University of Tennessee, Knoxville

TRACE: Tennessee Research and Creative Exchange

Doctoral Dissertations

Graduate School

8-2006

An Examination of Competitiveness and Personality in Relation to Academic and Sales Performance

Matthew Charles Valenti
University of Tennessee, Knoxville

Follow this and additional works at: https://trace.tennessee.edu/utk_graddiss

Part of the Psychology Commons

Recommended Citation

Valenti, Matthew Charles, "An Examination of Competitiveness and Personality in Relation to Academic and Sales Performance. " PhD diss., University of Tennessee, 2006.
https://trace.tennessee.edu/utk_graddiss/4283

This Dissertation is brought to you for free and open access by the Graduate School at TRACE: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Doctoral Dissertations by an authorized administrator of TRACE: Tennessee Research and Creative Exchange. For more information, please contact trace@utk.edu.

To the Graduate Council:

I am submitting herewith a dissertation written by Matthew Charles Valenti entitled "An Examination of Competitiveness and Personality in Relation to Academic and Sales Performance." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Debora Baldwin, Major Professor

We have read this dissertation and recommend its acceptance:

Warren Jones, Jacob J. Levy

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

I am submitting herewith a dissertation written by Matthew Charles Valenti entitled "An Examination of Competitiveness and Personality in Relation to Academic and Sales Performance." I have examined the final paper copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Debora Baldwin, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Chancellor and Dean of
Graduate Studies

Thesis
20066
.V26

AN EXAMINATION OF COMPETITIVENESS AND PERSONALITY IN RELATION TO ACADEMIC AND SALES PERFORMANCE

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Matthew Charles Valenti

August 2006

Abstract

The purpose of this study was to investigate potential non-linear relationships between competitiveness as measured by the Revised Competitiveness Index and performance in both college students (Study 1) and insurance agents (Study 2). In addition, relationships between competitiveness and personality were explored. All participants completed the 16PF Fifth Edition to measure personality and the Revised Competitiveness Index to measure self-reported competitiveness. Study 1 consisted of 188 undergraduate students, and performance was defined as college GPA. Study 2 consisted of 30 licensed insurance agents and performance was measured by raw sales, sales efficiency, cross sell, average commission earned, and commission efficiency. Results of Study 1 showed that within a quadratic equation with an inverted-U shape, competitiveness explained significant observed variance in college GPA. In Study 2, competitiveness explained significant observed variance in average monthly sales. This equation in this study was cubic and was U-shaped. No gender differences in self-reported competitiveness were found in either study. With regard to personality measured via the 16PF, competitiveness was found to be related to self-control in Study 2 but no significant correlations were found between competitiveness and any factor of personality in Study 1. An investigation into competitiveness, self-efficacy, and performance found that, in the discovered polynomial equations, competitiveness explained significant variance beyond that accounted for by self-efficacy in both studies. Overall, this study was the first to investigate a non-linear relationship between competitiveness and objective performance, and it was the first to detect significant findings of this type. Because different relationships were found in each study, it is likely that those who are

extremely high and low in competitiveness have outcomes different from those of average competitiveness, though similar to each other. The non-linear relationship was independent of self-efficacy and should serve to re-open investigation into competitiveness as a predictor of performance outcomes.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION 1

Theoretical Models and Survey Construction 3

Group Differences in Competitiveness 7

Gender Differences 7

Differences in Socially Defined Groups 8

Physiological, Biological, and Cognitive Correlates of Competitiveness 11

Competitiveness and Personality 13

Competitiveness and Performance 16

Rationale 23

Objectives 25

Hypotheses 26

CHAPTER 2: METHODS 28

Samples 28

Instrumentation 29

Personality Measures 29

Self-Efficacy 30

Competitiveness 30

Dependent Measures 31

CHAPTER 3: RESULTS 33

Study 1: Competitiveness, Personality, and Academic Performance 33

Hypothesis 1a 33

Hypothesis 1b 43

Hypothesis 3a 47

Hypothesis 3b and 3d 47

Study 2: Competitiveness, Personality, and Sales Performance 48

Hypothesis 2a 48

Hypothesis 2b 54

Hypothesis 3a 58

Hypothesis 3c and 3e 58

Chapter 4: GENERAL DISCUSSION 60

Self-reported Competitiveness as a Predictor of Performance 60

Gender Differences in Competitiveness and Performance 63

Competitiveness and Personality 65

Competitiveness, Self-efficacy, and Performance 65

Limitations 69

Directions for Future Research 70

List of References 72

Appendices 82

Appendix A 83

Appendix B 85

Appendix C - Tables 86

Vita 91

LIST OF TABLES

TABLE

1.	Descriptive Statistics – students	35
2.	Descriptive Statistics – students by gender	36
3.	Curve Estimation – all students: Competitiveness and GPA	37
4.	Curve Estimation – all students: Enjoyment of Competition and GPA	40
5.	Curve Estimation – lower-division students: Competitiveness and GPA	42
6.	Curve Estimation – male students: Enjoyment of Competition and GPA	44
7.	Correlations: Competitiveness, its factors and personality Students	86
8.	Correlations – students by gender: Competitiveness, its factors and personality	87
9.	Linear regression: Self-efficacy then Competitiveness and Competitiveness-squared	88
10.	Descriptive Statistics – insurance agents	49
11.	Descriptive Statistics – insurance agents by gender	50
12.	Curve Estimation – insurance agents: Competitiveness and Average Sales	52
13.	Curve Estimation – insurance agents: Enjoyment of Competition and Average Sales	55
14.	Curve estimation – female insurance agents: Competitiveness and Average Sales	57
15.	Correlations: Competitiveness, its factors and personality Insurance Agents	89

16. Linear regression: Self-efficacy, Competitiveness, and Competitiveness-cubed 90

LIST OF FIGURES

FIGURE

1.	Scatter-plot of Competitiveness and GPA	38
2.	Scatter-plot of Competitiveness and GPA: female students	45
3.	Scatter-plot of Competitiveness and GPA: male students	46
4.	Scatter-plot of Competitiveness and Average Sales	53

CHAPTER 1: INTRODUCTION

Trait competitiveness has been under investigation for nearly a century (Houston, McIntire, Kinnie, & Terry, 2002). Sport psychology generated the bulk of the research on this phenomenon (e.g. Chroni, 1998; Gill, 1988; Gill & Deeter, 1988; Gill, Dzewaltowski, & Deeter, 1988). Over the last fifteen years, however, industrial psychologists have begun to test the idea that trait competitiveness can be used during personnel selection (for both initial employment and advancement) to detect those who are most likely to succeed (Hibbard, 2000; D. L. Johnson, 1993).

The definition of competitiveness varies depending upon the psychological discipline within which the research falls. For example, Riskind and Wilson (1982) define competitiveness as "enjoyment of interpersonal competition and being better than others"(p. 444). Helmreich and Spence (1978) define competitiveness as the "desire to enter and strive for success in sports competition"(p. 4). Along these lines, researchers have labeled competitiveness as a sports-specific achievement motivation (e.g. Fabian & Ross, 1984; Gill, Kelley, Martin, & Caruso, 1991). In addition, researchers have turned to athletes from a variety of sports to serve as participants (Chroni, 1998; Houston, Carter, & Smither, 1997).

Although this list of definitions of competitiveness is not exhaustive, the variety of definitions for and the perceived similarities between competitiveness and achievement motivation (nAch) have led researchers to investigate the relationship between the two. Researchers have also sought to determine what factors might comprise trait competitiveness (Houston, McIntire, Kinnie, & Terry, 2002; D. L. Johnson, 1993).

However, for competitiveness to be investigated as a multifactor construct on its own, it first had to be separated from need for achievement (nAch).

Early scale-development research proposed a model of nAch that included competitiveness as an underlying factor (Cassidy & Lynn, 1989; Gill & Deeter, 1988; Helmreich & Spence, 1978). It was not until several years after the development of Helmreich and Spence's Work and Family Orientation Questionnaire (1978) that researchers began to propose multi-factorial models of competitiveness (Griffin-Pierson, 1990; Smither & Houston, 1992). Johnson (1993) performed an exploratory factor analysis of measures of both nAch and competitiveness. This research concluded that as the constructs have been defined thus far, "competitiveness is not a part of achievement motivation" (p. 193). She makes this assertion because, in her analysis of unit and area managers in a large food service company, there was variance explained by competitiveness that was independent from that explained by nAch. If competitiveness were a factor fully contained within achievement motivation, nAch should explain all of the variance in competitiveness as well as any additional variance from additional nAch factors.

Because of the similarities between achievement motivation and competitiveness, the question arises, "how are nAch and competitiveness different?" The answer to this question may depend on how the participant perceives the task being examined. Previous studies examining competitiveness have focused on the process of engaging in competition (enjoyment of competition/conflict), whereas nAch literature focuses on the outcome of these processes (drive for perfection/pursuit of excellence). Based on this distinction, it is possible for participants to score highly on measures of competitiveness

or nAch or both, depending upon where their focus lies. Because researchers have consistently found a positive relationship between the two (Gill & Deeter, 1988; Gill, Dzewaltowski, & Deeter, 1988; D. S. Johnson & Perlow, 1992; Kirkcaldy & Furnham, 1993), future research could measure both along with performance to determine why the relationships that each has with performance criteria are different.

Theoretical Models and Survey Construction

Initially, competitiveness appeared as a lower-order factor in a number of multifactor models of achievement motivation (nAch). Helmreich and Spence (1978) proposed a four-factor model of achievement motivation with their Work and Family Orientation Questionnaire (WOFO). Their Competitiveness factor was defined as "the desire to win in interpersonal situations" and was measured by five items such as "I enjoy working in situations involving competition with others." The other factors are Mastery, Work, and Personal Unconcern. This scale has been used in numerous studies as both a measure of nAch and as a means to determine concurrent validity during scale development (Gill & Deeter, 1988; Griffin-Pierson, 1990; Houston, McIntire, Kinnie, & Terry, 2002; Smither & Houston, 1992).

The Sport Orientation Questionnaire (SOQ) was developed by Gill and Deeter (1988) to measure sport oriented achievement motivation. They define their competitiveness factor as "the desire to enter and strive for success in sport achievement situations" (p. 195), and it is measured by thirteen items such as "The best test of my ability is competing with others." This factor explained 33.5% of the total variance and correlated significantly with both their Mastery and Work scales as well as the Competitiveness factor of the WOFO. Their findings went a long way toward supporting

the idea that competitiveness may actually be a type of "sports" achievement motivation (e.g. Fabian & Ross, 1984).

In an effort to create a more comprehensive model of nAch, Cassidy and Lynn (1989) combined several measures and derived [via exploratory factor analysis (EFA)] a seven-factor solution to the structure of nAch. This included a competitiveness factor defined as "enjoyment of competition with the goal of winning." At that time, most of the previous research had indicated that competitiveness was a factor of achievement motivation (e.g. Gill & Deeter, 1988). Therefore, their inclusion of this factor was in line with previous research. It is also possible that this factor is the result of items from the WOFO (Helmreich & Spence, 1978) being utilized during their factor analysis (3 of the 7 items in their competitiveness factor were from the WOFO).

Shortly after Cassidy and Lynn's (1989) study was published, researchers began examining competitiveness as more than just a part of achievement motivation or a specific type of nAch. The Hypercompetitive Attitude Scale (Ryckman, Hammer, Kaczor, & Gold, 1990) proposes a uni-factorial model of *competitiveness*. They define hypercompetitive attitude as an "indiscriminate need by individuals to compete and win…at any cost as a means of enhancing…self worth" (p. 630). It consists of twenty-six items such as "I find myself turning a friendly game or activity into a serious contest or conflict." Scores on their scale have been found to be related to other's measures of self-aggrandizement (Houston, Harris, McIntire, & Francis, 2002).

As the study of competitiveness progressed, multi-factor models of the construct began to appear. An early example of this is the Competitiveness Questionnaire (Griffin-Pierson, 1990). This scale measures a two-factor model of competitiveness and includes

interpersonal competitiveness (IC) and goal competitiveness (GC). Instead of traditional factor analysis, these factors were derived theoretically and items were written to measure each of them. Griffin-Pierson defined IC as "the desire to do better than others, the desire to win in interpersonal situations," and GC as "the desire to excel, the desire to obtain a goal" (1990) and notes that this encompasses the two "directions" of competitiveness, focus on others and focus on goal. It is this mention of "others" that could point to the distinction between nAch and competitiveness. The IC factor is measured by eight items such as "I perform better when I am competing against someone rather than when I am the only one striving for a goal." The GC factor is measured by seven items such as "I would want to get an A because that is the best grade a person can get." The GC factor was able to distinguish competitive swimmers from medical residents during construct validation.

The Winning, Competitiveness, Mastery and Persistence Scale (Franken, 1990) measures a three-factor model of competitiveness: motivation for high performance (MHP), motivation for new learning (MNL), and importance of winning (WIN). The MHP factor is measured by four items such as "I tend to work harder when I am competing against other people." The MNL factor is measured by nine items such as "I like situations that challenge me to learn and develop." The WIN factor is measured by six items such as "I sometimes bend the rules in order to win." This scale was found to predict interest in competitive sports in both men and women but was not tested outside the arena of athletics.

The Competitiveness Index (Smither & Houston, 1992) is a 20-item, true/false measure consisting of three factors: Emotion, Argument, and Games explaining 89.3% of

the variance. However, measurement problems prompted Houston et al to revise the Competitiveness Index. The result was a two-factor, 14-item measure with a Likert-type response scale (Houston, Harris, McIntire, & Francis, 2002). Their two factors, *enjoyment of competition* (EC) and *contentiousness* I, are similar to those put forth by Griffin-Pierson (1990) and Franken et al. (1994). The EC factor is measured by nine items, and the C factor is measured by five items. The overall reliability estimate for all fourteen items was .87. Scores on this scale correlated significantly with scores on the competitiveness subscales of the WOFO and the SOQ.

In a similar effort to that of Cassidy and Lynn (1989), Houston, McIntire, Kinnie, and Terry (2002) performed an EFA on several measures of competitiveness. Their goal was to define competitiveness more thoroughly by relating several measures to each other. Their EFA yielded the following two-factor solution: Self-Aggrandizement and Interpersonal Success. The former is similar to Ryckman et al's (1990) Hypercompetitive Attitude and accounted for 34% of the variance during factor analysis. The latter is similar to Griffin-Pierson's (1990) Interpersonal Competitiveness factor and explained 33% of the variance.

Based on a literature review, Valenti (2005a) proposed a three-factor interpretation of competitiveness based on similarities between factors found in many of the previously mentioned studies. The factors and their definitions are: *personal victory* – winning for victory's sake or to be superior to others; *enjoyment of competition* – captures the emotional aspect of competitiveness suggested by Houston et al's Competitiveness Index revision (2002); and *conflict* – the willingness to risk ego and

enter into situations that involve conflict or competition and could result in victory or defeat.

