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Psychological correlates of investor risk

John Laurin Vaughn

PSYCHOLOGICAL CORRELATES OF INVESTOR RISK

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Business Administration

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ABSTRACT

The Internal/External Locus of Control Scale was used to explore variation in student responses on several different investment assessment measures. The measures included a test of risk aversion, and scales assessing intentions to invest long term and short term. One hundred and fifty six undergraduate students from randomly selected sections of a finance course participated. Correlation and ANOVA's were calculated. 120 subjects attained an Internal Locus of Control score. 36 attained an "external" score. Results found significant ANOVA's between marital status and risk aversion, and ethnicity with years of investing. Short term investment intentions approached significance with locus of control and gender. Analysis found locus of control and long term investment intentions to be negatively correlated, and gender correlated with short term investment intentions. Significant findings were consistent with previous research. Non-significant findings are reviewed in the context of previous research. The implications of the study are discussed in the context of future trends for research in finance.

ACKNOWLEDGEMENTS

I wish to express my deepest gratitude to Dr. Francisca Beer whose knowledge inspired, and whose guidance was full of wisdom. Thank you for a genuine learning experience.

This project is dedicated to my daughter, Heather.

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CHAPTER ONE

INTRODUCTION

Financial Planners are bound by ethics to incorporate a client's comfort level with risk into the process of constructing client portfolios. Valid and reliable assessment of risk tolerance is very complex and difficult, an art more than a science. The degree to which it is considered by the broad array of professional investment advisors has yet to be established. On the heels of the recent worldwide financial meltdown, there has been an outcry for a more profound understanding of risk tolerance and the unique characteristics of the individual investor. Financial planners and major financial firms utilize simple proprietary measures of risk to ascertain a client's risk tolerance. These measures have not stood the test of transparency and scrutiny of the academic world or the general public. Are they efficacious? How much do we know about measures of risk and what they allege to measure? What, if any, are the personality correlates of individual risk tolerance? Are they useful in the financial planning process?

Kahneman and Turvinski (1972) brought forth to the world of finance a recognition that this variable, the

investor, is independent and subject to variability, no matter how efficient the market may seem.

The present study explores the efficacy of a standardized psychological test known as Rotter's (1966) Internal/External Locus of Control Scale in predicting investor's level of risk aversion. Locus of control and risk are examined relative to investors' propensity to prefer long term investments and/or short term investments.

Background

Neoclassical finance theory is based on the belief that individuals behave in a rational manner. It rests on the premise that all critical information is available and utilized in the investment process. This assumption of the primacy of rationalism is the critical underpinning of the Efficient Market Hypothesis (EMH). The investor is said to be an agent of reason and as Gao and Schmidt (2005) put it with tongue in cheek, an unbiased Bayesian forecaster, always utilizing all available public information to maximize utility.

Over the past couple of decades, researchers have noted the occurrence of numerous financial market

anomalies that defy this underlying principle of the Efficient Market Hypothesis (EMH). EMH simply cannot explain all the real world data (Shiller, 2002).

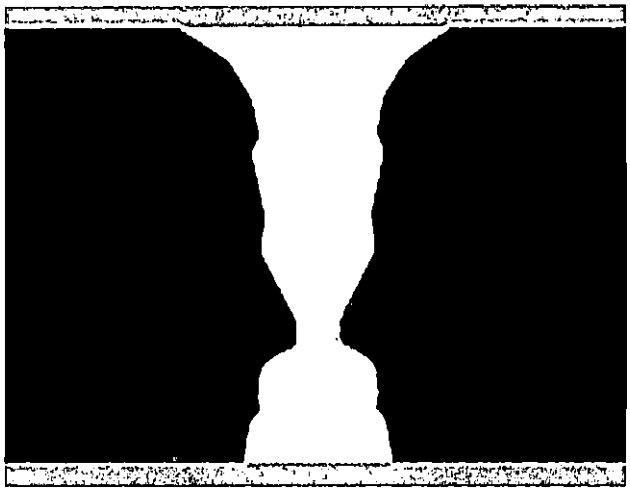
Efficient Market Hypothesis as a postulate is embedded in investment theories that assert that it is impossible to "beat the market". Stock market efficiency causes existing share prices to incorporate and reflect all relevant information (Bodie, Kane and Marcus, 2008). Subsequently, stocks will always trade at their fair value on stock exchanges, making it impossible to either purchase undervalued stocks or sell stocks for inflated prices. Therefore, it is impossible to "beat" the market consistently on a risk adjusted basis, through techniques of stock selection or market timing. The only way an investor can earn higher returns is by purchasing riskier stock (Bodie, Kane and Marcus, 2008).

Another tenant, the notion that the investor behaves in a rational manner may not be as omnipotent in the investment process as previously believed.
The rationality premise of EMH began to draw critical, empirical scrutiny when Kahneman and Tverskys' published their landmark article, Subjective Probability: A Judgment of Representitiveness (1972); and then later in

Prospect Theory: An Analysis of Decision under Risk (1979). These researchers set into motion what has now become known as Behavioral Finance.

Drawing heavily from Cognitive Psychology and particularly Attribution Theory, they Kahneman and Tversky provided empirical evidence that the underlying principles of the Efficient Markets Hypothesis are not entirely correct. This early beginning opened the flood gates. A new competing paradigm began to quickly take form and has enjoyed a meteoric catapult into prominence, adding new vitality to the field of theoretical and applied finance. That school is now providing considerable empirical evidence that some anomalies can better be understood by recognizing that human beings do not always behave rationally. Psychologists have well documented the ability of an individual to behave irrationally, to draw different conclusions from the same data and to process information in unique ways. A good example of bias in information processing can be found in the Optical Illusion literature. One such example is the face and vase illusion, i.e. an illustration of a cognitive illusion featuring reversible figures of faces and a vase.

Figure 1. The Vase Illusion

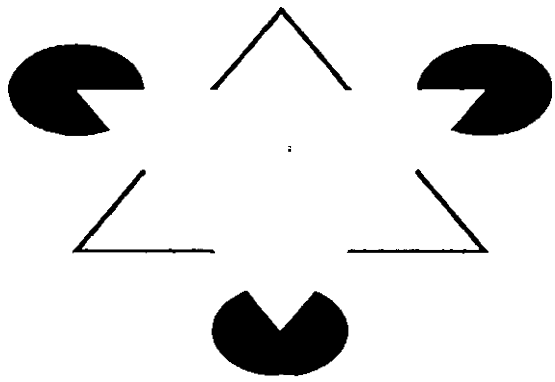


(wikipedia.org/wiki/facesOptical_illusion, reviewed on June 1, 2010)

Some individuals see only a vase initially while others see two. Psychologists argue that to make sense of the world, human beings organize meaningful information into a whole (Myers, D, 2003).

The Kanizsai triangle presents the illusion of a triangle in the center of a shaded area. It appears brighter than the shaded area but is in fact, the same shade as other displayed areas.

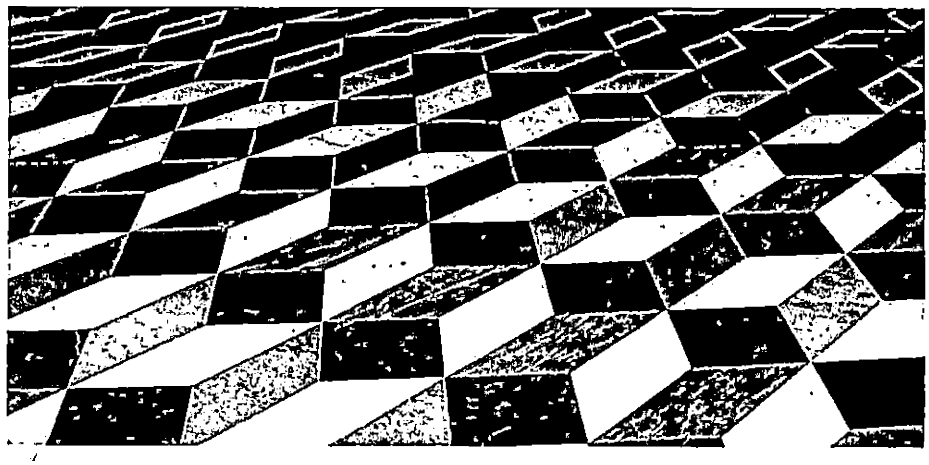
Figure 2. The Kanizsai Triangle



(http://en.wikipedia.org/wiki/File:Kanizsa_triangle.svg, reviewed on June 1, 2010)

The next picture depicts actual floor tiles at the Basilica of St. John Lateran in Rome. The illusion created is one of three-dimensional boxes.

Figure 3. Floor Tiles

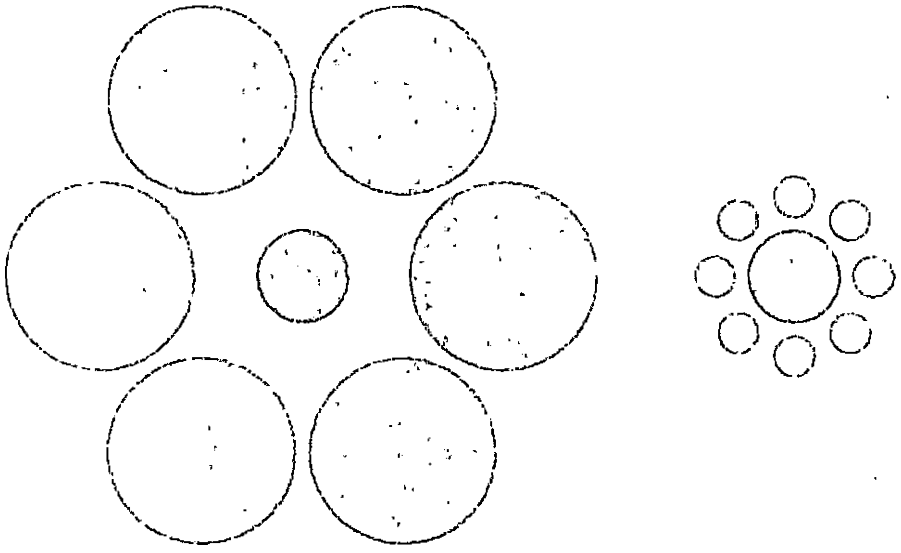


(wikipedia.org/wiki /Optical_illusion, reviewed on June

1,2010)

The illustration below depicts the Ebbinghaus illusion. The first central circle appears smaller than the second central circle.

