, according to the results of the present study, competitiveness does not affect performance negatively. As such, the present findings are not congruent with earlier research. This study was designed to measure not only these dimensions, but other achievement-related variables as well. Such variables as desired educational level, birth order, importance of advancement and salary expectations were also examined.

The relationship between birth order and importance of advancement in the business world revealed a slight correlation indicating that lastborns placed more importance on achievement in the business world than other groups. Lastborns also aspired to a higher educational level and starting salary. Those who placed importance on getting ahead in the business world also aspired to a higher educational level and expected a higher salary. In other words, those who aspired to get ahead in the business world aspired to achieve a higher education and higher starting salary than those who were not concerned with advancement in the business world. Lastly, there was a significant positive correlation between education and salary indicating that those who sought a higher educational level expected a higher starting salary.

Theoretical Implications

Spence (1983) proposed a theoretical model based on assumptions of achievement motivation in which she argued that achievement motivation is conceived as a series of more or less independent motives, each reflecting general dispositional tendencies or traits that are relatively enduring over time and that remain latent until engaged or aroused by particular tasks or situations. Achievement motivation does not assume that individuals are necessarily expected to show a high degree of behavioral consistency over all situations. Rather, achievement motives must be aroused or engaged to affect behavior and almost any situation can be turned into an achievement-oriented challenge. According to Spence (1983), then, certain events or tasks are likely to trigger achievement-oriented behaviors.

The present study partially supports Spence's (1983) theory. The results of this study revealed that those participants who appeared to be competitive also scored higher on the CTA. Their need to compete may have been aroused by the testing situation which may have affected their behavior by scoring relatively high on the CTA. In other words, tests may arouse achievement-related motives in competitive people.

On the other hand, the present study does not support the proposed theoretical model. Correlations between the CTA and mastery and work were nonsignificant indicating that a connection or relationship between the constructs did not exist. In addition, Spence (1983) proposed the idea that competitiveness detracts from performance. Results of the present study do not support this relationship because

competitive people achieved higher CTA scores.

Research Implications

Although this study had a relatively large sample size, there was an inherent problem with the subject pool. The nature of the sample may have been partially responsible for the results obtained. The sample used consisted of volunteers who received extra credit for their participation in the study. Personality traits possessed by volunteers are likely to differ from those individuals who choose not to volunteer (Cohen, Schmida & Ferman, 1985). High academic achievers tend to volunteer less frequently than low achievers. It is possible then, that the entire sample consisted primarily of average or below-average students who needed the extra points to raise their grades. It was noted that GPA was affected by the ability to comprehend abstract concepts. If this is true and if the entire sample consisted of average or below-average students, then one can understand why CTA scores were so low. In other words, the sample may have consisted of individuals who lacked critical thinking skills because they were average or below-average students. This might explain the low CTA scores.

Taken one step further, one can assume that high critical thinkers have higher GPAs. If so, then it is likely that they did not participate in the study. This occurrence could have resulted in the rejection of the first two hypotheses suggesting that people with a high need for mastery and work are high critical thinkers. Thus, an imbalance in the sample limits the generalizability and the stability of the research findings. Future research should include a large enough representation of above-

average, average and below-average students to correct for the possible imbalance of subjects that occurred in the present study.

Another limitation concerns the reported scale means for mastery, work and competitiveness. According to previous research (Spence & Helmreich, 1978; Adams et al., 1985) the work scale mean in the present study is not representative of previous findings. Spence and Helmreich (1978) reported their scale means for college students and revealed the following: mastery ($X=19.3$ for men and $X=18.0$ for women); work ($X=19.8$ for men and $X=20.3$ for women); and competitiveness ($X=13.6$ for men and $X=12.2$ for women). Similarly, Adams et al. (1985) conducted a similar study in an attempt to analyze the validity of the WOFO and found similar results. However, the current study found the following: mastery ($X=21.83$); work ($X=9.04$); and competitiveness ($X=12.0$). It is apparent that the work scale mean differed significantly from previous research findings. Based upon these findings, there is evidence to suggest a problem with the data.