Group Differences in Competitiveness

Gender Differences

Measures of general personality and narrower traits are often used during selection processes for employment and academics. For this reason, it is important to determine if a given scale is generalizeable to diverse groups. Mean differences based on gender or race are the most common problems a researcher may face when developing an instrument. Therefore, it is necessary to make sure that the selection process, as a whole, does not adversely impact the applicants' opportunities for employment based on race or gender ("Adoption of Four Agencies of Uniform Guidelines on Employee Selection Procedures", 1978).

Most studies that include a scale measuring competitiveness have provided information on significant differences in competitiveness scores between gender and between different racial groups when sample sizes are large enough to allow for analysis. When gender differences are found to be significant, men tend to score higher on measures of competitiveness than do women. Cassidy and Lynn (1989) found significantly higher scores for males on their competitiveness factor in three separate samples. This is similar to what Franken et al (1994) found in their study predicting sport interest. Males scored significantly higher on their Motive for Higher Performance and WIN factors, but no difference was found on the Motivation for New Learning factor.

During the development of the Sport Orientation Questionnaire, Gill and Deeter (1988) found significantly higher scores for men than women on their competitiveness

factor. Additional studies utilizing this instrument found similar mean differences (Gill, 1988; Gill & Dzewaltowski, 1988; Gill, Kelley, Martin, & Caruso, 1991). During the development of the WOFO, Helmreich and Spence (1978) found no significant difference between males and females on their competitiveness factor. This supported their intent which was to develop an instrument that would be equally useful for both men and women. However, continued use of this instrument by different researchers has produced markedly different results. For example, Franken et al (1994) found men scored significantly higher on the dimensions of competitiveness and mastery. Johnson (1993) reports differences in the same direction on both factors. Griffin-Pierson (1988) notes that these differences reveal that competitiveness in women may be a different phenomenon all together that is not measured accurately with the existing scales.

Systematic gender differences in the measurement of competitiveness may lessen the usefulness of competitiveness in any selection process falling under the regulation of federal or state governments. However, it is possible to utilize a measure during personnel selection if the following two conditions are met: 1) no single hurdle in a multiple hurdle selection process results in discrimination on the basis of race or gender, and 2) there is not another measure available that results in less adverse impact. The scenario presented here has arisen previously with the use of measures of intelligence and critical thinking (Hill, Pettus, & Hedin, 1990).

Differences in Socially Defined Groups

In addition to differences in competitiveness that may exist between different demographic groups, meaningful differences have also been found between groups in studies looking for a competitiveness-performance relationship. For example, Hoffman

(1986) attempted to determine what differences there may be between athletes and non-athletes. A sample of fifty individuals (25 sport participants and 25 non-participants) completed a fourteen item index of competitiveness. Athletes were found to be higher in competitiveness and self-esteem. It is not clear if these characteristics are the result of athletic participation or if these are qualities that participants brought with them to athletic competition. Additional research is necessary to determine which of these scenarios is more likely. It is also important for future research to study larger samples if possible.

Begley and Boyd (1987) investigated differences between small business managers (184) and entrepreneurs (248) (operationally defined as non-founders and founders, respectively). Competitiveness was measured as a component of Type-A behavior via the Jenkins Activity Survey (JAS; Jenkins, Zyzanski, & Rosenman, 1979). Financial performance consisted of several criteria: revenues, debt/equity ratio, growth rate, profit % sales, profit trend and return on investment (ROI). For growth rate, profit % sales, profit trend, and ROI, small business managers (non-founders) scored significantly higher on hard-driving competitiveness. Begley and Boyd concluded that because entrepreneurs have no direct competitors within the firm, and thus are not striving for advancement within the company, they may not need to be competitive to be successful. It is also possible that levels of competitive behavior are fostered by the competitiveness of the environment in which participants work. This idea was supported by Houston, Kinnie, Lupo, Terry, and Ho (2000) who found that competitive behavior increased when conditions themselves were competitive.

As part of a validation study for the Competitiveness Index (CI), Houston, Farese, and la Du (1992) examined possible mean differences between groups (attorneys and nurses) theoretically thought to differ in competitiveness. This difference "refers to the extent to which interpersonal competition is required by the tasks and duties specified by the respective job descriptions" (p. 1153). These hypothesized differences coincide with other's descriptions of attorneys as highly competitive (Daicoff, 2004; Williams & McCullers, 1983). The sample consisted of 158 nurses (153 females and five males) and ninety-seven attorneys (twenty-eight females and sixty-nine males). Results indicate that CI score was a significant predictor of occupation. They report that there was no interaction between gender and CI score, though this is difficult to determine because the sample of nurses only contained five males. This would seem to indicate that attorneys are significantly more competitive than nurses and that those higher in competitiveness may be more likely to succeed as attorneys (Houston et al did not test this second assertion empirically). It is also possible that the lack of male representation in the sample of nurses was responsible for the differences in self-reported competitiveness.

Mendez (2000) was unable to detect a significant difference in competitiveness between gifted and non-gifted students. Competitiveness was measured via the WOFO and participants (all female) were 132 "gifted" students and 77 students classified as "general education" from two public schools. She explains this stating that "the two groups are equally interested in trying to outperform others" (p. 162), and that competitiveness does not contribute to group assignment (gifted versus general education). This conclusion may be erroneous because the idea that the groups do not

differ with respect to self-reported competitiveness was not tested empirically. Mendez merely accepts the null hypothesis because the research hypothesis was not supported.

These studies taken together indicate that most measures of competitiveness have demonstrated concurrent validity (groups thought to differ theoretically with regard to a given construct are found to differ in the hypothesized direction). The study finding no group differences in competitiveness was not relying on any specified theoretical evidence to expect such a difference to have existed.

Physiological, Behavioral, and Cognitive Correlates of Competitiveness

Because hard-driving/competitiveness, defined as "an intense, sustained drive to achieve" (Friedman & Rosenman, 1959, p. 1286), is considered a component of Type-A personality , psychologists have examined physiological differences between the personality types. Friedman and Rosenman found that those exhibiting Type-A behaviors had higher incidence of coronary artery disease compared to a group not exhibiting Type-A behaviors and a control group.

Bermudez and Perez-Garcia (1996) found that those undergraduate students who scored higher in self-reported competitiveness had a higher systolic blood pressure than those lower in self-reported competitiveness. In addition, they found those high in competitiveness exhibited significantly shorter response times compared to their less competitive counterparts. This can be seen as performance difference between the two groups (high and low competitiveness) though no significant differences in scores or response times were found between the groups on a mental arithmetic test. They attribute these differences to the increased effort that more competitive people tend to exert,

regardless of task difficulty. This coincides with findings by both Wang and Netemeyer (2002) and Krishnan, Netemeyer, and Boles (2002).

Kivlighan, Granger, and Booth (2005) examined differences in testosterone and cortisol levels in forty-six members of a university crew team. Three items were used to assess competitiveness in male and female participants (no reliability information was presented for this three-item scale). Men showed increased competitiveness associated with higher cortisol levels. Women did not show a significant relationship between cortisol level and competitiveness. No significant relationship was found between competitiveness and testosterone level in men or women. Overall, they conclude that any relationship that may exist between competitiveness and performance does not manifest itself in differences in hormonal levels.

Northam and Bluen (1994) examined the relationship between Type-A behaviors including competitiveness and mental health. They operationally defined the competitiveness component as an individual's score on Cassidy and Lynn's (1989) achievement motivation measure. They found no significant relationship between competitiveness and achievement striving, but there was a positive correlation between competitiveness and depression. No significant relationship was found between competitiveness and academic performance. The findings of this and the previous two studies seem to indicate that competitiveness is associated with a number of poor physical and mental health outcomes.

Research into competitiveness, psychological pathologies (measured by the MMPI), and marital satisfaction found several significant relationships (James & Johnson, 1988). In women, competitiveness was significantly related to seven of ten

pathologies (e.g. hypochondriasis and paranoia). In men, it was only related to hypomania and social introversion. For both men and women, competitiveness was significantly related to global dissatisfaction with the marriage. They attribute these findings to the idea that competitive orientations lead to isolation from others and a more negative view of life events. They state that this may lead to psychological pathologies in both men and women.

The general consensus of the studies presented here is that people who are highly competitive may experience higher levels of cardiovascular activity and hormone levels which could lead to health problems. These differences can also lead to psychological pathologies which can interfere with the ability to form and maintain close relationships.

Competitiveness and Personality

Over the past 20 years, a number of studies have explored the relationship between competitiveness and general personality. In a study of 558 secondary school students, Wang and Ding (2002) found several correlations between competitiveness and scales on the Eysenck Personality Questionnaire (EPQ). They found it was positively related to extraversion and negatively related to neuroticism and psychoticism (a combination of agreeableness and conscientiousness; Eysenck & Eysenck, 1968). The negative relationship between competitiveness and psychoticism (as measured by the EPQ) coincides with findings by Kirckaldy, Furnham, and Lynn (1992), though they did not find a correlation between competitiveness and extraversion as Wang and Ding (2002) had. Kirkcaldy et al suggest that psychoticism may be more related to being independent and self-sufficient and less related to being socially competitive.

A measure of competitiveness (as hard-driving/competitiveness) is often included in research because it is considered a Type-A (coronary- prone) behavior. In a study of eighty-one participants, Wong and Reading (1989) found that the only significant correlation was a positive correlation between extraversion and competitiveness. They did find that psychoticism and neuroticism correlated with other Type-A behaviors (speed and impatience), but neither correlated significantly with competitiveness.

May and Kline (1987) examined personality and Type-A behavior in a sample of 135 men in the military. They found a significant positive correlation between competitiveness and extraversion and a significant negative correlation with neuroticism. Like Wong and Reading (1989), no significant correlation was found between competitiveness and psychoticism. These two studies serve as an example of the inconsistency of correlations between competitiveness and personality components. Neither shows a relationship between competitiveness and psychoticism, while two studies found a negative correlation between the two constructs (Kirkcaldy & Furnham, 1993; J. Wang & Ding, 2002). These different findings are important because all four studies used the same measures of both personality (EPQ; Eysenck & Eysenck, 1968) and competitiveness (JAS; Jenkins, Zyzanski, & Rosenman, 1979). Thus, additional research into the relationship between competitiveness and personality is needed to alleviate this confusion.

In an effort to determine predictors of managerial performance, Johnson (1993) found several correlations between competitiveness and personality. Personality was measured via the Hogan Personality Inventory (Hogan, 1992) which consists of seven scales (with explanation of each in parentheses): intellectance (bright, cultural, and

educated), self approval (self-confident…lack of worry), prudence (conscientiousness), ambition (leadership potential and initiative), sociability (extraversion), likeability (seen by others as likeable…even-tempered), and school success (values education). Her model of competitiveness included items measuring competitive behaviors (C1) as well as items measuring Self-description of Competitiveness (C2). Several significant positive correlations emerged between C2 and personality: intellectance, self approval, ambition, and sociability. There were also a significant negative correlation between C1 and prudence and a positive correlation between C1 and sociability. These findings provide further evidence of a positive relationship between competitiveness and extraversion but no consistent relationship was found between competitiveness and factors of psychoticism (prudence/likeability). This pattern of correlations is consistent with what previous studies have found.

Similar correlations were found between competitiveness and personality measured via the California Personality Inventory (Haemmerlie & Beamish, 1990). Participants were 142 undergraduate students enrolled in introductory psychology (though most were engineering majors). Type-A-competitiveness was positively related to dominance, capacity for status, sociability, self-acceptance, responsibility, and achievement via conformity; and negatively related to flexibility and introversion. These findings suggest that "the Competitive subscale appeared to measure more adaptive aspects of the Type-A pattern" (p. 578). This could explain findings of a negative relationship with psychoticism (Kirkcaldy, Furnham, & Lynn, 1992).

The studies in this section suggest that competitiveness and competitive behavior may lead to adverse cardiovascular health. This could be due to increased effort of more

competitive people leading to increased heart rate and blood pressure. Research presented here also suggests that there is a positive relationship between competitiveness and extraversion. This may be due to the idea that competition involves interaction with others so competitive people would be more comfortable in social settings.

Competitiveness and Performance

In several instances, secondary personality traits interact with competitiveness to influence performance. In addition to personality and behavioral variables, several researchers have also sought to determine if competitiveness is a contributor to performance. Four studies include path diagrams and/or structural equation modeling (SEM) to measure the extent to which competitiveness influences performance. SEM is an expansion on path analysis. "Each equation expresses a downstream variable as a function of the causal paths leading to it" (Loehlin, 1998).

Johnson and Perlow (1992) measured nAch for a sample of 1458 college students via the WOFO (including the competitiveness subscale). They measured performance via an air traffic controller's plane landing simulation. Performance was measured over three trials of varying difficulty. Their path diagram of performance did not include a significant influence by competitiveness, but instead they found that mastery influenced goal commitment which influenced performance. They explain the lack of a relationship between competitiveness and performance by noting that their performance criterion did not involve interpersonal competition. Additional research should focus on criteria more likely to appeal to competitive individuals or involving direct competition.

Graziano, Hair, and Finch (1997) examined, via SEM, what relationship exists between competitiveness, personality (*agreeableness* in particular) and group

performance. Participants were 270 introductory psychology students who had previously completed a measure of agreeableness. Participants then completed a self-report measure of competitiveness prior to participating in a group block-stacking activity. Performance was operationally defined as the height of block tower and number of corrections needed to achieve that height. Their initial model proposed that: (1) competitiveness contributed to performance through agreeableness, (2) through sex, (3) through goal structure, and (4) directly. However, their final model had only competitiveness and goal structure as direct contributors to performance. Agreeableness, sex and goal structure all contributed to performance through competitiveness. The sex component is important because the link between competitiveness and performance is only significant in males and must pass through goal structure in females. They conclude that components of group performance are different in men that in women. More specifically, they found that agreeableness played a bigger part in women's performance (no statistical tests were performed to determine if this difference was significant), and competitiveness played a greater part in men's performance. This is similar to Griffin-Pierson's (1988) assertion that competitiveness in men and women may be different phenomena.

Two recent publications also address competitiveness' relationship with performance using path analysis or SEM. Wang and Netemeyer (2002) hypothesized that trait competitiveness would directly influence sales performance of 147 real estate sales agents. They also hypothesized that trait competitiveness would indirectly influence performance, first through learning effort, and then through self-efficacy. Both hypotheses were supported in this sample; however in an additional sample of 136 advertising sales people, the competitiveness/performance link was not found to be

significant. They conclude that learning effort and self-efficacy completely mediated the competitiveness-performance relationship.

Virtually identical results were found in a study by Krishnan et al. (2002). Their structural model did not assume a direct competitiveness-performance link, but they hypothesized that competitiveness would influence performance through effort and self-efficacy. In their first sample, ninety-one salespeople from a cellular phone company, they did not find a significant path from competitiveness to effort. Thus competitiveness only influenced performance through self-efficacy. In their second sample, 182 real estate salespeople, they found a significant path from competitiveness to effort as well as competitiveness to self-efficacy.