Figure 4. The Ebbinghaus Illusion



(wikipedia.org/wiki /Optical_illusion, reviewed June 1, 2010)

The perception of the relative size of the circle in the center is distorted. The two circles are surrounded by other circles, and are of equal size.

CHAPTER TWO

BEHAVIORAL FINANCE

Behavioral finance is the discipline of how human cognition and emotion impact investors in their decision-making process. It attempts to understand and explain the role of these cognitive and emotional processes that influence rationality. In broad terms, it argues that some financial phenomena can better be understood using models that incorporate a more complex view of the characteristics of the subject or the investor, in situations where investors fail to behave in a fully rational manner (Barberis and Thaler, 2003). In particular, behavioral finance analyzes what happens when one, or both, of these two tenets, cognition and emotion, underlying individual rationality, varies. As Ritter (2003) describes it, "Behavioral finance is the paradigm where financial markets are studied using models that are less narrow than those based on Von Neumann-Morgenstern expected utility theory and arbitrage assumptions. Specifically, behavioral finance has two building blocks: cognitive psychology and the limits to arbitrage" (p.429).

The emergence of the paradigm of behavioral finance has been facilitated by the failure of neo-classical theory to adequately address anomalies seemingly outside their explanatory constructs. Traditional financial models cannot predict some financial crises.

The short-comings of their predictive and explanatory power were exemplified by the market crash of 1987, which continues to puzzle researchers. Since that time, once quiet voices have found a pitch as the crash, and other anomalies became the focal point of research even though it was outside the explanatory realm of traditional theory.

On that fateful day in 1987, known as Black Monday, stock prices plunged an average of 22.6%. Any attempt to explain market changes by examining changes in economic variables came up woefully and significantly short (Black, 1988; Fama, 1989; Shiller, 1989; Seyhun, 1990; Siegel, 1992). Academicians were faced with the reality that the traditional models cannot explain financial crises.

The behavioral approach reframes or redefines the perception of what an investor is. Investors are not presumed to necessarily be "rational" but "normal", and

that systematic biases in their beliefs induce them to trade on inaccurate information. This is referred to as "sentiment" (Statman and Klimek, 2008, p.7).

Barberis et.al, (1998) divide investors into two types: informed investor and misinformed noise traders. These types are said to compete with each other. Informed investors are said to be rational and sentiment-free. This affords the investor the ability to accurately evaluate assets. Misinformed traders act on sentiment that is overly optimistic or pessimistic and subsequently results in asset miss-pricing.

According to Barberis and Thaler (2003), some investors fail to update their beliefs correctly. Others, apply Bayes' law appropriately but make choices that are outside the norm in that they are questionable, and/or are incompatible with expected utility (Barberis and Thaler, 2003).

Several premises in behavioral finance address a general phenomenon that seems to render Efficient Market Hypothesis partially theoretically inaccurate. The first behavioral premise is that information processing biases lead to investment error (Barberis and Thaler 2003). Some of the information processing errors include what are

termed forecasting errors. An example of a forecasting error would be the situation where investors give too much weight to recent stock performance and ignore the uncertainty accompanying the information (Kahneman and Tversky, 1973). For example, a high price/earnings ratio due to recent favorable earnings may reflect an optimism that does not reflect the objective long term potential of the company (Bodie, Kane and Marcus, 2008). Investor over-confidence is another information processing error. Investors tend to assume they know more than they do. Barber and Odean (2001) demonstrated that over-confident investors traded more frequently than less confident investors, and with less favorable outcomes.

Sample size and the problem of representativeness refer to the error of over-generalization of a market trend on the basis of too little information. Chopra, Lakonishok and Ritter (1992), note that a strong recent performance by a security frequently results in a price reversal. This correction occurs when exuberance carries the price higher, and then a gap between the price of the security and its actual value becomes too disparate.

Another information processing error frequently cited is that a bias of conservatism results when

investors lag in updating their belief systems when new information is available. New information is not immediately reflected in behavior when this error is said to occur (Ritter 2003).

The second general premise of Behavioral Finance (Bodie, Kane and Marcus, 2008) addresses error even when information processing is completely efficient. These anomalies, termed behavioral biases, examine what happens to even perfect information in risk-return situations. How critical information is said to be framed, influences decisions involving risks and returns. By framing an investment in terms of risk and loss rather than profit and gains, can alter the investor's behavior. Framing in terms of focusing on risks or in terms of focusing on rewards can be arbitrary (Bodie, Kane and Marcus, 2008). The valence of the descriptive style of an investment can influence the investor's decision.

Types of behavioral biases may also include mental accounting. Mental accounting describes situations where certain decisions are categorized or compartmentalized (Ritter, 2003). The decision is said to be segregated. Consider the example of some who holds two different mutual funds. Fund number one was established to

accumulate a down payment on a vacation home. Fund number two was set up to pay for college for the investor's child. The funds are compartmentalized by the difference in goals, as opposed to viewing the two funds as part of a comprehensive portfolio.

Some investors hold losing stocks too long due to a reluctance to take a loss. The same investor may sell stocks that show modest gains, too quickly (Shefrin and Statman, 1985). The prospect of selling a stock at a price lower than a purchase price can be an emotional event that leads to the investor trying to avoid regret by not selling, or by selling too soon. Researchers term this regret avoidance. As a corollary to mental accounting, regret avoidance is another behavioral bias. It is said to occur when an investment turns out badly, particularly when the equity was a less than conventional choice. For example, someone who purchases stock in a start-up as opposed to a blue chip company will regret the unconventional purchase more, even if the loss is the same (Debont and Thaler, 1987).

A third common behavioral bias addresses Prospect Theory. Prospect Theory challenged Utility Theory's risk aversion postulate. Utility Theory holds that where

increases in total wealth are said to lead to lower relative increase in utility (satisfaction) for a gain, a loss of the same amount reduces it- the greater the wealth, the lower the value of a gain. Prospect Theory argues that loss aversion as opposed to risk aversion is more important (Kahneman and Turvinski, 1972). It takes into account potential losses in terms of current wealth as influencing investor behavior. Unlike Utility Theory, the level of wealth is deemed less important. Loss aversion as a salient motivator has been demonstrated to generate risk taking behavior as opposed to risk avoidant behavior. This phenomenon is inconsistent with Utility Theory which would predict losses would increase risk aversion (Coval and Shumway, 2005).

Adherents of the behavioral perspective note that there are limits to arbitrage as well. Under EMH, profiteer traders would take advantage of the errors proliferated by behavioral or sentiment investors thereby correcting the market. Delong, et al, (1990) caution that there is fundamental risk in this type of arbitrage activity. Quite simply, the situation engenders risk when purchasing under-priced stock. What if the price declines further? Furthermore, the price of the equity may not

correct until after the investment horizon of the arbitrageur. These examples are a small sample of the anomaly literature. The dot.com bubble is said to be an example of investor overconfidence and the representativeness bias. The list of biases unmasked in the literature continues to proliferate.

Recently, investor sentiment has become the focus of studies on asset pricing. In fact, several theoretical works offer models establishing a relationship between asset pricing and investors' sentiment (Black, 1986; De Long, Shleifer, Summers and Waldmann, 1990; Daniel, Hirshleifer and Subrahmanyam, 1998; Barberis, Shleifer and Vishny, 1998). Two categories of investors characterize this model: informed traders who rationally anticipate assets value; and misinformed noise traders, whose decisions are influenced by irrational sentiment. Rational traders, who are sentiment free, are said to correctly evaluate assets. Noise traders are said to be misinformed or uninformed, and they act on overly optimistic or pessimistic expectations. This induces strong and persistent pricing error. Rational traders and noise traders are said to compete. Informed traders, the unemotional, rational investors who force capital market

prices to equal the rational present value of expected future cash flows, face non-trivial transaction and implementation costs that prevent them from taking fully offsetting positions to correct mispricing induced by noise traders. Hence, to the extent that sentiment influences valuation, taking a position opposite to prevailing market sentiment can be both expensive and risky. Mispricing arises out of the combination of two factors: a change in sentiment on the part of the noise traders, and a limit to arbitrage.

Numerous empirical studies attempt to measure investor sentiment (Lee, Shleifer and Thaler, 1991, Neal and Wheatley, 1998, Brown and Cliff, 2004). Some of these studies identified direct and indirect sentiment measures. Direct measures were derived from self-report surveys while indirect measures of sentiment relied on objective variables that correlate with investor sentiment.

Behavioral finance is not without its critics. The proponents of Efficient Market Hypothesis, particularly Eugene Fama (1998) have argued and continue to argue a position rejecting behavioral finance. A comparative examination of these competing theories is beyond the

scope of this paper. Suffice it to say that Behavioral Finance came to fore as a response to address issues unresolved by the prevailing paradigm, EMH. In the opinion of some, it complements EMH as opposed to replacing it.

As behavioral finance became a major player in the field, it has brought a plethora of studies that examine financial behavior using insights and empirical data from the field of psychology, both theoretical and methodological. Individual variation and group differences including age, education, ethnicity and gender have been invoked to explain the variance in investor behavior (Riley and Chow, 1992). The realm of examination has not been restricted to investor behavior either. For example, Medina, Saegert and Gresham (1996) found cross-cultural group differences in Hispanic and Anglo attitudes toward money. Barber and Odean (2001), as well as Roszkkowski and Grable (2005) among others, established the salience of gender differences in investing.

CHAPTER THREE

STATEMENT OF THE PROBLEM

More recently, researchers have begun to incorporate standardized psychological tests into the mix. Are there pre-established personality measures from the psychological literature 1) that contribute to the explanation of investor and market behavior variances not explained by EMH; 2) can standardized tests and their theoretical underpinnings advance the understanding of financial decision making; and 3) to assist the professional financial planning community in applying such measures in assessing the complexity of client loss and risk aversion? Some recent research suggests it can. The present study examines a standardized personality measure and its role mediating an investor's level of risk aversion, and it's role mediating the intention to invest, both in the long term, and the short term. The Internal/External Locus of Control Scale was administered to students who also responded to tests that measured their risk aversion for investment or risk bearing capacity. Subjects in the study were also administered paper and pencil tests designed to measure their

intention to engage in long term investing and short term investing.