Lastly, the distribution of CTA scores were low. According to Watson and Glaser (1964), a mean of 49.00 is representative of the 26-34 percentile band which indicates that respondents scored below average on the CTA. Moreover, the maximum score possible on the CTA is 80 indicating that the sample mean ($M=49.0$) is fairly low. In other words, most of the subjects did not appear to possess a very high level of critical thinking skills. Due to the lack of high CTA scores, results of the study may be biased because they are not representative of the general population.

Practical Implications

These results suggest that respondents who appeared to possess adequate critical thinking skills tend to be competitive. Although correlations were low or nonexistent, this research expanded existing knowledge of achievement motivation and critical thinking ability. It has been noted that the WOFO may be predictive of future academic performance and realworld accomplishment, such as salary and scientific citations (Spence & Helmreich, 1978). In addition, the CTA is predictive of success in certain types of occupations in which critical thinking is known to play an important role (Watson & Glaser, 1964). This predictive ability of both the WOFO and CTA would allow researchers to use test results to predict future behavior.

Organizations could benefit from the predictability of the tests in that human resource managers could employ these tests for screening and selection purposes as a way of matching the right person to the right job. Research shows that if a person is properly fitted to a job, in other words, if a person's needs match the job, he or she probably will be someone who is satisfied with and committed to the job (Chusmir, 1990). Parker and Chusmir (1991) found that a good fit is a major key to a stable and satisfied work force. When jobs are matched to needs, employees enjoy their jobs more, have stronger motivation, stay on the job longer, and are not absent as much (Chusmir, 1990). As a result, the company's effectiveness is increased by the higher levels of satisfaction and job performance. Operating costs are substantially lower because of the ensuing reduction in turnover and absenteeism (Chusmir & Azevedo, 1992). Both concepts, critical thinking and achievement motivation, are

concerned with finding solutions to problems (Spence, 1980; Watson & Glaser, 1964). Organizations can take this concept one step further by looking at these two constructs as prerequisites for employment.

Organizations are continually seeking solutions to problems. Whether it is solving staffing problems, reducing high labor costs or resolving grievances, problem-solving tactics are a common necessity (Norris, 1986). As such, organizations need to hire individuals who would be able to handle these problems appropriately. Therefore, possessing critical thinking skills and achievement-oriented motives is preferred and desirable. Furthermore, organizations are likely to avoid unnecessary disasters or mistakes by employing workers who apply their own strategies and knowledge to solve complex and controversial problems.

Results can also be applied to academics, specifically career development. By recognizing certain abilities and skills, students might be able to understand and pursue careers that fit their needs and interests. For example, people with high levels of achievement motives tend to perform well as staff specialists, commission salespersons, and professionals. Some job situations that require problem-solving skills are engineers, builders, and certain staff jobs requiring specialized expertise. Lastly, professionals such as accountants, lawyers, and doctors usually have high achievement needs (Carr-Ruffino, 1993). In sum, employing these tests may aid students in guiding their coursework and majors for future careers by highlighting their skills and abilities.

Summary and Conclusions

The purpose of this study was to examine the association between achievement motivation and critical thinking ability. Specifically, it was predicted that (1) people with a higher need for mastery will have a higher critical thinking ability than those with a lower need for mastery, (2) people with a higher need for work will have a higher critical thinking ability than those with a lower need for work, and (3) need for mastery and need for work are more strongly related to critical thinking ability than competitiveness. Inspection of the results indicated a significant correlation between critical thinking ability and competitiveness, suggesting that competitive people possess critical thinking skills. Hypotheses one and two were not supported indicating that no relationship between critical thinking ability and mastery or work existed. Although the first two hypotheses were rejected, test scores in the present study were relatively low for college freshman and sophomores and should be considered when interpreting the findings. Other achievement motivation dimensions, such as, educational aspiration, importance of advancement and salary expectations, were also examined.