The role that self-efficacy plays in the relationship between competitiveness and performance could be explained by Bandura's social cognitive theory (Wood & Bandura, 1989). They note that self-efficacy is strengthened through past performance, modeling behavior that they have seen others use to succeed, receiving encouragement which helps eliminate self-doubt, and enhancing physical status to reduce stress levels. Harrison, Rainer, Hochwater & Thompson (1997) are quick to point out that self-efficacy is more likely to be tied to behaviors than to outcomes. This suggests that, as a mediator between competitiveness and performance outcomes, self-efficacy would have an impact on that part of the relationship that is directly related to behavior. This would mean that in cases where self-efficacy completely mediates a relationship between competitiveness and outcomes, those outcomes are most likely the direct result of behaviors with little influence from environmental forces, and those who are more self-efficacious and more effective probably receive ample encouragement following success. Harrison et al's

(1997)findings suggest that competitiveness probably plays a part in behaviors that lead to performance outcomes but may not contribute to those outcomes directly.

Additional research into competitiveness as a predictor of performance has been conducted through correlational analyses. Helmreich, Beane, Lucker, and Spence (1978) examined scientific publication and its relationship to components of achievement motivation (including competitiveness). Like previous studies, Helmreich et al found an interaction instead of a direct linear relationship between competitiveness and performance. In a sample of 108 PhD's, they found that publication was high when need-for-work and need-for-mastery were high and competitiveness was low. Publication was also high when need for work and need for mastery were low and competitiveness was high. They found this same interaction with a sample of business school graduates using starting salary as a performance criterion. This pattern may indicate that performance remains high in a three-dimensional model of performance (performance on the y-axis (dependent variable), competitiveness on the x-axis, and work/mastery on the z-axis (independent variables)).

Johnson (1993) examined what work outcomes are predicted by competitiveness. Her sample consisted of two hundred unit managers and forty-seven area managers for a large food-services company. Competitiveness was measured via self-report and ratings from peers and supervisors and performance was measured via supervisors' ratings. She proposed a six-factor model of Competitiveness (competitiveness, self-description of competitiveness, affective reaction to competitiveness, win, beating others in the workplace, and recognition of performance). Only her win factor showed a significant correlation with overall performance. The correlation between Competitiveness (the sum

total of the six underlying factors) and performance was not significant. She explains this by noting that there is little available research to suggest that competitiveness should be related to job performance. Johnson also mentioned that it might be wise to examine a non-linear relationship between competitiveness and performance.

Hibbard (2000) examined the relationship between his two-factor model of competitiveness and academic achievement (grades and awards) in 110 high school students. He found positive correlations between his *mastery* factor and both performance criteria. However, his factor definition mentions "maximizing outcomes" which makes it difficult to determine the direction of the relationship. A Time-series research design using these measures and criteria could help answer these questions.

In a similar study, Frederick (2000) found a negative correlation between GPA and competitiveness (measured via the WOFO) in a sample of 137 college students. She also found that those higher in competitiveness tended to blame outside forces and luck for success so those lower in competitiveness may have higher self assurance and this could result in better grades.

Houston, Carter, and Smither (1997) found a different relationship between competitiveness and performance. Their investigation of tennis players found that scores on the Competitiveness Index (Smither & Houston, 1992) could differentiate between amateurs and professionals but could not predict world ranking. These findings suggest that competitiveness beyond a certain level may be necessary for success but that there is not a linear relationship between the two. Chroni (1998) also found that self-descriptions of competitiveness differentiated professional polo players (high-competitive) from amateurs (low-competitive). The most notable difference was that the goals or

professionals are more focused and clearly defined. Because this study was qualitative in nature, Chroni did not investigate any statistical relationship between competitiveness and performance.

Martin and Ecklund (1994) examined eighty distance runners from two running clubs in the southeastern US. They found a significant positive relationship between competitiveness and personal best times at several different distances (one mile, five kilometers (k), ten k, and marathon). They attribute better performance to increased effort and more aggressive goal setting behavior by more competitive runners. It should be noted that personal best times were not measured objectively (subjects reported times themselves), so this correlation should be examined further. The use of a subjective criterion is especially problematic because competitiveness has been found to be negatively related to ethical behaviors in a sample of college students (Sankaran & Bui, 2003) and positively related to incidents of problem behaviors at work in three different samples of salespeople (Murphy, 2004).

Brown, Cron, and Slocum (1998) found a positive correlation between competitiveness and sales performance, but they found that this relationship was not significant in a regression with self-efficacy. This same study also found that salespeople who are more competitive set higher goals when the environment is perceived by participants to be competitive. They conclude that this could help organizations if they recruit competitive salespeople and encourage competition in the workplace leading to "more effective goal setting and better performance" (1998)

Hinsz and Jundt (2005) found a correlation between practice performance and competitive excellence measured by the Motivational Trait Questionnaire (Heggestad &

Kanfer, 2000) in 258 undergraduate students. However the relationship between task performance and competitive excellence was not significant. Like Brown et al (1998), Hinsz and Jundt (2005) found positive correlations between competitive excellence and both goal setting and self-efficacy. These two studies taken together suggest that the relationship between competitiveness and task performance may manifest itself through more aggressive or optimistic goal-setting behavior.

Based on this sample of studies, results are mixed regarding the relationship between competitiveness and performance. Four studies found significant relationships between the two, three positive relationships (Graziano, Hair, & Finch, 1997; Hibbard, 2000; Martin, Eklund, & Smith, 1994), and one negative (Frederick, 2000). Additional research found that the linear relationship between competitiveness and performance is mediated by various aspects of personality (Helmreich, Beane, Lucker, & Spence, 1978; Krishnan, Netemeyer, & Boles, 2002) or other behaviors (Brown, Cron, & Slocum, 1998; Hinsz & Jundt, 2005). It is also possible that the relationship between competitiveness and performance is not linear. Without looking at a scatterplot, it would be difficult to differentiate a curvilinear relationship from a non-significant correlation. In one case, the idea of a non-linear relationship did occur to the researcher but was not examined even after a linear relationship was not found to be significant (D. L. Johnson, 1993). In another, a researcher suggested that a positive correlation between competitiveness and age may be better explained as a curvilinear relationship requiring further investigation (Martin, Eklund, & Smith, 1994).

Rationale

Because studies have shown mixed results with regard to a linear relationship between competitiveness and performance criteria, a non-linear relationship should be investigated in order to determine if competitiveness warrants continued examination as a precursor of performance. Schopler, Insko, Wieselquist, Pemberton, Witcher, Kozar, Roddenberry, and Wildschut (2001) found that it is theoretically possible that non-linear relationship exists between competitiveness and performance. For example, if the relationship were polynomial, this could mean that competitiveness may facilitate performance up to a certain point. Beyond this point, increased competitiveness would become a detriment to performance. By this same reasoning, there would be a peak level of competitiveness where it is contributing to performance optimally. This study will examine a variety of non-linear relationships between competitiveness and performance.

Kirkcaldy et al (1998) found a quadratic relationship between competitiveness and the Human Development Index (HDI), a non-performance criteria. They note that beyond a critical value, increasing competitiveness was associated with a decrease in quality of life scores. However, both the linear regression and quadratic models were significant so additional research is necessary to determine which is more likely. Beyond these two studies, a search of the literature failed to find any studies testing a non-linear relationship between competitiveness and individual performance criteria in either an academic or an industrial setting.

Mixed results have been found in studies looking at correlations between competitiveness and personality. Many studies have found a significant positive relationship between extraversion and competitiveness. This is logical because

competition frequently involves interaction with others. In addition, self-efficacy has been shown to completely mediate the linear relationship between competitiveness and performance. It is possible though, that in a non-linear model, self-efficacy may moderate rather than mediate the relationship, or it may not affect the relationship at all because self-efficacy normally has a positive linear relationship with performance. This study will examine these interactions in a non-linear model of competitiveness' impact on performance.

Because competitiveness measures the desire to enter and strive for success and to perform better than others, students who are more competitive tend to increase effort in order to perform well. However, competitiveness beyond a certain level can lead to a loss of focus causing performance to decline. This should lead to a non-linear relationship between competitiveness and academic performance with at least one peak level of performance. Negative correlations have also been found between competitiveness and ethical behaviors. Combined with a potential loss of focus, it is possible that beyond a certain level of competitiveness, sales performance can be expected to decline in a similar fashion to the example posed above for students. This study will examine this relationship in both academic and industrial arenas.

Research has repeatedly found that men tend to score higher than women on self-report measures of competitiveness. These findings are consistent across multiple samples and multiple instruments. Though mean differences have been found between genderes, there is no reason to believe that the non-linear model would not fit men and women equally. However, competitiveness for men in student samples is still expected to

be higher than those for women. This study will examine these potential gender differences in a curvilinear model of competitiveness and performance.

People who are more competitive tend to select themselves into more competitive occupations. People also tend to become more competitive if they are placed in a competitive environment. Therefore, it is likely that a group of people working in sales are more competitive than a group of undergraduate students. In those same competitive environments, gender differences tend to be smaller; so mean differences between genders may not be significant in a sample of salespeople. This study will examine each of these issues.

Objectives

There are five objectives of this research. The first objective is to determine the criterion related validity of trait competitiveness in relation to college grade point average (GPA) and sales performance by using a self-report measure of competitiveness. The second objective is to examine the role that gender plays in the relationship between competitiveness and GPA in college students and sales performance in insurance agents. The third objective is to determine if gender differences are found in highly competitive populations (defined as groups of individuals involved in direct competition on a regular basis). The fourth objective is to determine how self-efficacy affects the relationship between competitiveness and college GPA/sales performance. Due to conflicting findings in the research examining competitiveness and general personality, the fifth objective will be to explore what relationships exist between competitiveness and personality. Extraversion has consistently been found to correlate positively with competitiveness but there has been a lack of consensus with regard to other personality factors.

Hypotheses

1. Competitiveness will explain a significant amount of variance in academic performance in undergraduate students as assessed by college grade-point average.
    a. *The relationship between competitiveness and college grade-point average will be non-linear.*
    b. *Peak competitiveness levels derived from the non-linear model will be higher for male students than for female students.*
2. Competitiveness will explain a significant amount of variance in performance in salespeople.
    a. *The relationship between competitiveness and sales performance will be non-linear.*
    b. *No difference will be found in peak competitiveness levels between male and female salespeople.*
3. Competitiveness will be related to facets of personality measured by the 16PF bipolar dimensions of personality and global factors of personality.
    a. *Extraversion will be positively related with competitiveness.*
    b. *In Study 1, self-efficacy will completely mediate the linear relationship between competitiveness and college grade-point average.*
    c. *In Study 2, self-efficacy will completely mediate the linear relationship between competitiveness and sales performance.*
    d. *In Study 1, self-efficacy will not completely mediate the non-linear relationship between competitiveness and grade-point average.*

e. *In Study 2, self-efficacy will not completely mediate the non-linear relationship between competitiveness and sales performance.*

CHAPTER 2: METHODS

Samples

Study 1 served as an exploratory study to determine if a non-linear model best described the relationship between competitiveness and performance. Study 2 served as a confirmatory study using an applied sample and will also served as a measure of external validity. Undergraduate participants were recruited from students enrolled in introductory and sophomore level psychology courses. Students received extra credit for their participation. Participants who completed the survey package individually were required to return their survey materials within 7 days. In addition, twelve group testing sessions were arranged over three weeks. All participants in group sessions completed survey materials within ninety minutes.

The participants for Study 1 were 200 undergraduate students at a mid-sized, southeastern university. Of those 200 completed survey packets, 12 were rejected because GPA was unverifiable (4), one or more surveys were not completed (6), or consent for participation form was not signed (2). The remaining 188 participants were 119 females and 69 males averaging (M) 21 years of age. Of these 188, 75 were freshmen, 53 were sophomores, 41 were juniors, and 19 were seniors (because 124 hours are required for a BA in Liberal Arts, year in school was defined as: freshman $\leq$ 31 hours; sophomore = 32 – 62 hours; junior = 63 – 93 hours; and senior $\geq$ 94 hours).

For Study 2, participants included licensed property and casualty insurance agents. The population from which the sample was selected consisted of 54 licensed property and casualty insurance sales agents who work in an inbound call center for a large, Fortune-500 insurance company located in the southeastern United States. Agents

were notified of the study via e-mail, and those who were interested in participation contacted their sales manager to pick up the survey materials. All participants completed the package individually, and were required to return survey materials within 7 days to their sales managers. Of the 54 agents, 37 volunteered to participate. Of the 37 insurance agents who completed survey packets, 7 were rejected because consent forms were not signed (3) or one or more surveys were not completed (4). The remaining sample of 30 insurance agents was made up of 18 women and 12 men. Salespeople did not receive any compensation for participation.

Instrumentation

Personality Measures

The 16PF Questionnaire measures sixteen personality factors derived via factor analysis. Participant scores on each of these factors are converted to standardized scores (stens). These stens can help identify extreme scores and are also used to calculate the five global factors. Conn and Reike (1994) conducted validation studies illustrating the usefulness of this instrument in industrial and applied settings.

Internal consistency for the scales averages 0.76. There is one form consisting of 185 items measuring sixteen primary factors and five global factors. Primary factors with reliability estimates are: Warmth (A) (α = .69); Reasoning (B) (α = .75); Emotional Stability (C) (α = .79); Dominance (E) (α = .68); Liveliness (F) (α = .73); Rule-Consciousness (G) (α = .77) ; Social Boldness (H) (α = .87); Sensitivity (I) (α = .79); Vigilance (L) (α = .73); Abstractedness (M) (α = .78); Privateness (N) (α = .77); Apprehension (O) (α = .80); Openness to Change (Q1) (α = .68); Self-Reliance (Q2) (α = .79); Perfectionism (Q3) (α = .74); and Tension (Q4) (α = .79). Reliability estimates were

calculated by Cattell and Schuerger (2003) using a sample of over 10,000. Because previous reliability estimates were calculated based on such large samples, inter-item correlations are not available for this dissertation and an item analysis was not performed

The five Global factors are: Extraversion (EX), Anxiety (AX), Tough-Mindedness I, Independence (IN), and Self-Control (SC). Reliability estimates are not available for the five global scales because they are calculated using the sixteen primary factor scores. This orthogonal, twenty-one factor structure (16 first-order factors and 5 second-order factors) has been confirmed on a sample of over 13000 (Chernyshenko, Stark, & Chan, 2001).

Self-Efficacy

Self-efficacy refers to the confidence in one's ability to achieve a certain level of performance in a given activity (G. Wang & Netemeyer, 2002). For the purpose of this dissertation, self-efficacy will be operationalized as the "O" scale of the 16PF. This scale measures apprehension as a bipolar concept with low scores meaning low apprehension or high self-assuredness. Ten items, such as "I tend to be too sensitive and worry too much about something I've done," are used to measure this trait. Each item has three possible responses tailored to that item. Responses for the example item are: a) *hardly ever*, b) *?*, and c) *often*. Test instructions suggest using response *b* "when neither '*a*' nor '*c*' is better for you" (R. B. Cattell, Cattell, & Cattell, 1993, p. 3).