The objective of this study is to identify statistically significant relationships between a subject's locus of control (personality) and these identified variables. The variables are fundamental influences documented in the literature review that make up the complexity of the investment decision. In addition, the salience of demographic information gleaned from subjects is also factored into this analysis. In sum, studying these individual differences should give us a better understanding of the reasons investors deviate from a rational model when making difficult and anxiety inducing decisions. This should be true especially in an environment where there may be more uncertainty than convincing, accurate information.

Review of the Literature

At the most fundamental level, a client's financial capacity to assume risk and their emotional tolerance to bear the risk and loss has considerable impact on long term satisfaction (Buff 2000). According to Buff, a financial planner, risk is comprised of these two

dimensions, financial capacity and emotional capacity. Neace, Deer and Barnard (2010) make a strong argument that affect plays an important role in decision making under uncertainty. According to these researchers, affect impacts the decision making process. It then sets into motion "a process where decision-makers exhibit risk averse and avoidant choice behavior" (p.2).

Mayfield et al. (2008) noted that an extensive body of literature has been generated to understand the role of personality characteristics that influence investor behavior. "If a common theme is present in this literature, it is that personal characteristics influence investors' perception of risk and their willingness to assume risks."

Carducci and Wong (1998) find that persons with a Type A personality demonstrate riskier behavior across the board in financial matters, than do their Type B counterparts. Wong and Carducci (1991) also suggest that the data supports that Type A's generally have a desire for sensation or thrill seeking, in realms financial and otherwise.

Investigating what has been termed The Big Five Factors of personality, Matthews, Deary and Whiteman

(2003) tested traders in London's Financial District. They found a significant negative effect of the cognitive bias "illusion of control" with some measured personality characteristics and a positive effect on others. Filbeck, Hatfield and Horvath (2005) in their article on Risk Aversion and Personality type paired the well-known Myers-Briggs Type Indicator (MBTI) with what was termed investors ex ante measured expected utility.

By grouping personality characteristics as measured by the Myers-Briggs, these researchers were able to quantify personality correlates to risk tolerance. This study confirms that personality type does explain some of the variance in behavior demonstrated by investors.

Locus of Control Overview

First developed by Julian Rotter, the Internal-External Locus of Control Scale is said to measure the degree to which a person believes they have control over their life events. Locus of control was first introduced by Rotter (1966) who was an early proponent of Social Learning Theory. The construct is said to measure the degree to which a person has an internal or an external locus of control.

> According to Rotter (1966), When reinforcement is perceived by the subject as following some action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control (p.7).

Someone with an internal locus of control is said to be someone who believes they control or influence outcomes that impact their life. Ones actions determine ones destiny.

Someone who has an external locus of control believes that event outcomes are outside of their influence or control. Rotter's work strongly lends evidence to the idea that "internals", or those who believe they control their destiny are 1) more alert to the environment and those characteristics of the environment that yield useful data for future behavior; 2) take action to improve their circumstances; 3) tend to

value skill related rewards and focus more on ability and failures; 4) are cautiously resistant to forces that attempt to subtly influence them (Rotter 1966).

Locus of Control is considered to be a measure of generalized expectancy of social reinforcement regarding the forces that determine rewards and punishments. As such, it has proved to be a salient variable for understanding human behavior across a significant number of professional and scientific areas of inquiry (Lefcourt, 1981). The sheer volume of published articles on the topic speaks to the reliability and validity of the measure. It is exemplary in its adherence to the law of parsimony.

The degree to which a person's locus of control influences behavior has been the topic of achievement in education (Findley and Cooper, 1983) recovery of illness and health (Lewis, Morisky & Flynn, 1978), successful managerial styles and productivity at work (Furnham 1992), cross-cultural differences (Garza 1974), motivation, mental health and on (Levenson 1973). Articles pepper the literature in social, educational, health and organizational psychology. More recently locus of control has been examined in light of subjective

well-being and emotional intelligence in business executives (Kulshrestha and Sen, 2006). Internal Locus of Control has been correlated with trust and good decision making (Bonoma and Johnson, 1979).

Locus of Control and Finance

Given the breadth and depth of this body of knowledge and its general acceptance, it would be reasonable to assume that there has been a similar application of the construct applied to the finance literature. That is not entirely the case.

Some studies have examined the roll of an individual's Locus of Control in the area of finance but it has not enjoyed the full examination of its application as have other areas of research. The following studies are representative of Locus of Control research and matters finance. It is worth repeating that the adoption of psychological and individual variables as a relevant area of inquiry under the rubric of behavioral finance is relatively recent Legge and Heynes (2008) argue that people's savings and debt decisions are influenced by the degree to which an individual has an internal or an external locus of control. Their study

suggests that internals make better financial decisions and carry less debt. Others found a positive relationship between locus of control and entrepreneurs earnings (Praag et. al, 2004).

In a study of locus of control and home mortgage loan behavior, Wang et.al, (2008) found that participants with stronger external control were more likely to purchase a lower priced home, have a lower ratio of mortgage loan amount to the total home value, and have a shorter term of mortgage loan.

Using a stock market game simulation model in a laboratory setting, McInish (1980) found that students who had an internal locus of control, selected riskier portfolios than their external locus of control counterparts. The simulation was characterized as a random walk in terms of stock prices. Interesting as well, for internals as opposed to externals, trading was more profitable despite higher trading volume and resultant costs. The authors concluded that one's locus of control is significant determinant for investor decision making. A belief about the ability to control ones environment leads to considerably increased portfolio activity (McInish, 1980) and riskier portfolios

as measured by beta. This is consistent with Filer, Maital and Simon (1978) whose model McInish replicated.

Muehlfeld and Witteloostuijn (2006) paired six measured personality traits with a trading simulation game. The traits were Locus of Control and the Big Five Personality Factors. These investigators looked at trader personality and subsequent performance. Locus of control and optimization (a Big Five personality factor correlated with internal locus of control) had no effect on trader behavior. The authors state "of course, whether or not this is a robust finding cannot be judged on the basis of a preliminary pilot study as ours" (p.24). Apparently their sample size of 32 students was too small for multivariate analysis. They conclude with the obligatory "Future work is needed to further explore this issue".

Vanjeko (2007) utilizing a direct method for studying trader behavior, gave Indian professional traders the Locus of Control Scale. He then collected data on their actual trading behavior. His results suggest that the evidence from cross sectional data supports the hypothesis that individuals' Locus of

control may have some association with their risk bearing capacity.

CHAPTER FOUR

SIGNIFICANCE OF THE PROJECT

In their article on Investment Management and Personality type, Mayfield, Perdue and Wooten (2008) examined personality traits as measured by the Big Five personality construct. Big Five personality variables were paired with measures of an individual's motivation to engage in long term investing, short term investing, and subjects score on a risk aversion scale.

As one of the most widely accepted and comprehensive models of personality, the Big Five purports to measure five primary personality factors. According to Major et al (2006) "the Big Five factors include Neuroticism

> (i.e., tendency to experience negative effects, such as fear, sadness, embarrassment, anger, guilt, and disgust), Extraversion (i.e., tendency to like people, prefer being in large groups, and desire excitement and stimulation; likely to be assertive, active, talkative), Openness (i.e., tendency to have an active imagination, esthetic sensitivity, intellectual curiosity, and be attentive to feelings), Agreeableness (i.e., tendency to be

altruistic, cooperative, and trusting), and Conscientiousness (i.e., tendency to be purposeful, organized, reliable, determined, and ambitious) (p 928).

Mayfield et al (2008) found that conscientiousness and openness to be salient factors when studying investment intentions and risk aversion.

For measuring risk aversion these authors utilized a scale that was developed by Gomez-Mejia and Balkin (1989). This measure uses four items with five-point Likert-type response system (strongly agree, agree, neutral, disagree, strongly disagree). Items were then reworded to make them context specific to investment behavior and personal finance. Gupta and Govndarajan (1984) point out that risk taking propensity is significantly dissimilar across situations. Attempts to measure risk as a generalized personality trait, in their view, is conceptually unsound. Any measure of risk must be tailored to the specific decision making context. Gomez-Mejia and Balkin tailored their questions to the context of compensation strategies. Mayfield et.al. tailored the questions to the context of the investment decision. The researchers hypothesized that the higher

the level of risk aversion, the lower the level of measured behavioral intentions. This translated into a lower likelihood an individual would be to engage in planned portfolio management and a general inclination to avoid personal investment risk. Measured behavioral intentions to invest were drawn from two author generated scales. An example of an item measuring long term intentions is: "I intend to invest some money in long-term assets where my money will be tied up and inaccessible for years." An example of a short term item is: "I intend to engage in portfolio management activities at least twice per week." They are presented in Appendix A for the reader who is interested in more detail.

These researchers found gender to be a salient variable with males attaining a significant correlation for both measured long and short term investment intention. On short term intentions, males scores were correlated at the .01 level, and at the .05 level for long term intentions.

These results are consistent overall, with the research highlighted in the previous section, on gender differences and investing. Mayfield et al lend support to

the notion that individuals who are risk averse do not engage in long or short term investing. These authors strongly emphasize that risk tolerance is the "reigning basis for financial decision making" (p.220).

While a clear link between measured personality differences and measured risk tolerance, and investment intentions, has been established in the literature, the role of the investor's locus of control remains uncertain. Hattruup et.al.(2005) examined locus of control and the Big Five Factors in relation to job performance for which locus of control proved to be a significant predictor. The authors concluded that locus of control was a potent dimension in their study versus broader measures of personality, and that research needed to look beyond the Five Factor Model, and consider other personality variables.

Investment intentions as defined by Mayfield et. al. (2008) has yet to be framed in the context of one's locus of control. Saltzer (1981) looked at locus of control and a priori behavioral intentions in a weight loss experiment. Subjects with high behavioral intentions and an internal locus of control were found to benefit most from weight loss efforts. As noted earlier, a priori

behavioral intentions and risk tolerance were paired with the Five Factor Model of personality in the context of personal investing. The present study will examine a priori behavior intentions for investing, risk aversion and investors locus of control.