It was suggested that lastborns placed greater importance on getting ahead in the business world than other categories. Lastborns also aspired to a higher educational level and starting salary. Those who aspired to get ahead in the business world aspired to achieve a higher education and higher starting salary than those who were not concerned with advancements in the business world. There was also a significant correlation between education and salary indicating that those who sought a

higher educational level expected a higher starting salary.

Future Research

Further research should include a sample more representative of the general population to strengthen the results, correct for any imbalances, and allow the results to be more generalizable and stable. Limiting the sample to volunteers alters the results because volunteers have different traits than non-volunteers (Cohen et al., 1985). Using extra credit as an incentive to participate in the study can bias the results by attracting only those average or below-average students who need the extra points. Also, using both lower and upper classmen is suggested since it was noted that critical thinking skills increase with the level of education one obtains. By limiting the present sample to those freshmen and sophomores in Introduction to Psychology, low CTA scores could have resulted. Lastly, it is suggested that future research should collect grade point averages and possibly intelligence scores. This would allow researchers to expand the findings and predict future behavior.

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APPENDIX A

WORK AND FAMILY ORIENTATION QUESTIONNAIRE

Work and Family Orientation Questionnaire
(Spence and Helmreich, 1983)

Rate yourself on each item, using the following scale:

1=Strongly agree
2=Somewhat agree
3=Neither agree or disagree
4=Somewhat disagree
5=Strongly disagree

Work

_____ 1. It is important for me to do my work as well as I can even if it isn't popular with my coworkers.

_____ 2. I find satisfaction in working as well as I can.

_____ 3. There is satisfaction in a job well done.

_____ 4. I find satisfaction in exceeding my previous performance even if I don't outperform others.

_____ 5. I like to work hard.

_____ 6. Part of my enjoyment in doing things is improving my past performance.

Mastery

_____ 1. I would rather do something at which I feel confident and relaxed than something which is challenging and difficult.

_____ 2. When I group I belong to plans an activity, I would rather direct it myself than just help out and have someone else organize it.

_____ 3. I would rather learn easy, fun games than difficult thought games.

_____ 4. If I am not good at something, I would rather keep struggling to master it than to move on to something I may be good at.

_____ 5. Once I undertake a task, I persist.

_____ 6. I prefer to work in situations that require a high level of skill.

_____ 7. I more often attempt tasks that I am not sure I can do than tasks that I believe I can do.

_____ 8. I like to be busy all the time.

Competitiveness

_____ 1. I enjoy working in situations involving competition with others.

_____ 2. It is important to me to perform better than others on a task.

_____ 3. I feel that winning is important in both work and games.

_____ 4. It annoys me when other people perform better than I do.

_____ 5. I try harder when I'm in competition with other people.

What amount of education would you be satisfied with?

_____ 1. Not graduating from college
_____ 2. Bachelor's degree
_____ 3. Some postgraduate work
_____ 4. Master's
_____ 5. Ph.D.

What is your birth order?

_____ 1. Only child
_____ 2. First-born
_____ 3. Middle-born
_____ 4. Last-born

What is the lowest starting salary you would accept for your first job?

_____ 1. $11,000-15,000
_____ 2. $16,000-20,000
_____ 3. $21,000-25,000
_____ 4. $26,000-30,000
_____ 5. $31,000-35,000
_____ 6. $36,000-40,000

To what extent is getting ahead in the business world important to you?

Not Important	/	1	/	2	/	3	/	4	/	5	/	6	/	7	/	Extremely Important

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Jill Mastbergen
Signature of Author

July 8, 1994
Date

An Investigation of Achievement Motivation and Critical Thinking
Title of Thesis

Dave Cooper
Signature of Graduate Office Staff Member

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