Competitiveness

The Revised Competitiveness Index (Houston, Harris, McIntire, & Francis, 2002) reflects a person's desire to win in interpersonal situations. An additional revision was performed during a pilot study to this dissertation (Valenti, 2005b). It is this revised

version that was utilized in this study. The scale consists of fourteen items measuring a two factor model of competitiveness. Initial internal consistency reliability estimate for the scale was $\alpha = .891$. Factor one, *enjoyment of competition* ($\alpha = .919$), consists of ten items such as "I get satisfaction from competing with others," and measures a participant's emotional response to competition. Factor two, *conflict* ($\alpha = .879$), consists of four items like "I will do almost anything to avoid an argument," and measures a participant's propensity to enter confrontational situations or conflict. Confirmatory factor analysis for this measure was performed with data from a sample of 399 introductory psychology students. Based on this analysis of several fit indices, fit for the proposed two-factor fourteen-item model is acceptable (see **Appendix A**). Responses are on a five-point Likert-type scale ranging from 1 "Strongly Disagree" to 5 "Strongly Agree." A copy of the survey can be found in **Appendix B.**

For Study 1, the survey packet contained the following materials: informed consent form, 16PF Fifth Edition answer sheet and questionnaire (R. B. Cattell, Cattell, & Cattell, 1993), revised Competitiveness Index (Valenti, 2005b), and a grade verification form. For Study 2, the survey packet contained the following materials: informed consent form, 16PF Fifth Edition answer sheet and questionnaire (R. B. Cattell, Cattell, & Cattell, 1993), and the Revised Competitiveness Index (RCI; Valenti, 2005b).

Dependent Measures

Cumulative grade point average (GPA) was used as a criterion measure for the sample of undergraduate students. Because increased competitiveness has been shown to be related to a decrease in ethical behavior, GPA was gathered from independent sources. Participants were given the option of providing a copy of their academic history (a

transcript listing all courses taken and grades received) when returning their completed survey materials (an option only one participant chose), or they could choose to sign an authorization form allowing the researcher to obtain these records. Because several students had completed coursework at different schools over the course of their academic careers, the decision was made to only include cumulative grade point average from the students' current institution, making sure that the same criterion was being measured for each participant.

For salespeople, several different performance measures were used. All performance data utilized was archival and was collected by the organization in the normal course of business. Archival performance data was collected for the period beginning January 2005 and continuing through March 2006. The performance measures selected were those deemed most important by sales managers. "Raw sales" equals the average number of insurance policies sold per month by an individual agent. This includes all types of property and casualty insurance. "Sales efficiency" equals the number of different customers who buy policies from an agent in a given month divided by the number of phone calls the agent answers that month. "Cross sell" is the average number of policies sold to each customer. "Average commission earned" is the average amount of commission earned in a month. Because this company pays commission on a sliding scale, the amount of commission earned per sale each month may vary. "Commission efficiency" will equal commission earned divided by the number of sales.

CHAPTER 3: RESULTS

All data was analyzed using SPSS version 14. The SPSS *Curve Estimation* utility was employed to determine the likely shape of any linear or non-linear relationships. This utility tests several different regression equations to determine which fit the data acceptably. The following relationships were tested: linear, logarithmic, inverse, quadratic, cubic, power, and s-curve. Because it was possible that more than one model would produce significant p-values, the R^2 statistic was used to help determine which was most likely. In addition, simpler relationships were favored over complicated ones when both were significant, and linear regression was used to see if additional terms present in more complicated models contributed significant additional variance. Once any non-linear relationships were found, new variables were generated as transformations of the independent variable in question. All results were considered significant if $p \leq .05$.

To determine the difference in group means, t-tests were performed. To determine whether variables were related, a Pearson's correlation analysis was performed. When significant relationships are found, actual *p*-values are presented, and "n.s." will be used to designate findings that are not significant (except in tables where actual p-values are presented and significance is noted by "*" or "**"). Unless otherwise noted, tables will be located within the body of the text.

Study 1: Competitiveness, Personality, and Academic Performance

Hypothesis 1a

Hypothesis 1a states that the relationship between competitiveness and college grade-point average will be non-linear. Across the entire sample, self-reported competitiveness as measured by the RCI ranged from 19 to 66 with a mean of 42.57 and

standard deviation (SD) of 11.47. Upper-division students (juniors and seniors) scored significantly higher on self-reported competitiveness, $t(186) = 2.11, p = .04$, than did lower-division students. This was primarily the result of higher scores on the enjoyment of competition factor ($t(186) = 2.29, p = .02$). College GPA ranged from .00 to 4.00 with M of 2.94 and SD of .73. With regard to undergraduate performance, lower-division students had significantly higher GPA's than did upper-division students, $t(186) = 2.18, p = .03$. Group descriptive statistics for Study 1 can be found in **Table 1**, and descriptive statistics by gender can be found in **Table 2**.

When implementing the curve estimation utility on the entire sample and the females separately, it was necessary to test the following relationships separately: logarithmic, power, and s-curve. This was done because one participant's GPA equaled 0.00 and this participant had to be excluded in order to conduct these analyses. Output from this procedure yields a *model summary* including R^2, F statistic and significance level found for each model tested. It is this significance level that will be compared to .05 to determine which models provide adequate fit.

Of the seven relationships tested, both quadratic and cubic models were found to fit the data accounting for 5%, $p = 0.01$, and 5.2%, $p = 0.02$, of the total variance respectively (relevant fit statistics for each model can be found in **Table 3**). A scatter-plot of competitiveness (x) and GPA (y) with the quadratic curve suggested by the curve estimation utility can be seen in **Figure 1**. A linear regression was performed with GPA as the dependent variable. Beginning with competitiveness score and the square of competitiveness score in the regression equation, tests were performed to determine if addition of the cubic term added significant variance.

Table 1

Descriptive Statistics - students

	Minimum	Maximum	Mean	Std. Deviation	Variance
GPA	0	4	2.94	0.73	0.53
Self-Efficacy	1	9	6.13	1.52	2.30
Extraversion	0.6	9.8	5.94	1.86	3.46
Anxiety	2.55	11.05	6.75	1.55	2.39
Tough Mindedness	0.75	10.55	5.39	1.68	2.82
Independence	0.9	9.8	5.45	1.71	2.92
Self Control	1.15	9.25	4.47	1.57	2.46
Competitiveness	19	66	42.57	11.47	131.51
Conflict	4	20	11.83	3.66	13.40
Enjoyment of Competition	12	50	30.74	9.89	97.77

Table 2

Descriptive Statistics - Students by Gender

FEMALE	Minimum	Maximum	Mean	Stdandard Deviation	Variance
GPA	0	4	2.99	0.70	0.49
Self-Efficacy	3	9	6.55	1.35	1.83
Extraversion	0.6	9.8	6.25	1.87	3.48
Anxiety	3.55	11.05	6.97	1.43	2.04
Tough Mindedness	0.75	9.45	5.13	1.50	2.26
Independence	0.9	9.8	5.32	1.79	3.19
Self Control	1.55	9.25	4.71	1.60	2.55
Competitiveness	21	66	43.04	10.77	116.09
Conflict	4	20	11.91	3.83	14.66
Enjoyment of Competition	13	49	31.13	9.23	85.20

MALE	Minimum	Maximum	Mean	Std. Deviation	Variance
GPA	0.33	4	2.85	0.77	0.60
Self-Efficacy	1	9	5.41	1.52	2.30
Extraversion	0.9	9.1	5.41	1.74	3.03
Anxiety	2.55	10.35	6.38	1.67	2.80
Tough Mindedness	1.25	10.55	5.83	1.87	3.51
Independence	2.3	9	5.68	1.56	2.42
Self Control	1.15	6.95	4.05	1.44	2.08
Competitiveness	19	64	41.77	12.62	159.15
Conflict	4	20	11.70	3.38	11.39
Enjoyment of Competition	12	50	30.07	10.97	120.30

Table 3

Curve Estimation – All Students: Competitiveness and GPA

Dependent Variable: GPA

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.001	0.279	1	186	0.598	3.042	-0.002		
Inverse	0.001	0.226	1	186	0.635	3.018	-3.159		
Quadratic	0.05	4.865	2	185	0.009**	1.097	0.097	-0.001	
Cubic	0.052	3.371	3	184	0.020*	-0.147	0.195	-0.004	0
Logarithmic	0	0.006	1	185	0.937	2.901	0.014		
Power	0	0.055	1	185	0.815	3.041	-0.018		
S	0.001	0.098	1	185	0.754	1.068	-0.873		

The independent variable is Competitiveness.

Linear regression adding cubic term

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
a	0.224	0.05	0.04	0.714	0.05	4.865	2	185	0.009**
b	0.228	0.052	0.037	0.715	0.002	0.414	1	184	0.521

a: Predictors: (Constant), CIR_squared, Competitiveness

b: Predictors: (Constant), CIR_squared, Competitiveness, CIR_cubed

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

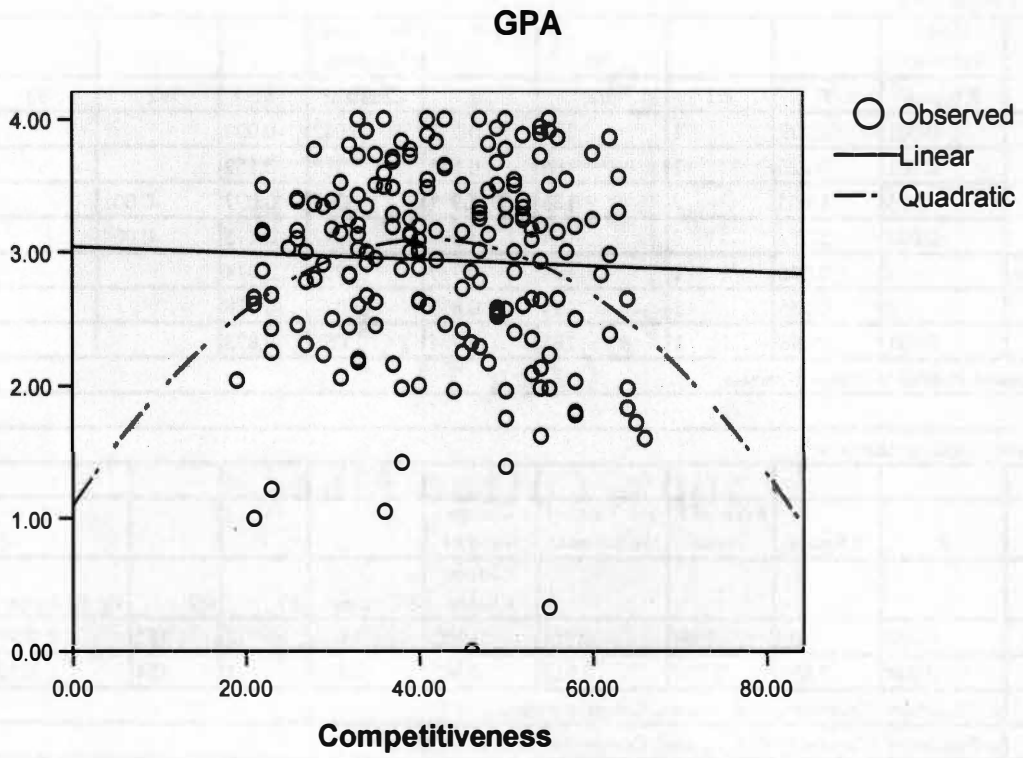

Figure 1

Scatter-plot of Competitiveness and GPA

Results indicate that the cubic term did not add significant additional variance beyond the first and second order terms, F-change = .42, n.s.

A similar analysis was conducted beginning with competitiveness score and the cube of competitiveness score in the regression equation (this equation without the quadratic term explained 4.7% of the total variance in GPA). Results of this analysis found that the quadratic term did not add significant variance. Because results indicate that only one or the other term is necessary to adequately fit the data, the equation with the quadratic term was accepted because it is simpler and explains more of the total variance (quadratic 5.0% versus cubic 4.7%). These findings offer initial support for the hypothesis that the relationship between competitiveness and performance would be non-linear.

Further investigation was conducted on each factor of competitiveness using the curve estimation utility. For the conflict factor, none of the relationships tested fit the data. However, both the quadratic and cubic models provided adequate fit between enjoyment of competition and GPA, explaining 4.9%, $p = 0.010$, and 5.1%, $p = 0.02$, of the total variance respectively (see **Table 4**). A linear regression was performed with GPA as the dependent variable. Beginning with enjoyment of competition score and the square of enjoyment of competition score in the regression equation, tests were performed to determine if addition of the cubic term added significant variance. Results indicate that the cubic term did not add significant additional variance beyond the first and second order terms, F-change = .53, $p = 0.47$.

Table 4

Curve Estimation – All Students: Enjoyment of Competition and GPA

Dependent Variable: GPA

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.001	0.111	1	186	0.739	2.992	-0.002		
Inverse	0.003	0.489	1	186	0.485	3.036	-2.711		
Quadratic	0.049	4.719	2	185	0.010**	1.457	0.11	-0.002	
Cubic	0.051	3.316	3	184	0.021*	0.441	0.222	-0.006	0
Logarithmic	0.001	0.113	1	185	0.737	2.786	0.049		
Power	0	0	1	185	0.983	2.831	0.001		
S	0.002	0.291	1	185	0.59	1.078	-0.877		

The independent variable is Enjoyment of Competition

linear regression adding cubic term

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
a	0.22	0.049	0.038	0.714	0.049	4.719	2	185	0.010**
b	0.226	0.051	0.036	0.715	0.003	0.534	1	184	0.466

a: Predictors: (Constant), enjoyment_squared, Enjoyment

b: Predictors: (Constant), enjoyment_squared, Enjoyment, enjoyment_cubed

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

A similar analysis was conducted beginning with enjoyment of competition score and the cube of enjoyment of competition score in the regression equation. Results of this analysis found that the quadratic term did not add significant variance, F-change = 1.15, $p = 0.29$. Because results indicate that only one or the other term is necessary to adequately fit the data, the equation with the quadratic term was accepted because it is simpler and explains more of the total variance (quadratic 4.9% versus cubic 4.5%).

Additional analyses were performed to determine if the relationship between competitiveness and performance is different in upper-division students than it is in lower classmen. No significant relationship was found between competitiveness and performance in upper-division students. In lower-division students, both quadratic and cubic models provided adequate fit, each explaining 10.7%, each $p = 0.00$, of the total variance (see **Table 5**). A linear regression was performed on lower-classmen's data with GPA as the dependent variable. Beginning with competitiveness score and the square of competitiveness score in the regression equation, tests were performed to determine if addition of the cubic term added significant variance. Results indicate that the cubic term did not add significant additional variance beyond the first and second order terms, F-change = .00, p = n.s.