CHAPTER FIVE

METHODOLOGY

All subjects were drawn from randomly selected sections of an undergraduate general education finance class. The class is a required course at California State University, San Bernardino. The Attitudes and Investing Packet (see appendix A) was administered to each volunteer student. Subjects were told that the study is preliminary work designed to examine attitudes toward investing among different people. They were informed that their participation is anonymous, confidential, and totally voluntary. Arrangements were made for post-test disclosure of each subject performance. A total of 156 subjects were selected from a sample of 159 students who accepted surveys in four randomly selected sections of the finance class. Three surveys were returned incomplete. It was believed at the time that randomly selected sections of a course that was a general education requirement would generate a representative sample of the student body. The relative efficacy of sampling methodology is further discussed in the conclusions section. One-way ANOVA's were calculated to

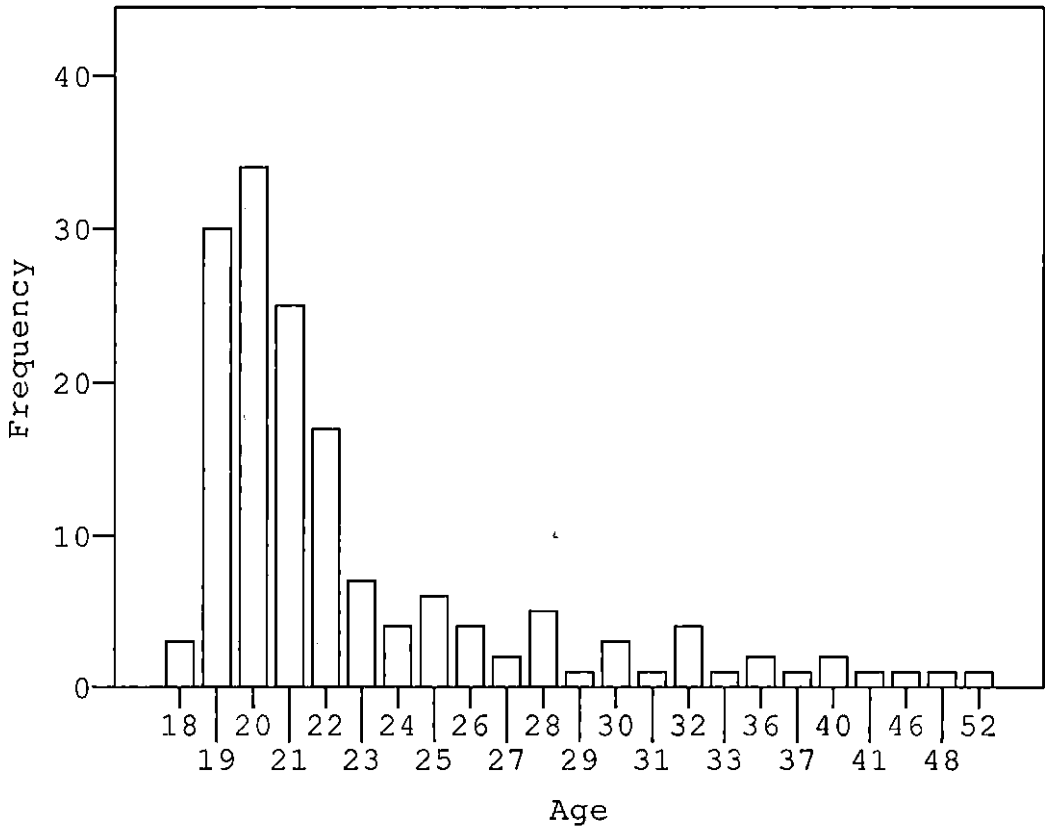
test a number of null hypotheses. Correlation analysis of paired variables were also performed (see the results section).Descriptive statistics calculated included the mean, median, range, standard deviation, skewness, kurtosis and the Jarque-Bera statistic. Mean was calculated by adding up the variables scores and dividing by the number of observations. The median is the simply the middle value but is considered a robust measure of the center of the distribution, and is less reactive (to outliers) than the mean. The range represents the maximum (max) and the minimum (min) value for each variable. The standard deviation measures the dispersion of the variable. Skewness is a measure of asymmetry of the distribution around its mean while Kurtosis measures peakness or flatness of the distribution of the series.

This statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. The reported probability is the probability that a Jarque-Bera statistic exceeds (in absolute value) the observed value under the null hypothesis-a small probability value leads to the rejection of the null hypothesis of a normal distribution. It is considered a good measure of the

normalcy of the distribution. The distribution of the variables age, gender, marital status and ethnicity presented below. Jarque-Bera statistic does not make sense for age, gender, marital and ethnicity.

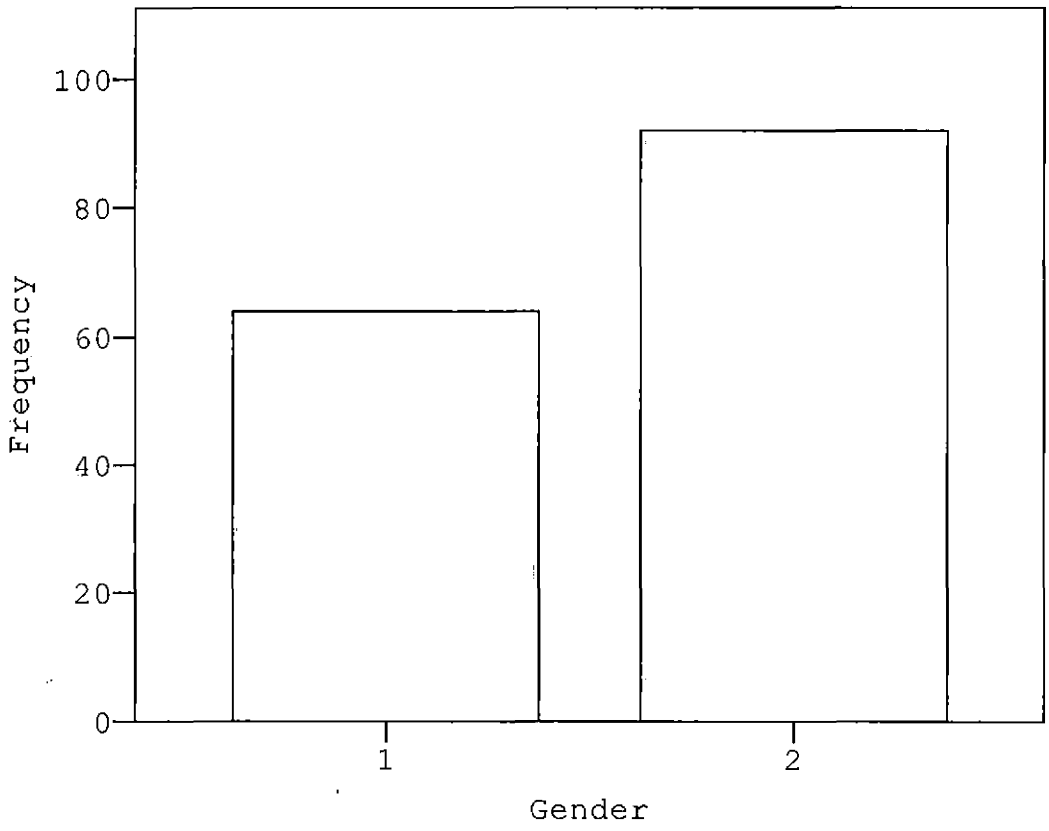
Age distribution of the sample is represented graphically below. The depiction relates a skew to the extreme left with a right tail. It does not approximate a normal curve. It may not represent the CSUSB campus population. This will be fully addressed in the conclusions section. Student's ages ranged from 18 to 52, with a mean age of 23.04487. The median age was determined to be 21 years old.

Graph One. Age



Breakdown of respondents by gender is represented in the graph below. Male was coded 1.0 and female respondents were coded 2.0. Sixty four (41%) subjects were male and 92 were female (59%). Given sample size, it is felt that this is a relatively accurate representation of the campus population by gender.

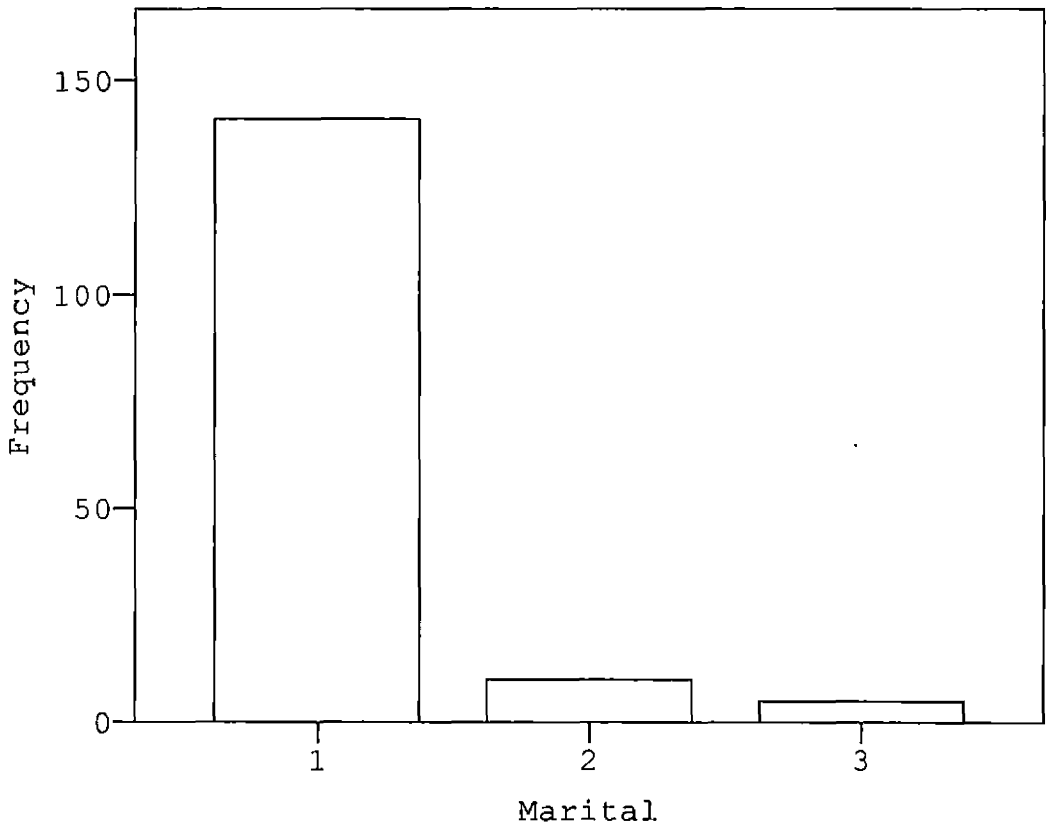
Graph 2. Gender



Subject's marital status is also displayed graphically. The majority of students (141) responded that they were single. The number of students disclosing that they are married and divorced breakdown as follows:

- Single = 141 (90+ percent)
- Married = 10 (female = 3, male = 7)
- Divorced = 5 (female = 4, male = 1)

Graph 3. Marital Status



The sample is dominated by those students who self-report that they are single. The implications of this will be discussed in the conclusions section (1 = single, 2 = married, 3 = divorced).