A similar analysis was conducted beginning with competitiveness score and the cube of competitiveness score in the regression equation. This analysis found that the quadratic term did not add significant variance, F-change = .15, p = n.s. Because results indicate that only one or the other term is necessary to adequately fit the data, the equation with the quadratic term was accepted because it is simpler and explains slightly more of the total variance (quadratic 10.7% versus cubic 10.6%).

Table 5

Curve Estimation Utility - Lower Division Students: Competitiveness and GPA

Dependent Variable: GPA

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.001	0.072	1	126	0.788	3.077	-0.001		
Logarithmic	0.001	0.082	1	126	0.776	2.787	0.062		
Inverse	0.006	0.7	1	126	0.404	3.184	-6.446		
Quadratic	0.107	7.496	2	125	0.001**	0.274	0.144	-0.002	
Cubic	0.107	4.957	3	124	0.003**	0.289	0.143	-0.002	0
Power	0.001	0.097	1	126	0.755	3.244	-0.03		
S	0	0.037	1	126	0.847	1.084	-0.663		

The independent variable is Competitiveness.

Linear regression adding cubic term

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
a	0.327	0.107	0.093	0.669	0.107	7.496	2	125	0.001**
b	0.327	0.107	0.085	0.672	0	0	1	124	0.994

a: Predictors: (Constant), CIR_squared, Competitiveness

b: Predictors: (Constant), CIR_squared, Competitiveness, CIR_cubed

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

Hypothesis 1b

Another objective of this study was to examine the role that gender plays in the relationship between self-reported competitiveness and objective measures of performance. No differences were found between men and women with regard to competitiveness, $t(186) = .73$, n.s., though a much greater range in self-reported competitiveness was found in women (21-66) versus men (45-64). In addition, no gender differences were found for either the conflict factor of competitiveness, $t(186) = .38$, n.s., or the enjoyment of competition factor of competitiveness, $t(186) = .71$, n.s., nor were any differences in GPA found, $t(186) = 1.29$, n.s.

An examination of competitiveness and GPA using the curve estimation utility found no significant relationships of any shape for either male or female participants when tested separately. However, examination of each factor in each gender separately found that, for men, self-reported enjoyment of competition was able to predict GPA. Both quadratic and cubic models provided adequate fit, explaining 9.7%, $p = 0.035$, and 13.2%, $p = 0.03$, of the total variance respectively (see **Table 6**). No significant relationships of any shape were found for either factor in female participants. An examination of scatter-plots shows that extreme scores on competitiveness in each group appear to have lower GPA than the mean. Without male data, the female data appears flat and without female data the male data are bunched about the mean (see **figures 2 and 3**). These findings do not support predictions competitiveness would explain significant variance in GPA in each gender.

Table 6

Curve Estimation Utility - Male Students: Enjoyment of Competition and GPA

Dependent Variable: GPA

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.003	0.178	1	67	0.674	2.956	-0.004		
Logarithmic	0	0.001	1	67	0.979	2.826	0.006		
Inverse	0.004	0.284	1	67	0.596	2.97	-3.198		
Quadratic	0.097	3.544	2	66	0.035*	0.946	0.147	-0.002	
Cubic	0.132	3.307	3	65	0.026*	-2.497	0.53	-0.015	0
Power	0.002	0.155	1	67	0.695	3.145	-0.045		
S	0	0.001	1	67	0.974	0.998	-0.094		

The independent variable is Enjoyment of Competition.

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

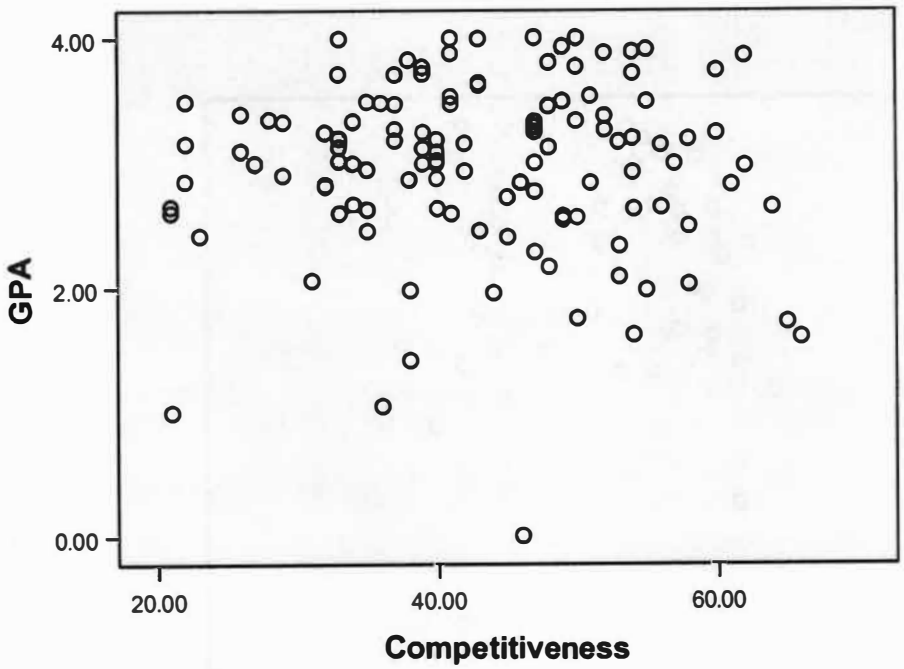

Figure 2

Scatter-plot of Competitiveness and GPA: Female students

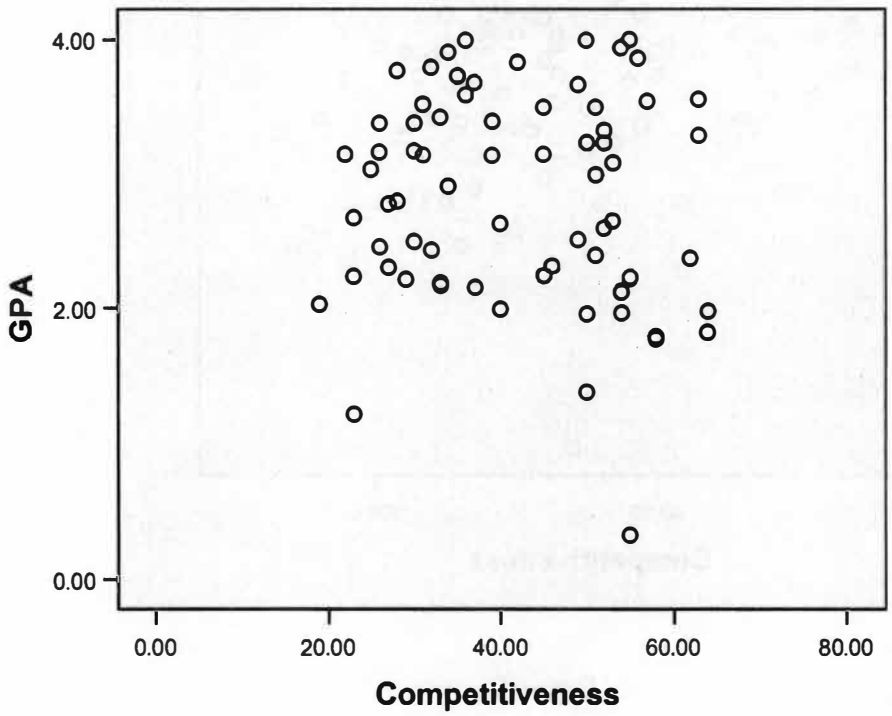

Figure 3

Scatter-plot of Competitiveness and GPA: Male students

Hypothesis 3a

A third objective was to examine the relationship between competitiveness and personality. Personality consisted of five factors measured by the 16PF (R. B. Cattell, Cattell, & Cattell, 1993): extraversion, anxiety, tough-mindedness, independence, and self-control. Competitiveness was expected to correlate positively with extraversion, but no additional predictions were made with regard to the other four personality factors. Contrary to predictions, no significant correlations were found with regard to competitiveness and any factor of personality (see **Table 7** in appendix). A modest and significant positive correlation, $r = .16$, $p = 0.03$, was found between the conflict factor of competitiveness and independence.

When analyses were performed on each gender, no relationship was found between self-reported competitiveness and any aspect of personality in male students. In females, competitiveness was correlated with independence, $r = .30$, $p = 0.00$, and similar correlations were found for the conflict, $r = .26$, $p = 0.00$, and enjoyment of competition, $r = .26$, $p = 0.01$, factors of competitiveness. In addition, a moderate significant correlation was found between enjoyment of competition and self-control, $r = .20$, $p = 0.03$. Bi-variate correlations by gender can be found in **Table 8** (see appendix).

Hypotheses 3b and 3d

A final objective of this study was to determine what role self-efficacy plays in the relationship between self-reported competitiveness and objective measures of performance. It was predicted that self-efficacy would completely mediate the linear relationship between competitiveness and GPA but would not completely mediate any non-linear relationships discovered. Since no linear relationship was found between the

competitiveness and GPA no mediation tests were performed on this relationship. A significant positive correlation was found between self-efficacy and GPA, $r = .24$, $p = 0.00$; however, no correlation was found between competitiveness and self-efficacy. Using results of previous analyses as a guide, a linear regression was performed on GPA using self-efficacy and first and second order competitiveness terms. Results indicate that competitiveness score and the square of competitiveness score add significant variance in GPA, $R^2 = .04$, F-change = 3.95, $p = 0.02$, beyond that accounted for by self-efficacy (see **Table 9** in appendix). This provides support for prediction that self-efficacy would not completely mediate the non-linear relationship between competitiveness and performance.

Study 2: Competitiveness, Personality, and Sales Performance

Hypothesis 2a

One of the goals of Study 1 was to determine if a non-linear model provides an adequate explanation for the relationship between self-reported competitiveness and performance. Results of Study 1 indicate that a quadratic relationship explains a significant amount of the total variance in performance (GPA). Study 2 tested the quadratic model put forth in Study 1 on an applied sample. This applied sample consisted of 30 insurance agents. Across the entire sample, competitiveness ranged from 33 to 62 with M = 50.17 and SD = 6.74. The group and gender descriptive statistics are presented in **Tables 10** and **11**.

Table 10

Descriptive Statistics - Insurance Agents

	Minimum	Maximum	Mean	Std. Deviation	Variance
Average Sales	14.5	76.47	49.51	16.09	258.88
Sales Efficiency	9.42	24.1	18.50	3.96	15.71
Cross Sell	1.19	1.38	1.27	0.06	0.00
Average Commission	0	2136	1106.10	521.73	272202.64
Commission Efficiency	0	26.67	16.66	6.80	46.29
Self Efficacy	3	8	5.63	1.38	1.90
Extraversion	2.5	8.3	5.47	1.77	3.14
Anxiety	3.65	8.15	5.85	1.32	1.75
Tough Mindedness	3.25	9.75	5.95	1.71	2.94
Independence	3.1	7.8	5.49	1.21	1.47
Self Control	2.85	8.45	5.87	1.47	2.17
Competitiveness	33	62	50.17	6.74	45.39
Conflict	7	15	11.07	2.41	5.79
Enjoyment of Competition	24	49	39.10	6.02	36.23

Table 11

Descriptive Statistics - Insurance Agents by Gender

FEMALE	Minimum	Maximum	Mean	Std. Deviation	Variance
Average Sales	30.5	76.47	51.56	14.35	205.99
Sales Efficiency	12.93	24.1	19.72	3.43	11.78
Cross Sell	1.21	1.38	1.29	0.05	0.00
Average Commission	440	2136	1150.44	484.06	234312.73
Commission Efficiency	7.06	26.67	17.32	6.33	40.01
Self efficacy	3	8	5.78	1.59	2.54
Extraversion	3.1	8.3	5.97	1.75	3.05
Anxiety	3.65	8.15	5.88	1.44	2.08
Tough Mindedness	3.25	8.05	5.39	1.51	2.27
Independence	3.3	7.8	5.75	1.23	1.52
Self Control	2.85	8.45	6.12	1.53	2.34
Competitiveness	33	62	49.00	8.21	67.41
Conflict	7	15	11.11	2.59	6.69
Enjoyment of Competition	24	49	37.89	7.28	52.93

MALE	Minimum	Maximum	Mean	Std. Deviation	Variance
Average Sales	14.5	73.27	46.44	18.63	346.97
Sales Efficiency	9.42	22.65	16.67	4.14	17.11
Cross Sell	1.19	1.36	1.25	0.06	0.00
Average Commission	0	1906	1039.58	589.46	347460.99
Commission Efficiency	0	26.01	15.68	7.65	58.47
Self efficacy	4	8	5.42	1.00	0.99
Extraversion	2.5	6.8	4.72	1.60	2.55
Anxiety	4.25	7.65	5.79	1.18	1.39
Tough Mindedness	3.75	9.75	6.78	1.72	2.95
Independence	3.1	7.1	5.10	1.12	1.25
Self Control	3.05	7.85	5.49	1.35	1.83
Competitiveness	47	57	51.92	3.15	9.90
Conflict	8	15	11.00	2.22	4.91
Enjoyment of Competition	36	45	40.92	2.78	7.72

The curve estimation utility was used to test the relationship between self-reported competitiveness and each of the 5 objective performance measures: average monthly sales, sales efficiency, cross-sell, average commission, and commission efficiency. The following relationships, suggested by Study 1, were tested: linear, quadratic, and cubic. A significant relationship was only detected between competitiveness and one of the performance measures, average monthly sales. Of the three relationships tested, both the quadratic and cubic models were found to fit the data, accounting for 26.1%, $p = 0.02$, and 27.1%, $p = 0.01$, of the variance respectively (see **Table 12**). A scatter-plot of the data with the quadratic and cubic curves can be seen in **Figure 4**.

A linear regression was performed with average sales as the dependent variable. Beginning with competitiveness score, the square of competitiveness score, and the cube of competitiveness score in the regression equation, analyses were performed to determine if all three terms contributed significantly to the total variance in the dependent variable. It was not possible to perform the regression analyses in a similar fashion to Study 1 because of the smaller sample size in Study 2. Regression analysis revealed that the quadratic term was not significant $t\ (28) = -.55$, n.s. For this reason the quadratic term was rejected leaving only competitiveness score and the cube of competitiveness score in the regression equation which predicted 26.7% of the total variance in average monthly sales. These findings offer further support for the hypothesis that the relationship between competitiveness and aspects of performance would be non-linear.

Table 12

Curve Estimation - Insurance Agents: Competitiveness and Average Sales

Dependent Variable: Average Sales

Equation	Model Summary				Parameter Estimates				
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.003	0.086	1	28	0.772	42.89	0.132		
Quadratic	0.261	4.761	2	27	0.017*	347.711	-12.923	0.137	
Cubic	0.271	5.02	2	27	0.014*	150.17	0	-0.139	0.002

The independent variable is Competitiveness.

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

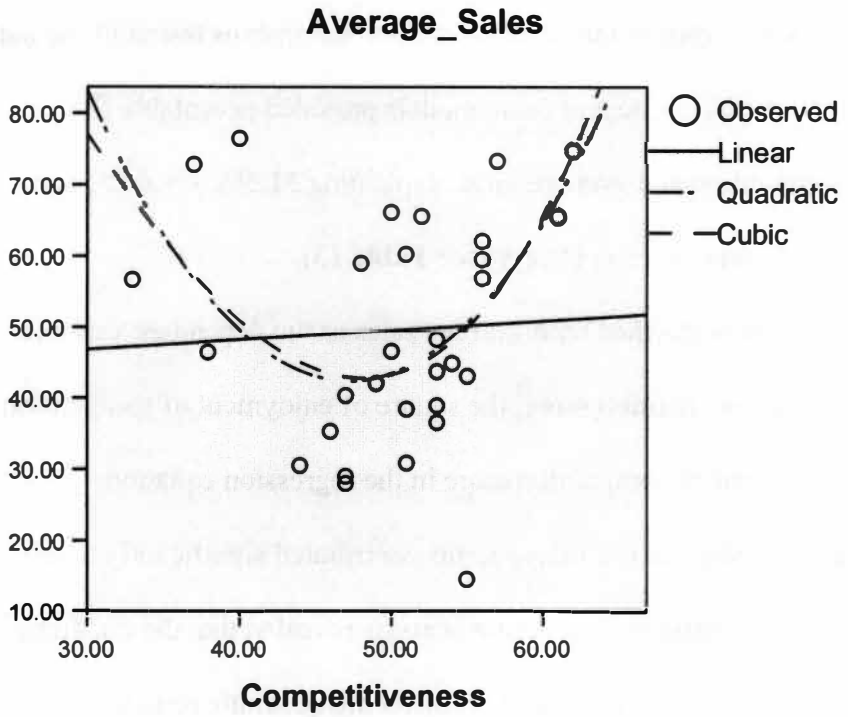

Figure 4

Scatter-plot of Competitiveness and Average Sales

Further investigation was conducted on each factor of competitiveness using the curve estimation utility. For the conflict factor, none of the relationships tested fit the data adequately. However, both the quadratic and cubic models provided acceptable fit between enjoyment of competition and average sales, explaining 31.5%, $p = 0.01$, and 33.6%, $p = 0.00$, of the total variance respectively (see **Table 13**).

A linear regression was performed with average sales as the dependent variable. Beginning with enjoyment of competition score, the square of enjoyment of competition score, and the cube of enjoyment of competition score in the regression equation, analyses were performed to determine if all three terms contributed significantly to the total variance in the dependent variable. Regression analysis revealed that the quadratic term was not significant, $t\,(28) = -1.19$, n.s. For this reason the quadratic term was rejected leaving only enjoyment of competition score and the cube of enjoyment of competition score in the regression equation which predicted 32.6% of the variance in average monthly sales.

Hypothesis 2b

As with Study 1, attempts were made to determine if self-reported competitiveness predicts performance differently in men and women. No gender differences were found with regard to competitiveness, $t(28) = .25$, n.s. In addition, no gender differences were found for either the conflict factor of competitiveness, $t(28) = -.12$, n.s., or the enjoyment of competition factor, $t(28) = 1.37$, n.s.

Separate analyses of the relationship between competitiveness and each of the 5 performance measures were conducted for each gender using the curve estimation utility. Linear, quadratic, and cubic relationships were tested in both groups.

Table 13

Curve Estimation - Insurance Agents: Enjoyment of Competition and Average Sales

Dependent Variable: Average Sales

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.01	0.289	1	28	0.595	38.953	0.27		
Quadratic	0.315	6.203	2	27	0.006**	268.178	-12.935	0.184	
Cubic	0.336	6.843	2	27	0.004**	122.181	0	-0.19	0.003

The independent variable is Enjoyment of Competition

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

No significant relationships found between competitiveness and any of the five performance measures for male participants. However, for female participants both quadratic and cubic models provided adequate fit between competitiveness and average sales, explaining 40.5%, $p = 0.02$, and 43.7%, $p = 0.01$, of the total variance respectively (see **Table 14**).

Beginning with competitiveness score, the square of competitiveness score, and the cube of competitiveness score in the regression equation, analyses were performed to determine if all three terms contributed significantly to the variance in average sales. Analysis revealed that the quadratic term was not significant, $t\ (28) = -1.13$, n.s. For this reason, the quadratic term was rejected leaving only competitiveness score and the cube of competitiveness score in the regression equation explaining 42.2% of the variance.

Further investigation of this relationship in women was conducted using the curve estimation utility. Separate analyses were performed using each factor of competitiveness as the independent variable and average sales as the dependent variable. For the conflict factor, none of the three relationships tested fit the data adequately. However, both the quadratic and cubic models provided acceptable fit between enjoyment of competition and average sales, explaining 33.8%, $p = 0.05$, and 8.5%, $p = 0.03$, of the total variance respectively.

Beginning with enjoyment of competition score, the square of enjoyment of competition score, and the cube of enjoyment of competition score in the regression equation, analyses were performed to determine if all three terms contributed significantly to the variance in average sales.

Table 14

Curve Estimation - Female Insurance Agents: Competitiveness and Average Sales

Dependent Variable: Average Sales

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0	0.007	1	16	0.934	49.768	0.037		
Quadratic	0.405	5.113	2	15	0.020*	336.812	-12.353	0.13	
Cubic	0.437	5.822	2	15	0.013*	150.486	0	-0.14	0.002

The independent variable is Competitiveness.

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

Analysis revealed that the quadratic term was not significant, t (28) = -2.10, n.s. For this reason, the quadratic term was rejected leaving only enjoyment of competition score and the cube of enjoyment of competition score in the regression equation explaining 36.2% of the variance.

Hypothesis 3a

Similar to Study 1, an objective of this study was to examine the relationship between competitiveness and personality. Competitiveness was expected to correlate positively with extraversion; however, correlations between the two did not prove to be significant. A negative correlation was found between competitiveness and self-control, r = -.37, p = 0.04. The matrix of bi-variate correlations can be found in **Table 15** (see appendix).

When separate analyses were conducted on each gender, a different pattern emerged. No significant correlations were found between self-reported competitiveness (or either of its factors) and any of the five factors of personality in male insurance agents. In female insurance agents, competitiveness was positively correlated with extraversion, r = .54, p = 0.02. This correlation is primarily due to a high positive correlation between the competitiveness factor enjoyment of competition and extraversion, r = .57, p = 0.01. This provides partial support for the prediction that self-reported competitiveness would correlate with extraversion.

Hypotheses 3c and 3e

A final objective of this study was to determine what role self-efficacy plays in the relationship between self-reported competitiveness and objective measures of performance. It was predicted that self-efficacy would completely mediate the linear

relationship between self-reported competitiveness and objective measures of performance. It was also predicted that self-efficacy would not completely mediate any non-linear relationships discovered. Since no linear relationships were found between competitiveness and any of the performance measures, no mediation tests were performed on this relationship. In addition, no correlation was found between competitiveness and self-efficacy. Using results of previous analyses as a guide, a linear regression was performed with average sales as the dependent variable and self-efficacy, competitiveness score and the cube of competitiveness score as independent variables. Results indicate that competitiveness and competitiveness^3 predict significant variance in average sales, $R^2 = .33$, F-change = 5.72, $p = 0.01$, and, with the two competitiveness terms in the equation, self-efficacy is no longer significant (see **Table 16** in appendix). When these variables are entered into the equation in reverse order, self-efficacy is not found to be significant, $R^2 = .06$, F-change = 2.43, n.s. These findings support the prediction that self-efficacy would not completely mediate the non-linear relationship between self-reported competitiveness and performance.

CHAPTER 4: GENERAL DISCUSSION

The main objective of this dissertation was to explore the nature of the relationship between self-reported competitiveness and a variety of objective performance criteria. Others had suggested that non-linear models may better explain this relationship (e.g. D. L. Johnson, 1993). The two studies presented here were the first to test both linear and non-linear relationships across multiple samples.

Self-Reported Competitiveness as a Predictor of Performance

The first objective of this dissertation was to determine the criterion related validity of trait-competitiveness in relation to college GPA (Study 1) and sales performance (Study 2). Competitiveness was found to be related to college GPA and the relationship was non-linear. A polynomial equation explained 5% of the variance in college GPA. Discovery of a significant relationship between competitiveness and performance is contrary to previous findings (D. L. Johnson, 1993; D. S. Johnson & Perlow, 1992), but supports research by Helmreich et al (1978) and Houston et al (1997). Though only 5% of the variance in GPA is explained, it could be that this is variance that larger models may not explain. This is something that future research can examine.

The shape of the relationship discovered in Study 1 was that of an inverted-U. This suggests that people who are moderately competitive are more likely to perform better in school than those who score very high or very low in competitiveness. This non-linear relationship differs slightly from previous findings of a negative relationship between competitiveness and GPA (Frederick, 2000), although the pattern of results she found may be representative of the right half of the distribution in the current study. This non-linear relationship also runs contrary to others findings of a linear relationships and

correlations between competitiveness and performance (Graziano, Hair, & Finch, 1997; Hibbard, 2000).

The finding of a polynomial relationship coincides with what others have said when suggesting a non-linear relationship between competitiveness and performance (Kirkcaldy, Furnham, & Martin, 1998; Schopler et al., 2001). This same pattern of results occurs when plotting *enjoyment of competition* and GPA. It is possible that this one factor explains the bulk of the relationship between competitiveness and performance.

There are several possible explanations for the "inverted-U" pattern of this relationship. Highly competitive, lower performing students may become wrapped up in the process of competing for grades, because they enjoy competing, that they lose focus on the outcomes they are trying to achieve. It is also possible that they turn to less reliable measures such as cheating (because one is not certain as to the accuracy of the information being "stolen"), as suggested in studies on competitiveness and ethics (Sankaran & Bui, 2003). However, those low in competitiveness may not possess the drive or the desire to compete for the best grades in school as suggested by correlations between competitiveness and achievement motivation (e.g. Gill & Deeter, 1988). This may illustrate that some minimum level of competitiveness may be necessary in order to reach maximum academic performance as Houston et al. suggested (1997).

Findings with regard to competitiveness in upper-division students and lower-division students yield a different pattern all together. Upper-division students were more competitive, but competitiveness did not explain a significant portion of the variance in GPA. However, in lower-division students, competitiveness explained over 10% of the variance in GPA. A possible explanation for these findings is that those with lower

GPA's as lower-division students (who also tend to be very high or low in competitiveness) may not matriculate in school (dropout or be dismissed from school). Thus, plotting upper-division students's GPA against competitiveness would reveal a flatter distribution, though not flat enough for a linear explanation.

An entirely different pattern of results appear when investigating competitiveness in a field study (Study 2). Competitiveness was found to be related to one of the five objective performance measures (average sales) and the relationship was non-linear. A polynomial equation explained 27% of the variance in average monthly sales. This same pattern of results was found with regard to competitiveness' *enjoyment of competition* factor. It is likely that this was the only factor that was related to competitiveness because this is the only one of the five that is presented to agents on a daily basis. This allows them to make daily comparisons between their performance and the performance of others.

An interesting aspect of this pattern of results is that instead of an inverted-U shaped curve, as was found in Study 1, the relationship between competitiveness and performance in the field study was U-shaped. The shape of this relationship is contrary to what Schopler et al. (2001) suggested was probable. This pattern suggests that insurance agents who are highly competitive or not competitive at all tend to perform better with regard to average monthly sales. This could mean that agents low in self-reported competitiveness who are not distracted by interpersonal competition in sales remain focused on their sales process and perform better. This is contrary to Houston et al's (1997) finding that a minimum level of competitiveness may be necessary for success and that those high and low in self-reported competitiveness will perform differently.

In addition, those who are highly competitive may evaluate their performance compared to others' performances thus striving to be the best or may enjoy competing more than their peers. In this case, higher average sales would be a by-product of "defeating "other insurance agents or the love of the competition itself. Thus, those with moderate levels of competitiveness could be too distracted to perform as well as those who are not competitive, but not driven enough to perform as wells as those who are highly competitive.

These two studies are the first known attempts to detect non-linear relationships between competitiveness and performance, or at least the first successful attempts at detecting such relationships. Combined, the differing pattern of results from these two studies show that the relationship between competitiveness and performance relies heavily on the situations under which participants are competing (D. S. Johnson & Perlow, 1992) and definitions of what "success" is. A lack of direct interpersonal competition in the task could yield the pattern of results found in students, while direct competition with others on a daily basis could yield the results found in insurance agents. In either case, the further the participants are from the mean, the more impact competitiveness has on performance.

Gender Differences in Competitiveness and Performance

A second objective of these studies was to examine the role that gender plays in the relationship between competitiveness and performance. Contrary to what was predicted, no difference in mean competitiveness levels was found between male and female students. Most research involving competitiveness finds that men tend to score higher on measures of competitive than women (e.g. Cassidy & Lynn, 1989; Franken,

Hill, & Kierstead, 1994), and previously only Helmreich and Spence (1978) and (Houston, Carter, & Smither, 1997) had failed to find gender differences in competitiveness. This was particularly unexpected because previous research using similar instruments with samples taken from the same population have found higher competitiveness scores for men than women (e.g. Valenti, 2005b).

Investigation of the relationship between competitiveness and GPA in Study 1 found that the polynomial relationship that was discovered when testing the entire sample was not significant when testing each gender separately. However, non-linear relationship found between enjoyment of competition and GPA in male students does support Griffin-Pierson's (1988) assertion that competitiveness in men and women may be different phenomena.

A third objective of this study was to determine if gender differences in self-reported competitiveness are found in highly competitive environments. As was predicted, no mean differences in competitiveness between men and women. This coincides with Daicoff's (2004) assertion that men and women are more similar in highly competitive environments.

Investigation of the relationship between competitiveness and average monthly sales in Study 2 found that the polynomial relationship that was discovered when testing the entire sample was only significant in women and not in men. The inability to detect a similar relationship in men could be due to the small number of men in the sample of insurance agents or something similar to Griffin-Pierson's (1988) assertion regarding competitiveness in men and women. The shape of the curvilinear relationship between

competitiveness and average sales did not allow for determination of peak levels in either male or female agents.

Competitiveness and Personality

Another objective of this study was to determine what relationships exist between competitiveness and personality. Correlations between competitiveness and extraversion were not significant in either study (in Study 1 competitiveness did not correlate with any of the five personality factors). This finding goes against most previous research into competitiveness and extraversion (e.g. May & Kline, 1987; J. Wang & Ding, 2002; e.g. Wong & Reading, 1989) or sociability (D. L. Johnson, 1993).