Personality Tests and Measures of Intentions

The Attitudes and Investments Packet (see Appendix A) contains two tests that measure personality traits. The packet also includes surveys to assess the motivation of the investor to engage in short term investing and long term investing. Specifically, the packet includes four separate measures and a section designed to elicit demographic data.

Section A is the Internal/External Locus of Control Scale for Generalized Expectancies. Developed by Rotter (1966), it utilizes a forced-choice scoring system. Section B is the Risk Aversion Scale. This is a four item test described previously that uses a Likert five point scoring system for each item, that ranges from Strongly Agree to Strongly Disagree. A low score indicates a propensity to avoid the risk associated with a personal investment (Mayfield et al, 2008).

Section C comprises both Long Term and Short Term Investment Intentions Tests utilized by Mayfield et al (2008). The Likert five point scoring system was also utilized for these items. A high score indicates strong positive intentions for investing on each scale.

Section D is made up of general information-gathering questions to elicit the subject's gender, age, years of education and number of years as an investor.

Each packet has been coded with a five digit number for data coding purposes and for follow-up should a subject request their score on each of the items, or the overall results of the experiment. Rotter's scoring system is as follows (score one point for each of the following):

- 2b -- 3a -- 4a --5a -- 6b -- 7b -9b
- 10a -- 11a -- 12a -- 13a -- 15a
- 16b -- 17b -- 18b -- 20b -- 21b
- 22a -- 23b -- 25b -- 26a -- 28a -- 29b

Six filler items make up the remainder of the scale. Filler item numbers are: 1, 8, 14, 19, 24 and 27.
A high score indicates an internal locus of control. A low score represents an external locus of control. The highest possible score is 23. Subjects with a score range of 1 to 11 were placed in the external locus of control group. Subjects with a score of 12 or higher comprise the

internal group. This method is consistent with Rotter (1966, 1975).

Hypotheses

The present study asks: does an individual's locus of control give us clues to the investor's aversion to risk, and/or their motivation to engage different types of investing. For example, do they engage in short term investing, long term investing, or both, and to what degree? Are there salient demographic variables interacting with personality that frames the investors' investment potential? Correlation analyses and one-way ANOVA's were calculated to test these hypotheses operationally. The null hypotheses tested are listed below.

The first hypothesis examines subjects mean scores on the locus of control scale and postulates that they will not vary as a function of their score on the risk assessment scale, the long term investment intentions scale or the short term investment intentions scale (see ANOVA comparisons 1, 3, 5, in the table below).

This hypothesis is fundamental and goes straight to the heart of the matter. Does personality influence

performance on investment variables? Previous research has produced a body of literature that responded with a resounding "yes!" This study suspected that locus of control would be a highly potent predictor variable for a variety of levels of investment activity.

Furthermore, subjects categorized as internal on the locus of control scale will not score significantly different on the risk aversion measure compared to subjects who's scores grouped them in the external locus of control category.

Vanjeko (2007) found in his study that internal versus external Locus of Control did not mediate the degree of risk assumed by professional investors in India. Although he employed a direct method to measure risk aversion (actual investor behavior) his sampling was seriously flawed, and his modification of the locus of control scale does not address issues of reliability and validity, that seem reasonable to raise when one pairs down a 29 item scale to 4 items!

It was also hypothesized that subjects scores categorized as internal will not vary significantly on the short term investment intentions measure. This, compared to students whose scores grouped them in the

external locus of control category. As well, it was hypothesized that internals versus externals will have no effect on high versus low short term investment intention scores (see ANOVA comparisons 20, 21, Table 4). Another set of null hypotheses asserts that there would be no interactive effects of short term investment intentions and ethnicity; gender; Yrs investing; and marital status (see ANOVA comparisons 14, 15, 16, 17, Table 4).

It is here that one would expect results consistent with the established literature on gender differences and other demographics. One could easily speculate that married versus single, younger versus older, experienced versus inexperienced would vary considerable. Adding differences in generalized expectancies as measured by locus of control should also prove to be a factor.

Mayfield et al (2008) has documented gender differences when comparing male to female intentions to invest short term, and in stated intentions to invest long term. Males verbalize greater intentionality for both types of investing. The same differences are expected in this study.

Subjects categorized as internal on the locus of control scale will not score significantly different on

the long term investment intentions measure utilized by Mayfield et al (2008), compared to students who's scores grouped them in the external locus of control category (see ANOVA comparisons 22, 23, table 4). A reversal of results from short term investment would be reasonable to expect here.

It was also predicted by way of the null hypothesis that there would be no interactive effects of long term investment intentions and ethnicity; gender; Yrs investing; and marital status (ANOVA Table 4: items 10, 11, 12, 13). The opposite of the null hypothesis would mean that investing is a robust, dynamic and complex activity with many influences of a varying degree.

As well, it is hypothesized that there is no gender or ethnic difference influencing risk aversion. Another null hypothesis tested the interaction between risk aversion and the number of years investing (ANOVA Table 4: items 7, 8, 9). Filbeck et al (2005) found risk taking differences in personality types as measured by the MBTI. According to the authors, "there appears to be consistency across unrelated studies that certain personality preference such as enjoying taking risks. Noteworthy is the laboratory setting McInish (1980)

studied the personality characteristic where internals versus externals chose riskier portfolios.

To address the issue of interactive effects, the null hypothesis, that locus of control (internal and external) has no interactive effect on the variance between gender and risk aversion (high and low) was tested. Similarly, LOC and marital status with risk aversion was examined. Locus of control, both internal and external, was also examined for an interactive effect with low and high short term investment propensity, and, low and high risk aversion. Long term investment intentions also faced the same test (see ANOVA comparisons 25, 26, 27, 28, table 4).

Internal and external locus of control was tested for effect on risk aversion testing the null hypothesis for the variables Yrs investing and gender (see ANOVA comparisons 29 and 30, table 4).

It is also hypothesized that there is no statistically significant correlation between subject's locus of control and all three measures (RA, LT and ST) as measured by calculated correlation coefficients. Further, it is hypothesized in the null that there is no correlation between locus of control and age; LOC and

gender; and, LOC and Yrs investing (see correlation table 2).

It is hypothesized that there is no correlation between gender and long term investing, and short term investing, risk aversion, as well as Yrs investing. In addition, it is hypothesized that there is no correlation between age and long term intentions to invest, age and short term intentions, and risk aversion with age (see correlation table 3).

CHAPTER SIX

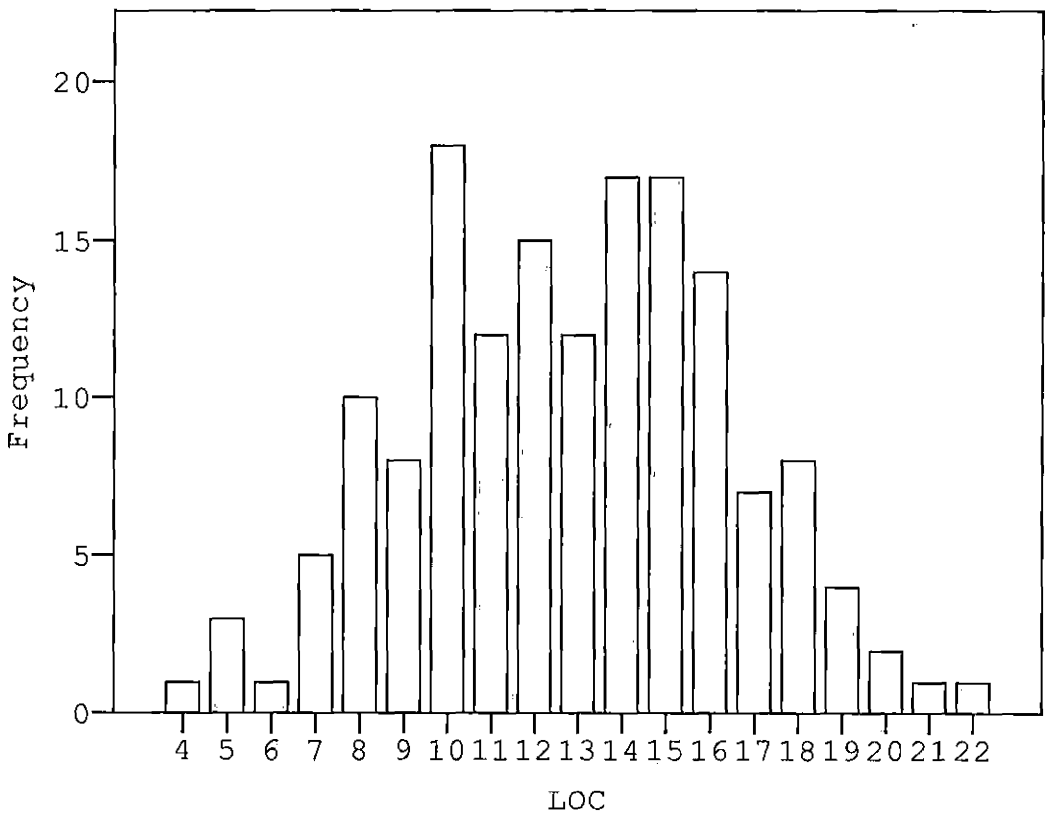
RESULTS

A total of 156 undergraduate college students responded to the Attitudes and Investments Packet (See Appendix A). The sample mean for locus of control scores was 12.8141 with a median of 13.00, and a standard deviation of 3.6007. The mode for the LOC variable was 10. The distribution has a bimodal appearance which suggests that there was measured differentiation of internals versus externals in the sample (see LOC Graph). The distribution's kurtosis of 2.550 suggests a somewhat flat peak. There is a minor skew to the left (-.021525) and the Jarque-Bera test for distribution normalcy was non-significant. The LOC scores from this sample appear to be normally distributed.