In Study 2, the only significant finding was a negative correlation between competitiveness and self-control (similar to conscientiousness). Thus those who are more competitive are less conscientiousness. This is similar to previous findings of a negative relationship with psychoticism (a factor containing conscientiousness) from the EPQ (Kirkcaldy, Furnham, & Lynn, 1992; J. Wang & Ding, 2002). This correlation could explain previous findings linking competitiveness with unethical behavior (Sankaran & Bui, 2003) and problem behaviors at work (Murphy, 2004).

Competitiveness, Self-Efficacy, and Performance

The final objective of this dissertation was to determine how self-efficacy affects the relationship between self-reported competitiveness and objective performance. A positive correlation was found between self-efficacy and GPA in Study 1, but it was not possible to test for mediation in a linear relationship between competitiveness and performance because no linear relationship was found between competitiveness and performance in either study. These findings contradict previous studies (Brown, Cron, &

Slocum, 1998; Krishnan, Netemeyer, & Boles, 2002; G. Wang & Netemeyer, 2002) which all found a linear relationship between competitiveness and performance that was mediated by self-efficacy. This means that all of the significant variation in performance predicted by competitiveness is explained by self-efficacy. SCT (Wood & Bandura, 1989) holds that self-efficacy is fostered if participants had enjoyed previous success, received encouragement following that success, modeled others' successful behaviors, and stress levels were managed successfully. For this to be the case, people must have some sense of internal locus of control (which was not measured in these studies). If participants attributed success to external factors, and were never encouraged following that success or did not attribute that encouragement to anything they had done, then the relationship between self-efficacy and performance could be weak or non-existent. In Study 1, self efficacy only explained 5.5% of the variance in GPA. This leaves little variance to share with competitiveness which could explain why competitiveness was not related to GPA (a relationship that should have been mediated by self-efficacy). In Study 2, self-efficacy was not related to any of the five sales performance measures, which could mean that participants contributed success to quality of leads and not an internal sales process. Thus, any encouragement they received may not have been internalized. If previous research (Brown, Cron, & Slocum, 1998; Krishnan, Netemeyer, & Boles, 2002; G. Wang & Netemeyer, 2002) is to serve as a guide, then no relationship between self-efficacy and performance should yield no relationship between competitiveness and performance, which was the case here.

It is also possible that self-efficacy was not related to performance as hypothesized (and as others had found) because of the way self-efficacy was

operationalized. The *O* scale of the 16PF is designed to measure apprehension/self-assurance which may be more closely related to self confidence than self-efficacy. This could affect results because self-efficacy focuses more on the specific task at hand and self-assurance may be more closely related to ego. Future research could correct this by adding a qualifier to each question such as "in my role as a(n) student/insurance agent..." to the beginning of each question on the *O* scale of the 16PF.

Results from both Study 1 and Study 2 found significant non-linear relationships between competitiveness and performance. Results of a linear regression in each study found that the polynomial terms in the linear regression between competitiveness and performance contributed significant variance beyond that accounted for by self-efficacy. This may not have been the case if the measure of academic performance had been behavioral (e.g. number of hours spent studying) (Harrison, Rainer, Hochwarter, & Thompson, 1997). This relationship had not been tested in previous research because only linear models had been considered.

Overall, the following hypotheses were supported: 1a and 2a, the relationship between competitiveness and performance in each study was found to be non-linear; and 3c, self-efficacy did not completely mediate the non-linear relationship between competitiveness and performance in either study. Partial support was found for the following hypothesis: 2b, no difference in competitiveness was found between male and female salespeople but peaks were not able to be determined separately for each gender. The following hypotheses were not supported: 1b, peak competitiveness levels were not higher in male students than in female students; 3a, competitiveness did not correlate with extraversion; and 3b, self-efficacy was not related to competitiveness or

performance. Hypothesis 3b was considered not supported because no linear relationships were found between competitiveness and performance.

Though men did not score higher in self-reported competitiveness as predicted in hypothesis 1b, this finding is not unheard of. Early studies using the Competitiveness Index found no gender differences in competitiveness (Houston, Carter, & Smither, 1997). It is possible that those students, who volunteered to participate in order to receive extra credit, may have done so in order to get higher grades than their classmates. Thus, if the sample were shown to be made up of the most competitive students in the population, then self-reported competitiveness levels in men and women may mimic those found in more competitive populations where no difference is expected (Daicoff, 2004). This anomaly could also be the case because such differences have been found in prior studies using similar instruments within this population (Valenti, 2005b).

Finally, there are several possible explanations for the finding of no relationship between competitiveness and extraversion. In each study, no deception was used when explaining the purpose and procedures of the experiment when seeking volunteers for participation. The study was presented as involving only individual survey completion and thus no interaction between participants would be involved. The result of this would be a greater than expected number of introverts signing up for participation in each study. Previous studies could have solicited volunteers in a manner that would discourage participation by introverts and thus could result in a different pattern of correlations between competitiveness and extraversion. It is also important to note that Kirkcaldy et al (1993) found no correlation between competitiveness and extraversion, and their sample also consisted of undergraduate students.

Limitations

One limitation in this study is that both Study 1 and Study 2 were conducted in a single region of the United States. In addition, reliability and validity testing was performed in this same area. One might see different results if the study were conducted in a different region or using a measure of competitiveness developed or designed in a different region. Because this is the first study to examine a non-linear relationship between competitiveness and performance, replication in different geographic regions and in different applied settings is recommended.

A second limitation is that the population from which the sample of insurance agents was drawn was small. This results in a marked decrease in power; however, because a significant relationship was found even in this small sample, it makes future research promising. Additional research should be conducted in sales organizations allowing for larger sample sizes for improved power.

In addition, Daicoff (2004) mentions that men tend to be more prevalent in competitive environments than are women, and yet the sample of insurance agents contained more women (18) than men (12) as did the population from which it was drawn (29 women to 25 men). For this reason, it is important to replicate this study to determine if these results are unique to this group.

A final limitation is the criterion used in Study 1. Though GPA was gathered from university sources, GPA differs from student to student depending upon several factors. Every effort was made to include only GPA from the students' shared university, but students may have transferred in the middle of their academic career and GPA at a previous institution could have been very different. Another reason for this is that GPA

from previous schools was only available on some students' transcripts and not others, so any investigation including prior GPA would have been incomplete. In addition, courses in different majors may be of varying difficulty and no effort was made to include only those students with similar coursework. For these reasons, it may be necessary to design a more effective way of measuring academic performance that is equal for all students.

Directions for Future Research

The results of the current studies do not answer the question of whether competitiveness explains additional variance beyond that accounted for my more traditional predictors of performance (e.g. prior performance or personality). It is important for future research to include additional predictors to answer this question. It may also be wise to operationalize competitiveness differently if more objective or behavioral measures become available.

Future research should also look at how well competitiveness predicts performance in different industries. While a sales organization allows for objective criteria to be used, there are several additional ways in which different types of companies can measure good or bad performance. These may include attendance/absenteeism or length of time with the company. It may even be possible to examine non-linear relationships between competitiveness and managerial performance as measured by the performance of their sales teams or supervisor ratings as suggested by Johnson (1993).

Future research can also look into the role that demographic factors beyond gender play in the relationship between competitiveness and performance. It is possible that race or even socio-economic status (SES) could affect the link between

competitiveness and performance. It may be necessary to conduct a replication in an area that would allow for representation of each of these groups of interest in sufficient numbers. Along these same lines, additional research could be conducted to determine if competitiveness is able to equally predict performance in different college majors or academic departments.

Though this study does have shortcomings, it is important that a non-linear relationship between competitiveness and performance was explored since research had previously been suggested but not attempted. Because a polynomial relationship was able to explain the relationship between competitiveness and performance in two different populations using different criteria opens the door to future research into other areas that competitiveness may have an impact, especially if previous research avenues have been closed after linear relationships were not significant.

In conclusion, results of this study indicate that those high and low in competitiveness are likely to score differently from those in the middle but similar to each other. Depending on the criteria used to determine success and the requirement for interpersonal competition, this could mean they perform better or worse than those who report average competitiveness. Most important, moderate non-linear relationships held up in an applied setting with small sample sizes. This could open up many new avenues for investigation.

List of References

List of References

Adoption of Four Agencies of Uniform Guidelines on Employee Selection Procedures. (1978). In E. E. O. Commission, C. S. Commission, D. o. Labor & D. o. Justice (Eds.) (Vol. 43 Federal Register 38, pp. 290-315).

Begley, T. M., & Boyd, D. P. (1987). A comparison of entrepreneurs and managers of small business firms. *Journal of Management, 13*(1), 99-108.

Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin, 107*, 238-246.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588-606.

Bermudez, J., & Perez Garcia, A. M. (1996). Cardiovascular reactivity, affective responses and performance related to the risk dimensions of coronary-prone behaviour. *Personality and Individual Differences, 21*(6), 919-927.

Brown, S. P., Cron, W. L., & Slocum, J. W., Jr. (1998). Effects of trait competitiveness and perceived intraorganizational competition on salesperson goal setting and performance. *Journal of Marketing, 62*(4), 88-98.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing Structural Equation Models* (pp. 136-162). Newbury Park, CA: Sage.

Cassidy, T., & Lynn, R. (1989). A multifactorial approach to achievement motivation: The development of a comprehensive measure. *Journal of Occupational Psychology, 62*(4), 301-312.

Cattell, H. E., & Schuerger, J. M. (2003). *Essentials of 16PF Assessment*. Hoboken, NJ: John Wiley & Sons, Inc.

Cattell, R. B., Cattell, A. K., & Cattell, H. E. (1993). *Sixteen Personality Factor Questionnaire (5th Ed.)*. Champaign, IL: Institute for Personality and Ability Testing.

Chernyshenko, O. S., Stark, S., & Chan, K. Y. (2001). Investigating the heirarchical factor structure of the fifth edition of the 16PF: An application of the Schmid-Leiman orthogonalization procedure. *Educational and Psychological Measurement, 61*(2), 290-302.

Chroni, S. (1998). Professional polo players' perception of competitiveness. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 58*(7-A).

Conn, S. R., & Reike, M. L. (1994). *The 16PF Fifth Edition Technical Manual*. Champaign, IL: Institute for Personality and Ability Testing, Inc.

Daicoff, S. S. (2004). The Lawyer Personality: How Lawyers Differ From "Regular People". In S. S. Daicoff (Ed.), *Lawyer, know thyself: A psychological analysis of personality strengths and weaknesses* (pp. 25-49). Washington, DC: American Psychological Association.

Eysenck, H. J., & Eysenck, S. B. (1968). A Factorial Study of Psychoticism as a Dimension of Personality. *Multivariate Behavioral Research*(Special Issue), 15-31.

Fabian, L., & Ross, M. (1984). The development of the Sports Competition Trait Inventory. *Journal of Sport Behavior, 7*(1), 13-27.

Franken, R. E. (1990). Winning, Competitiveness, Mastery, and Persistence scale.: University of Calgary.

Franken, R. E., Hill, R., & Kierstead, J. (1994). Sport interest as predicted by the personality measures of competitiveness, mastery, instrumentality, expressivity, and sensation seeking. *Personality and Individual Differences, 17*(4), 467-476.

Frederick, C. M. (2000). Competitiveness: Relations with GPA, locus of control, sex and athletic status. *Perceptual and Motor Skills, 90*(2), 413-414.

Friedman, M., & Rosenman, R. H. (1959). Association of specific overt behavior pattern with blood and cardiovascular findings. *Journal of the American Medical Association, 169*, 1286-1296.

Gill, D. L. (1988). Gender differences in competitive orientation and sport participation. *International Journal of Sport Psychology, 19*(2), 145-159.

Gill, D. L., & Deeter, T. E. (1988). Development of the Sport Orientation Questionnaire. *Research Quarterly for Exercise and Sport, 59*(3), 191-202.

Gill, D. L., & Dzewaltowski, D. A. (1988). Competitive orientations among intercollegiate athletes: Is winning the only thing? *Sport Psychologist, 2*(3), 212-221.

Gill, D. L., Dzewaltowski, D. A., & Deeter, T. E. (1988). The relationship of competitiveness and achievement orientation to participation in sport and nonsport activities. *Journal of Sport and Exercise Psychology, 10*(2), 139-150.

Gill, D. L., Kelley, B. C., Martin, J. J., & Caruso, C. M. (1991). A comparison of competitive-orientation measures. *Journal of Sport and Exercise Psychology, 13*(3), 266-280.

Graziano, W. G., Hair, E. C., & Finch, J. F. (1997). Competitiveness mediates the link between personality and group performance. *Journal of Personality and Social Psychology, 73*(6), 1394-1408.

Griffin-Pierson, S. (1988). Achievement and competitiveness in women. *Journal of College Student Development, 29*(6), 491-495.

Griffin-Pierson, S. (1990). The Competitiveness Questionnaire: A measure of two components of competitiveness. *Measurement and Evaluation in Counseling and Development, 23*(3), 108-115.

Haemmerlie, F. M., & Beamish, P. (1990). The Jenkins Activity Survey and the CPI--Revised: Further evidence of adaptive and maladaptive Type A traits. *Journal of Clinical Psychology, 46*(5), 573-581.

Harrison, A. W., Rainer, R. K., Jr., Hochwarter, W. A., & Thompson, K. R. (1997). Testing the self-efficacy-performance linkage of social-cognitive theory. *Journal of Social Psychology, 137*(1), 79-87.

Heggestad, E. D., & Kanfer, R. (2000). Individual differences in trait motivation: Development of the Motivational Trait Questionnaire. *International Journal of Educational Research, 33*, 751-776.

Helmreich, R. L., Beane, W., Lucker, G. W., & Spence, J. T. (1978). Achievement motivation and scientific attainment. *Personality and Social Psychology Bulletin, 4*(2), 222-226.

Helmreich, R. L., & Spence, J. T. (1978). Work and Family Orientation Questionnaire: An objective instrument to assess components of achievement motivation and

attitudes toward family and career. *Catalog of Selected Documents in Psychology, 8 MS. 1677*, 35.

Hibbard, D. R. (2000). The influence of two dimensions of competitiveness on achievement, adjustment, and interpersonal relationships among high school seniors. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 61*(2-B), 1111.

Hill, O. W., Pettus, W. C., & Hedin, B. A. (1990). Three studies of factors affecting the attitudes of Blacks and females toward the pursuit of science and science-related careers.

Hinsz, V. B., & Jundt, D. K. (2005). Exploring Individual Differences in a Goal-Setting Situation Using the Motivational Trait Questionnaire. *Journal of Applied Social Psychology, 35*(3), 551-571.

Hoffman, A. J. (1986). Competitive sport and the American athlete: How much is too much? *International Journal of Sport Psychology, 17*(5), 390-397.

Hogan, R. (1992). *Hogan Personality Inventory: Manual*. Minneapolis, MN: National Computer Systems.

Houston, J. M., Carter, D., & Smither, R. D. (1997). Competitiveness in elite professional athletes. *Perceptual and Motor Skills, 84*(3(2)), 1447-1454.

Houston, J. M., Farese, D. M., & la Du, T. J. (1992). Assessing competitiveness: A validation study of the Competitiveness Index. *Personality and Individual Differences, 13*(10), 1153-1156.