Subjects' responses (n= 156) on the Rotter internal/external Locus of Control Scale were scored and subjects were placed into one of two groups. The external locus of control group (n= 36) attained a score equal to or less than 11, using the scoring method outlined above. Subjects who attained a score of 12 or greater (n= 120) were placed in the internal locus of control group. Graph

number four shows the distribution of the subjects LOC scores.

Graph 4. Locus of Control



The following table displays the statistics calculated for Locus of Control, Short and Long Term Investment Preference, Risk Aversion and number of years investing (Yrs investing).

Table 1. Analysis by Variable

LOC= Locus of Control

RA= Risk Aversion

ST= Short Term Investment Intention Score

LT= Long Term Investment Intention Score

AGE= Subjects age

Years invest = Number of years of as an investor

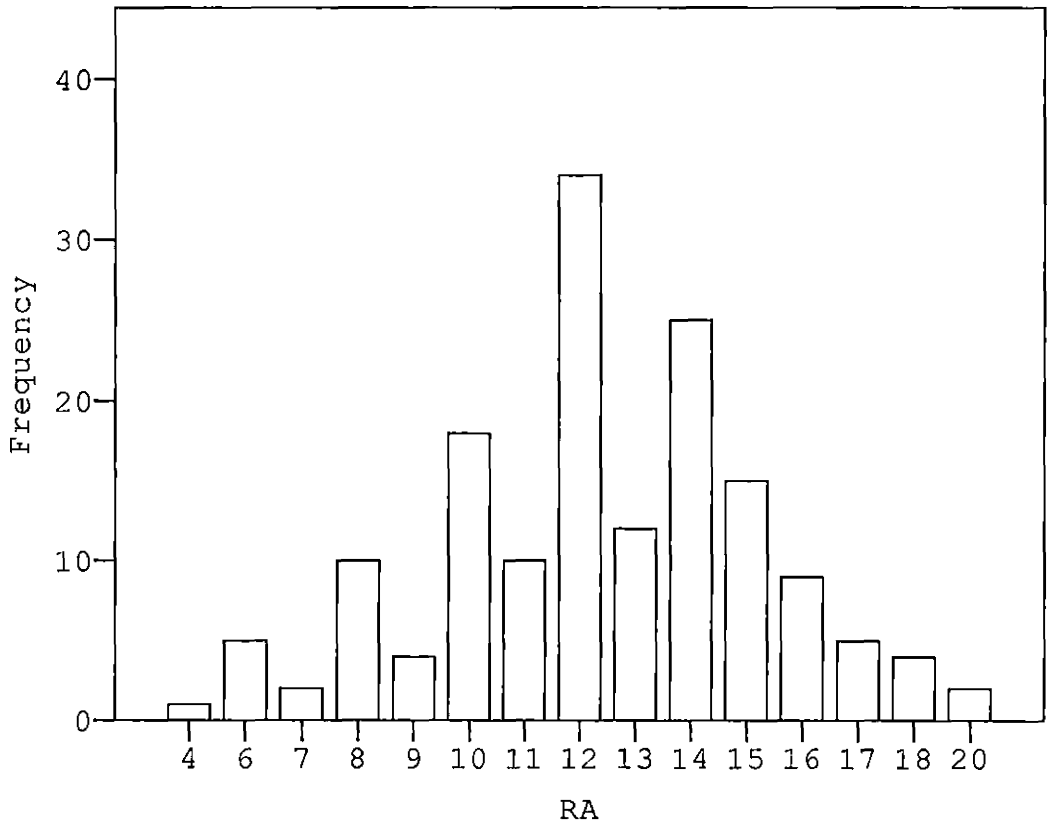
STATISTIC	LOC	RA	ST
Mean	12.81410	13.07051	15.17308
Median	13.00000	12.00000	15.00000
Max	22.00000	116.0000	25.00000
Min	4.000000	4.000000	5.000000
Std	3.600725	8.797443	4.038785
Skewness	-0.021525	10.33400	-0.244886
Kurtosis	2.550165	121.7171	3.330833
Jarque	1.327330	94385.94	2.270626
prob	0.514961	0.000000	0.321322
Observations	156	156	156

STATISTIC	LT	Age	Years Invest
Mean	18.69231	23.044	1.076923
Median	19.000	21.000	0.000
Max	25.00000	52.000	25.000

Min	5.00000	18.000	0.000
Std dev	3.9637	5.847903	3.295233
Skewness	-1.004982	2.505614	4.855996
Kurtosis	4.880179	9.977026	29.45111
Jarque	49.2377	479.6434	5160.895
Prob	0.000	0.000	0.000
Observations	156	156	156

The average number of years investing for the subjects was 1.076923, with the maximum number of 25 years of investment experience. More revealing however is that the median for years of investment experience is zero. Kurtosis score indicates a peak in scores, and Jarque-Bera probability came in at 0.000 a clear indicator of a non-normal distribution. Sampling issues will be addressed more thoroughly in the conclusions section. The mean for subjects risk aversion was 13.0705 with a median of 12.000. The largest pool of subjects had no investment experience.

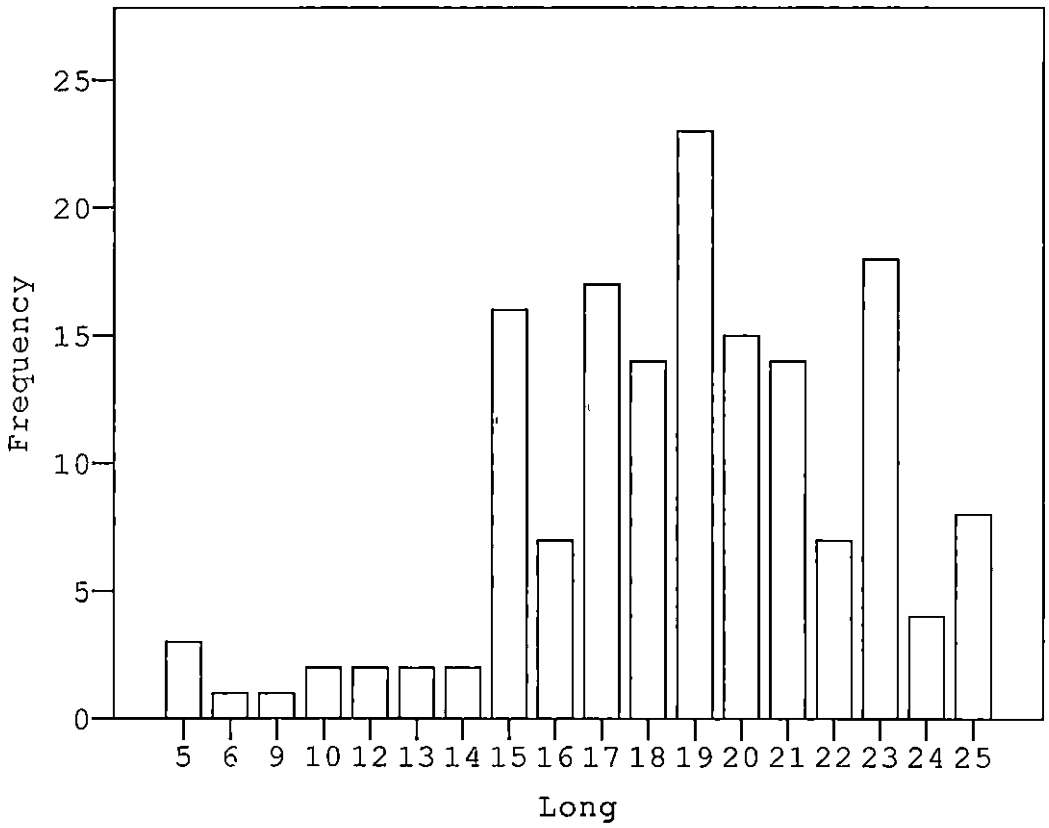
Graph 5. Scores on the Risk Aversion Measure



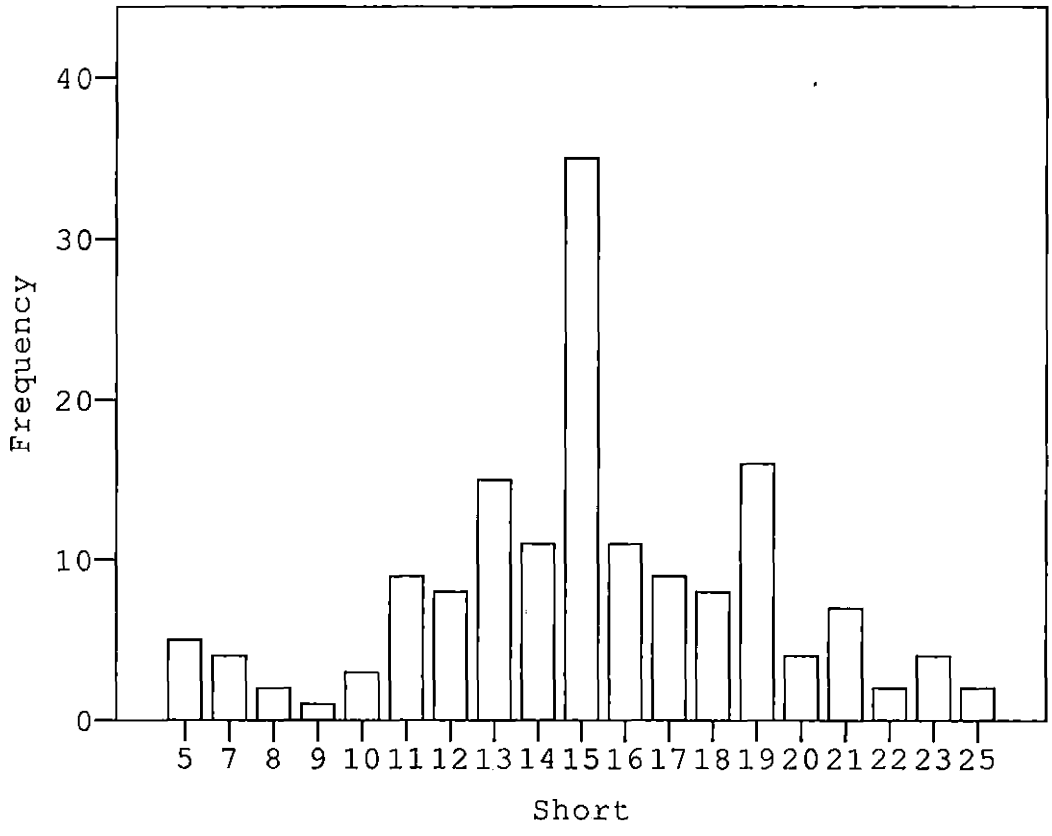
Subjects' responses to the Long Term Investment Intentions measure elicited a mean of 18.69231 (see Graph 6). The median score was 19. This suggests that the distribution is normal despite a small negative skew. Short term investment intention responses drew a mean of 15.17308 with a median of 15. This convergence of the mean and the median suggests that the sample has a normal distribution. If the mean and the median were divergent,

it would suggest a bimodal distribution. The Jaques-Bera probability supports this conclusion with a 0.000 probability that indicates a normal distribution.