Houston, J. M., Harris, P., McIntire, S., & Francis, D. (2002). Revising the Competitiveness Index using factor analysis. *Psychological Reports, 90*(1), 31-34.

Houston, J. M., Kinnie, J., Lupo, B., Terry, C., & Ho, S. S. (2000). Competitiveness and conflict behavior in simulation of a social dilemma. *Psychological Reports, 86*(3(2)), 1219-1225.

Houston, J. M., McIntire, S. A., Kinnie, J., & Terry, C. (2002). A factorial analysis of scales measuring competitiveness. *Educational and Psychological Measurement, 62*(2), 284-298.

James, S. D., & Johnson, D. W. (1988). Social interdependence, psychological adjustment, and marital satisfaction in second marriages. *Journal of Social Psychology, 128*(3), 287-303.

Jenkins, C. D., Zyzanski, S. J., & Rosenman, R. H. (1979). *Jenkins Activity Survey Manual.* New York: Psychological Corporation.

Johnson, D. L. (1993). Competitiveness and performance in the workforce: Hierarchical factor analysis of managerial competitiveness, achievement motivation, and the big five personality dimensions. *Dissertation Abstracts International, 53*(7-B).

Johnson, D. S., & Perlow, R. (1992). The impact of need for achievement components on goal commitment and performance. *Journal of Applied Social Psychology, 22*(21), 1711-1720.

Kirkcaldy, B. D., & Furnham, A. (1993). Predictors of beliefs about money. *Psychological Reports, 73*(3, Pt 2), 1079-1082.

Kirkcaldy, B. D., Furnham, A., & Lynn, R. (1992). Individual differences in work attitudes. *Personality and Individual Differences, 13*(1), 49-55.

Kirkcaldy, B. D., Furnham, A., & Martin, T. (1998). National differences in personality, socio-ecomonic, and work-related attitudinal variables. *European Psychologist, 3*(4), 255-262.

Kivlighan, K. T., Granger, D. A., & Booth, A. (2005). Gender differences in testosterone and cortisol response to competition. *Psychoneuroendocrinology, 30*(1), 58-71.

Krishnan, B. C., Netemeyer, R. G., & Boles, J. S. (2002). Self-efficacy, competitiveness, and effort as antecedents of salesperson performance. *Journal of Personal Selling and Sales Management, 22*(4), 285-295.

Loehlin, J. C. (1998). *Latent Variable Models: An introduction to factor, path, and structural analysis* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Martin, J. J., Eklund, R. C., & Smith, A. L. (1994). The relationships among competitiveness, age and ability in distance runners. *Journal of Sport Behavior, 17*(4), 258-266.

May, J., & Kline, P. (1987). Extraversion, neuroticism, obsessionality and the Type A behaviour pattern. *British Journal of Medical Psychology, 60*(3), 253-259.

Mendez, L. M. R. (2000). Gender roles and achievement-related choices: A comparison of early adolescent girls in gifted and general education programs. *Journal for the Education of the Gifted, 24*(2), 149-169.

Murphy, W. H. (2004). In pursuit of short-term goals: Anticipating the unintended consequences of using special incentives to motivate the sales force. *Journal of Business Research, 57*(11), 1265-1275.

Northam, S., & Bluen, S. D. (1994). Differential correlates of components of Type A behaviour. *South African Journal of Psychology, 24*(3), 131-137.

Riskind, J. H., & Wilson, D. W. (1982). Interpersonal attraction for the competitive person: Unscrambling the competition paradox. *Journal of Applied Social Psychology, 12*(6), 444-452.

Ryckman, R. M., Hammer, M., Kaczor, L. M., & Gold, J. A. (1990). Construction of a Hypercompetitive Attitude Scale. *Journal of Personality Assessment, 55*(3-4), 630-639.

Sankaran, S., & Bui, T. (2003). Relationship between student characteristics and ethics: Implications for educators. *Journal of Instructional Psychology, 30*(3), 240-253.

Schopler, J., Insko, C. A., Wieselquist, J., Pemberton, M., Witcher, B., Kozar, R., et al. (2001). When groups are more competitive than individuals: The domain of the discontinuity effect. *Journal of Personality and Social Psychology, 80*(4), 632-644.

Smither, R. D., & Houston, J. M. (1992). The nature of competitiveness: The development and validation of the Competitiveness Index. *Educational and Psychological Measurement, 52*(5), 407-418.

Valenti, M. C. (2005a). Achievement motivation and competitiveness: A review of the literature, *unpublished* (pp. 50): University of Tennessee.

Valenti, M. C. (2005b). Revising the Competitiveness Index (pp. 27): University of Tennessee Knoxville.

Wang, G., & Netemeyer, R. G. (2002). The effects of job autonomy, customer demandingness, and trait competitiveness on salesperson learning, self-efficacy, and performance. *Journal of the Academy of Marketing Science, 30*(3), 217-228.

Wang, J., & Ding, X. (2002). The relationship between innnovative diathesis and personality traits of secondary school students. *Chinese Journal of Clinical Psychology, 10*(4), 273-274 277.

Williams, S. W., & McCullers, J. C. (1983). Personal factors related to typicalness of career and success in active professional women. *Psychology of Women Quarterly, 7*(4), 343-357.

Wong, N. D., & Reading, A. E. (1989). Personality correlates of Type A behavior. *Personality and Individual Differences, 10*(9), 991-996.

Wood, R., & Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review, 14*(3), 361-384.

Appendices

Appendix A

Confirmatory Factor Analysis: Revised Competitiveness Index

Regression Weights: (Group number 1 - A Priori Model)

			Estimate	S.E.	C.R.	P	Label
cir14_1	<---	Enjoyment of_Competition	-0.673	0.032	-20.753	***	par_6
cir13_1	<---	Enjoyment of_Competition	-0.656	0.033	-19.593	***	EC-13
cir12_1	<---	Enjoyment of_Competition	0.604	0.033	18.255	***	par_7
cir11_1	<---	Enjoyment of_Competition	0.535	0.044	12.05	***	par_8
cir10_1	<---	Enjoyment of_Competition	0.681	0.036	19.087	***	par_9
cir7_1	<---	Enjoyment of_Competition	0.68	0.035	19.619	***	EC-7
cir5_1	<---	Enjoyment of_Competition	0.629	0.036	17.556	***	EC-5
cir3_1	<---	Enjoyment of_Competition	-0.674	0.041	-16.321	***	par_10
cir1_1	<---	Enjoyment of_Competition	-0.632	0.039	-16.051	***	par_11
cir8_1	<---	Conflict	0.956	0.047	20.541	***	par_12
cir6_1	<---	Conflict	0.679	0.046	14.698	***	par_13
cir4_1	<---	Conflict	0.849	0.049	17.188	***	par_14
cir2_1	<---	Enjoyment of_Competition	0.353	0.046	7.613	***	EC-2
cir9_1	<---	Conflict	0.568	0.049	11.705	***	EC-9

All regression weights significant at $p \leq 0.001$

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
A Priori Model	.917	.901	.940	.927	.939
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
A Priori Model	.079	.068	.089	.000
Independence model	.292	.283	.300	.000

In articles where each of these statistics were first introduced, authors presented rules of thumb for determining if the fit of a given model is adequate. Bentler and Bonett (1980) suggest that "models with [normed fit indices (NFI)] of less than .9 can usually be improved substantially." The comparative fit index (CFI; Bentler, 1990) has a range of 0 to 1 and values close to 1 are indicative of a good fitting model. Browne and Cudeck state of their root mean square error of approximation RMSEA (1993) "a value…of about .05 or less would indicate a close fit of the model in relation to the degrees of freedom…a value of about .08 or less…would indicate a reasonable error of approximation. As the output above (copied from AMOS version 5) shows, each of these fit indices are within the range deemed acceptable by the authors who derived the indices. Rules of thumb for the other indices included (RFI, IFI, and TLI) all follow rules similar to the CFI.

Appendix B

Attitude Index

We want to know how you *usually* feel. Read each statement fill in the circle that best indicates how much you agree or disagree with each statement. There is no right or wrong answer; simply answer as you honestly feel. Do not spend too much time on any one statement. Remember to choose the answer which describes how you *usually* feel.

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
1. I get satisfaction from competing with others.	O	O	O	O	O
2. Competition destroys friendships.	O	O	O	O	O
3. I am a competitive individual.	O	O	O	O	O
4. I will do almost anything to avoid an argument.	O	O	O	O	O
5. I try to avoid competing with others.	O	O	O	O	O
6. I often remain quiet rather than risk hurting another person.	O	O	O	O	O
7. I find competitive situations unpleasant.	O	O	O	O	O
8. I try to avoid arguments.	O	O	O	O	O
9. In general, I will go along with the group rather than create conflict.	O	O	O	O	O
10. I don't like competing against other people.	O	O	O	O	O
11. I don't like games that are winner-take-all.	O	O	O	O	O
12. I dread competing against other people.	O	O	O	O	O
13. I enjoy competing against an opponent.	O	O	O	O	O
14. I like competition.	O	O	O	O	O

Appendix C

Tables

Table 7

Correlations: Competitiveness, its factors, and personality: Students

		Competitiveness	Conflict	Enjoyment	EXT	ANX	TM	INDEP	SC
Competitiveness	Pearson Correlation	1	0.561**	0.952**	0.046	0.002	0.052	0.119	0.06
	Sig. (2-tailed)		0	0	0.528	0.978	0.477	0.104	0.41
	N		188	188	188	188	188	188	188
Conflict	Pearson Correlation		1	0.281**	0.094	0.015	0.008	0.159*	-0.074
	Sig. (2-tailed)			0	0.198	0.842	0.915	0.029	0.31
	N			188	188	188	188	188	188
Enjoyment of	Pearson Correlation			1	0.019	-0.003	0.058	0.079	0.098
competition	Sig. (2-tailed)				0.798	0.966	0.433	0.281	0.183
	N				188	188	188	188	188
	** Correlation is significant at the 0.01 level (2-tailed).								
	* Correlation is significant at the 0.05 level (2-tailed).								

Note. EXT = extraversion; ANX = anxiety; TM = tough mindedness; INDEP = independence; SC = self control.

Table 8

Correlations - Students by Gender: Competitiveness, its factors, and personality

MALE		Competitiveness	Conflict	Enjoyment	EXT	ANX	TM	INDEP	SC
Competitiveness	Pearson Correlation	1	0.590**	0.969**	-0.007	0.056	0	-0.173	-0.07
	Sig. (2-tailed)		0	0	0.955	0.646	0.998	0.155	0.57
	N		69	69	69	69	69	69	69
Conflict	Pearson Correlation		1	0.371**	0.047	-0.062	0.121	-0.057	0.018
	Sig. (2-tailed)			0.002	0.701	0.61	0.323	0.639	0.883
	N			69	69	69	69	69	69
Enjoyment of	Pearson Correlation			1	-0.023	0.084	-0.038	-0.181	-0.086
competition	Sig. (2-tailed)				0.854	0.493	0.759	0.136	0.485
	N				69	69	69	69	69
	* Correlation is significant at the 0.05 level (2-tailed).								
	** Correlation is significant at the 0.01 level (2-tailed).								

FEMALE		Competitiveness	Conflict	Enjoyment	EXT	ANX	TM	INDEP	SC
Competitiveness	Pearson Correlation	1	0.552**	0.938**	0.063	-0.059	0.119	0.303**	0.125
	Sig. (2-tailed)		0	0	0.498	0.527	0.198	0.001	0.177
	N	119	119	119	119	119	119	119	119
Conflict	Pearson Correlation		1	0.230*	0.111	0.053	-0.054	0.260**	-0.128
	Sig. (2-tailed)			0.012	0.23	0.569	0.562	0.004	0.167
	N			119	119	119	119	119	119
Enjoyment of	Pearson Correlation			1	0.027	-0.09	0.161	0.245**	0.198*
competition	Sig. (2-tailed)				0.77	0.329	0.08	0.007	0.03
	N				119	119	119	119	119
	** Correlation is significant at the 0.01 level (2-tailed).								
	* Correlation is significant at the 0.05 level (2-tailed).								

Note. EXT = extraversion; ANX = anxiety; TM = tough mindedness; INDEP = independence; SC = self control.

Table 9

Linear Regression: Self Efficacy then Competitiveness and Competitiveness-squared

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
a	0.235	0.055	0.05	0.71	0.055	10.844	1	186	0.001**
b	0.307	0.094	0.079	0.699	0.039	3.95	2	184	0.021*
	a: Predictors: (Constant), O								
	b: Predictors: (Constant), O, Competitiveness, CIR_squared								

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

Table 15

Correlations: Competitiveness, its factors, and personality: Insurance Agents

		Competitiveness	Conflict	Enjoyment of Competition	EXT	ANX	TM	INDEP	SC
Competitiveness	Pearson Correlation	1	0.46**	0.935**	0.317	0.081	-0.001	0.102	-0.371*
	Sig. (2-tailed)		0.01	0	0.088	0.672	0.995	0.593	0.044
	N		30	30	30	30	30	30	30
Conflict	Pearson Correlation		1	0.116	0.03	0.112	-0.127	0.025	-0.219
	Sig. (2-tailed)			0.541	0.873	0.557	0.503	0.895	0.244
	N			30	30	30	30	30	30
Enjoyment of Competition	Pearson Correlation			1	0.343	0.046	0.05	0.104	-0.327
	Sig. (2-tailed)				0.064	0.811	0.795	0.585	0.078
	N				30	30	30	30	30
	*Correlation is significant at the 0.05 level (2-tailed).								
	**Correlation is significant at the 0.01 level (2-tailed).								

Note. EXT = extraversion; ANX = anxiety; TM = tough mindedness; INDEP = independence; SC = self control.

Table 16

Linear Regression: Self-Efficacy, Competitiveness, and Competitiveness-cubed

regression: self-efficacy, then competitiveness and CIR_cubed

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
a	0.185	0.034	0	16.093	0.034	0.987	1	28	0.329
b	0.574	0.329	0.252	13.917	0.295	5.72	2	26	0.009**
	a. Predictors: (Constant), Self-efficacy								
	b. Predictors: (Constant), Self-efficacy, Competitiveness, CIR-cubed								

regression: competitiveness, CIR-cubed, then self-efficacy

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
a	0.516	0.267	0.212	14.28	0.267	4.909	2	27	0.015*
b	0.574	0.329	0.252	13.917	0.063	2.425	1	26	0.131

** Significant at the 0.01 level (2-tailed).

* Significant at the 0.05 level (2-tailed).

Vita

Matthew Charles Valenti was born in Athens, GA on September 23, 1974. He was raised in Nashville, TN and went to junior high and high school at Montgomery Bell Academy and graduated in 1992. From there he went to the University of Tennessee, Knoxville and received a B.A. in Psychology in 1997. Matthew received a PhD in psychology from the University of Tennessee, Knoxville in 2006.

8792 6514 14
11/08/06 VR