Graph 6. Long Term Investment Measure Scores



Graph 7. Short Term Investment Measure Scores



This variable had a small negative skew. Both variables (Long and Short) had modest kurtosis scores (3.330833 and 4.880179 respectively). Consistent with this trend are their standard deviations of 4.038 for short term, and 3.963 for Long Term. This data suggests a relatively similar spread relating to the distribution of scores. There may be little differentiation between subject's long term and short term scores. However, the

short term investment Jaques-Bera probability statistic (0.3213) was greater than .05 indicating a non-normal distribution and failure to reject the null hypothesis.

Correlation Coefficients of the key variables were also calculated to ferret out their relationships. Correlations among variables are listed in Table 3.

Table 2. Correlation

VARIABLE COMPARISON	R	Probability
LOC and Long Term Investment Preference	r = .177685	P = 0.0265
LOC and Short Term Investment Preference	r = .055907	P = 0.4882
LOC and Risk Aversion	r = -.025042	P = 0.7563
LOC and Gender	r = -0.112188	P = 0.1632
LOC and Age	r = 0.125100	P = 0.1197
LOC and Yrs Investing	r = 0.054500	P = 0.4992

GENDER and Long Term Preference

r = -.144116 P = 0.2127

GENDER and Short Term Preference

r = -.155134 P = 0.0531

GENDER and Risk Aversion

r = .100333 P = 0.2127

AGE and Long Term Preference

r = -.010964 P = 0.8919

AGE and Short Term Preference

r = .027509 P = 0.7332

AGE and Risk Aversion

r = .017470 P = 0.8286

YRS and Gender

r = -0.024111 P = 0.7651

No significant linear relationship was found between LOC and risk aversion. No statistical significance was achieved between LOC and short term investment intentions, gender, age or number of years investing. Among all of the combinations subjected to examination to determine the degree that they co-vary, the only

comparison to achieve statistical significance was subjects locus of control and their long term investment score (r = .177685, and P = 0.0265). This suggests that the more internal ones locus of control, the higher the measured intention to engage in long term investment activity. In their study of Big Five personality variables, long and short term investment intentions along with risk aversion, Mayfield et al calculated correlations and found significant correlation coefficients for risk aversion with long term intentions, with short term intentions, unclear and with the personality trait "openness to experience" (Mayfield et al, 2008). The other personality variable that proved to be significant on other statistical analyses, "conscientiousness", did not achieve statistical significance with any of the variables in the correlational analysis. One might conclude that Big Five is more sensitive to the above mentioned variables. It is intuitively appealing to accept that LOC and Long Term investing are correlated.

Gender paired with short term investment intentions approached significance as a negative correlation (r = -.155134, P = 0.0531). This result is consistent with

previously documented gender differences documented by Mayfield et al (2008). In the investment world, if one adopts the reasonable position that short term investing is riskier behavior relative to long term investing; differences in these variables would seem to be very relevant to financial planners. However, the result is not significant (only approaches significance) and no conclusions should be drawn from these results other than the obvious, that the null hypothesis was not rejected. The results of one way analyses of variance are listed in the ANOVA Table.

Table 3. ANOVAS

A.	Locus of Control by Primary Variables		
ANOVA	COMPARISON	VALUE	PROBABILITY
1	LOC w/Risk Aversion	1.237135	0.2513
2	LOC by Risk Aversion, High and Low	.327491	0.0701
3	LOC with Short Term Investment	0.989873	0.4751
4	LOC by ST Investment, High and low	1.762238	0.1863

5	LOC with Long Term Investment		
		1.098362	0.3614
6	LOC by LT Investment, High and low		
		1.195711	0.2759
7	LOC with Marital Status		
		6.190099	0.0026

B. Internal/External Locus of Control with Primary Variables

ANOVA	COMPARISON	VALUE	PROBABILITY
18	I./E. LOC with Risk Aversion		
		0.84851	0.6225
19	I/E. LOC by Hi/Low Risk Aversion		
		0.39931	0.5284
20	I./E. LOC with Short Term Investment		
		0.81681	0.678
21	I/E. LOC by Hi/Low S.T. Investment		
		1.48778	0.2244
22	I./E. LOC with Long Term Investment		
		0.91958	0.5525
23	I/E. LOC by Hi/Low L.T. Investment		
		1.68322	0.1964

C. I/E Locus of Control and Select Variables

ANOVA	COMPARISON	VALUE	PROBABILITY
24	I./E. LOC with Yrs. Investing	0.73964	0.6862
25	I/E LOC by Gender by Hi/Low RA	1.05211	0.3714
26	I/E LOC by Marital Status by Hi/Low RA	1.54919	0.1909
27	I/E LOC by Hi/Low ST Invest by Hi/Low RA	0.78788	0.5024
28	I/E LOC by Hi/Low LT Invest by Hi/Low RA	0.67894	0.5662
29	I/E LOC by Yrs Investing by Hi/Low RA	0.755	0.7247
30	I/E LOC by Ethnicity by Hi/Low RA	1.05198	0.4053

D. Long and Short Term Intentions

ANOVA	COMPARISON	VALUE	PROBABILITY
10	Long Term Investment wih Ethnicity	0.4539	0.8651
11	Long Term Investment by Gender		

		3.2663	0.0727
12	Long Term Investment wih Yrs investing		
		1.043	0.4107
13	Long Term Investment wih Marital Status		
		1.2294	0.2953
14	Short Term Investment with Ethnicity		
		0.8437	0.5658
15	Short Term Investment by Gender		
		3.7976	0.0531
16	Short Term Investment by Marital Status		
		0.8677	0.422
17	Short Term Investment by Yrs investing		
		1.2966	0.2376

E. Other Comparisons

ANOVA	COMPARISON	VALUE	PROBABILITY
7	Risk Aversion with Ethnicity		
		0.4706	0.8753
31	Gender by # of Yrs Investing		
		0.0896	0.7651
32	Marital Status by # of Yrs Investing		
		17.456	0
33	Ethnicity by # of Yrs Investing		

3.1287 0.0027

For interested readers, further details regarding calculated statistics for the above cited comparisons can be found in Appendix B. Thirty three comparisons were generated.

The variable risk aversion with the variable marital status reached statistical significance with an F of 6.190099 and a probability of 0.0026. These results are questionable due to the nature of the sample drawn. As mentioned previously, fewer than 9% of the respondents report that they are or were married. The standard deviations of the groups suggest a spurious ANOVA. The following calculations highlight LOC and marital status.

Table 4

Locus of Control by Marital Status

Included observations: 156

Method	df	Value	Probability
Anova F-test	(2, 153)	6.190099	0.0026
Welch F-test	(2, 8.25503)	11.72356	0.0039

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	2	150.4373	75.21867

Within	153	1859.172	12.15145
Total	155	2009.609	12.96522

Another variable to achieve significance was ethnicity by "Yrs investing". Subjects responded by writing in the number of years they had actually engaged in investment activity. The F value equaled 3.128668 with a probability of 0.0027. This is significant at the .05 and .01 level. Again, more revealing are the calculated standard deviations that suggest a false positive. Calculated statistics follow.

Table 5

Ethnicity by Years Investing

Method	df	Value	Probability
Anova F-test	(8, 147)	3.128668	0.0027
Source of Variation	df	Sum of Sq.	Mean Sq.
Between	8	244.8786	30.60983
Within	147	1438.198	9.783662
Total	155	1683.077	10.85856

The variable LOC with risk aversion generated an F value of 1.237135 and a probability of 0.2513 > .05.

Table 6

Locus of Control and Risk

Observations: 156

Method	df	Value	Probability
Anova F-test	(15, 140)	1.237135	0.2513
Source of Variation	df	Sum of Sq.	Mean Sq.
Between	15	235.1984	15.67989
Within	140	1774.411	12.67436
Total	155	2009.609	12.96522

When risk aversion subjects were divided into two groups, high or low, the F-value comparison with LOC had a probability of 0.0701, approaching significance (still > .05). An examination of the standard deviations for the two groups indicates that the variances are approximate in size suggesting the comparison is valid (low risk aversion standard deviation versus an almost equivalent high risk aversion standard deviation).

The mean of the high risk aversion group was 13.10 and the mean of the low risk aversion group was 11.861. Sum of squares and mean square calculations for all of the ANOVA comparisons can be found in Appendix B.

Subjects measured long term behavioral intentions by gender also approached significance with an F-value of 3.266348 (probability equaling 0.0727 which still exceeds alpha at the .05 level).

Conclusions

The present study should be regarded as exploratory in nature. The quasi-experimental design carries with it pitfalls that a true randomized experiment isn't prey to. Complete randomization of subjects was not possible and analysis relied on pooled variance and comparisons of group with unequal "n's". The sample drawn clearly isn't representative of the general population and probably not a campus population. Minimally a larger sample would be helpful although initially the undersigned felt one hundred and fifty six subjects seemed adequate. Drawing randomly from the full range of University classes for subjects, instead of a two unit requisite lower division finance class would make it easier to argue for representativeness.

It's also noteworthy that more than 90% of the subjects in this lower division class were unmarried. This most probably does not reflect general adult

population demographics. The primary life task for new college students is completing requisite course work, and not constructing a retirement portfolio. Using college students for this type of a study may be putting the cart before the horse. We have a new generation who for of their brief adult lives have witnessed only turmoil in the financial markets. Generational factors may be influencing individual attitudes toward investing. The limited data here does suggest that cross-cultural issues should be further explored.

Sampling error aside, this project has highlighted the fact that research has only begun to scratch the surface of the complexities of human behavior and its prediction in the field of finance. Also problematic for the present study is that well known idiom in the social sciences that self-report measures may lack objectivity. As well, paper and pencil measures lack the rigor of in-vivo experimentation. Furthermore, attitudes don't necessarily translate into behavior. Another concern is the limitations of doing research on college students. The ability to generalize findings to the larger investment community is limited.

However, given the degree to which the construct of Locus of Control has weathered the scrutiny of tough minded academicians, and has been utilized in multiple settings outside of academia, it seems a reasonable starting point for investigation that should be considered exploratory at this point.

More and more, the discipline of finance is expanding into the complex realm of human behavior. Behavioral finance is proving to be a compromising hybrid that expands understanding and complements the neo-classical approach. It is the ability of data to surprise and challenge- that makes up the mystery that draws us to do research.

The present study attempted to contribute to that promising trend by pairing a well-established, simple measure of a personality trait, Locus of Control, with new concepts involving risk aversion and a priori behavioral intentions of potential investors.
Results of the study found a statistical relationship between subjects locus of control and preference for long term investing. Subjects whose scores on the locus of control scale were significantly positively correlated ($P = 0.0265$) with scores on the long term investing

intentions scale. Furthermore, differences for gender approached significance, albeit negatively, with subjects scores on the short-term investing intentions scale(P = 0.0531).

Gender has proven to be a salient variable in previous studies that examined personality factors and risk aversion as well as investment intentions. The failure to reject the null hypothesis using numerous one way ANOVAs lends evidence to the hypothesis that the sample, and perhaps the experimental design in this study was not adequate. The intuitive appeal of the Locus of Control personality test and its incredible validation in the scientific literature suggests further research is warranted. Vanjeko's (2007) study of professional money managers actual investment strategies (risky vs non-risky) coupled with their Locus of Control scores further supports this contention. Filbeck et al (2005) pairing of the MBTI and investor risk aversion, and Mayfield et al's (2008) integration of long and short term investment intentions with Big Five Factors and risk aversion stand as models for further investigation utilizing Locus of Control.

APPENDIX A

ATTITUDES AND INVESTMENTS MEASURES

ATTITUDES AND INVESTMENTS MEASURES

The attached surveys are part of a study in Behavioral Finance to be used as a MBA graduate student project. The survey will just take a couple of minutes. Your participation is totally voluntary. All results are completely anonymous and confidential. Should you desire to obtain the results of your specific survey and the experiment in general, copy the survey number down and contact John at 951-243-6788. You will be given an appointment time to review the requested information. The survey number is the 5 digit number at the bottom right corner of the last page.

Please respond to each question.

Part one:

Pick the best answer (a or b) that matches your belief.

Do not leave any items blank. It is important that you

answer each item by circling "a" or "b".

1. a. Children get into trouble because their patents punish them too much.
b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.
b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.
b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.
b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks, one cannot be an effective leader.
b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try, some people just don't like you.

b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.
b. It is one's experiences in life which determine what they're like.

9. a. I have often found that what is going to happen will happen.
b. Trusting fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student there is rarely, if ever, such a thing as an unfair test.
b. Many times, exam questions tend to be so unrelated to course work that studying in really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.
b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.
b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.
b. There is some good in everybody.

15. a. In my case getting what I want has little or nothing to do with luck.
b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

b. Getting people to do the right thing depends upon ability - luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
b. By taking an active part in political and social affairs the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
b. There really is no such thing as "luck."

19. a. One should always be willing to admit mistakes.
b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.
b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good ones.
b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.
b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.
b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.
b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.
b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. a. People are lonely because they don't try to be friendly.
b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.
b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.
b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.
b. In the long run the people are responsible for bad government on a national as well as on a local level.

In Rotter, J. (1966). Generalized expectancies for internal vs. external control of reinforcement. *Pysch Monographs, 80,* 1-22.

PART TWO

PLEASE CIRCLE THE RESPONSE THAT BEST FITS YOU IN RESPONSE TO EACH OF THE STATEMENTS. Read the statement and then circle if you strongly agree, agree, are neutral to the statement, or if you disagree or strongly disagree.

Circle one opinion for each statement.

1. I am not willing to take risk when choosing a stock or investment.

Strongly Agree		Neutral		Strongly Disagree

2. I prefer a low risk/high return investment with a steady performance over an investment that offers higher risk/higher return.

Strongly Agree		Neutral		Strongly Disagree

3. I prefer to remain with an investment strategy that has known problems rather than take the risk trying a new investment strategy that has unknown problems, even if the new investment strategy has great returns.

Strongly Agree		Neutral		Strongly Disagree

4. I view risk in investment as a situation to be avoided at all cost.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

In Mayfield, C., Perdue, G., & Wooten, K. (2008). Investment management and personality type. *Financial Services Review, 17*, 219-236.

Short Term:

1. I intend to invest in an IRA every year.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

2. I intend to put at least half of my investment money into the stock market.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

3. I intend to engage in portfolio management activities at least twice per week.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

4. I intend to perform my own investment research instead of using outside advice.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

5. I intend to compare my portfolio performance to that

of professional managers.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

In Mayfield, C., Perdue, G., & Wooten, K. (2008). Investment management and personality type. *Financial Services Review, 17*, 219-236.

Long Term:

1. I intend to save at least 10% of my gross earnings for investing/saving/retirement purposes.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

2. I intend to have a portfolio that focuses on multiple asset classes (i.e., stocks, bonds, cash, real estate, etc.).

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

3. I intend to take an investments course.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

4. I intend to manage my portfolio for maximum gross return rather than tax and cost efficiency.

I----------I----------I----------I----------I
Strongly Neutral Strongly

Agree Disagree

5. I intend to invest some money in long-term assets where my money will be tied up and inaccessible for years.

I----------I----------I----------I----------I
Strongly Neutral Strongly
Agree Disagree

In Mayfield, C., Perdue, G., & Wooten, K. (2008). Investment management and personality type. *Financial Services Review, 17*, 219-236.

Date of Birth_____

Marital Status: S M D Gender: M F

Ethnicity_____

Number of years as an investor:_____

Survey #_____

APPENDIX B

STATISTICAL ANALYSIS

STATISTICAL ANALYSIS

Included observations: 156

HYPOTHESIS ONE

Test for Equality of Means of LOC

Categorized by values of RA

Method	df	Value	Probability
Anova F-test	(15, 140)	1.237135	0.2513
Between	15	235.1984	15.67989
Within	140	1774.411	12.67436
Total	155	2009.609	12.96522

HYPOTHESIS TWO

Test for Equality of Means of LOC

Categorized by values of RA1

Method	df	Value	Probability
t-test	154	1.824141	0.0701
Satterthwaite-Welch t-test	60.53146	1.882272	0.0646
Anova F-test	(1, 154)	3.327491	0.0701
Welch F-test	(1, 60.5315)	3.542946	0.0646

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	42.50342	42.50342
Within	154	1967.106	12.77341

Total	155	2009.609	12.96522

RA1	Count	Mean	Std. Dev.	Std. Err. of Mean
0	120	13.10000	3.619276	0.330393
1	36	11.86111	3.415534	0.569256
All	156	12.81410	3.600725	0.288289

HYPOTHESIS THREE

Test for Equality of Means of LOC

Categorized by values of SHORT

Method	df	Value	Probability
Anova F-test	(18, 137)	0.989873	0.4751

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	18	231.2827	12.84904
Within	137	1778.326	12.98048
Total	155	2009.609	12.96522

HYPOTHESIS FOUR

Test for Equality of Means of LOC

Categorized by values of SHORT1

Method	df	Value	Probability
t-test	154	1.327493	0.1863
Satterthwaite-Welch t-test	119.8832	1.327858	0.1867

Anova F-test	(1, 154)	1.762238	0.1863
Welch F-test	(1, 119.883)	1.763208	0.1867

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	22.73600	22.73600
Within	154	1986.873	12.90177
Total	155	2009.609	12.96522

Category Statistics

SHORT1	Count	Mean	Std. Dev.	Std. Err. of Mean
0	58	13.31034	3.589492	0.471323
1	98	12.52041	3.593320	0.362980
All	156	12.81410	3.600725	0.288289

HYPOTHESIS FIVE

LOC with LONG

Method	df	Value	Probability
Anova F-test	(17, 138)	1.098362	0.3614

Source of Variation	df	Sum of Sq.	Mean Sq
Between	17	239.5047	14.08851
Within	138	1770.104	12.8268
Total	155	2009.609	12.96522

HYPOTHESIS SIX

Test for Equality of Means of LOC

Categorized by values of LONG1

Method	df	Value	Probability
t-test	154	-1.093486	0.2759
Satterthwaite-Welch t-test	14.35757	-1.110112	0.2852
Anova F-test	(1, 154)	1.195711	0.2759
Welch F-test	(1, 14.3576)	1.232349	0.2852

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	15.48310	15.48310
Within	154	1994.126	12.94887
Total	155	2009.609	12.96522

HYPOTHESIS SEVEN

Test for Equality of Means of LOC

Categorized by values of MARITAL

Method	df	Value	Probability
Anova F-test	(2, 153)	6.190099	0.0026
Welch F-test	(2, 8.25503)	11.72356	0.0039

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	2	150.4373	75.21867
Within	153	1859.172	12.15145
Total	155	2009.609	12.96522

MARITAL	Count	Mean	Std. Dev.	Std. Err. of Mean
1	141	12.65248	3.399550	0.286294
2	10	12.40000	4.926121	1.557776
3	5	18.200	2.387467	1.067708
All	156	12.81410	3.600725	0.28828

HYPOTHESIS EIGHT

Test for Equality of Means of RA

Categorized by values of ETH2

Method	df	Value	Probability
Anova F-test	(8, 147)	0.470584	0.8753

Analysis of Variance

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	8	299.5522	37.44402
Within	147	11696.67	79.56920
Total	155	11996.22	77.39500

ETH2	Count	Mean	Std. Dev.	Std. Err. of Mean
1	40	11.65000	2.760063	0.436404
2	31	13.58065	3.170428	0.569426
3	21	12.76190	2.278262	0.497157
4	56	14.32143	14.12941	1.888122

5	2	12.00000	0.000000	0.000000
6	1	6.000000	NA	NA
All	156	13.07051	8.797443	0.704359

HYPOTHESIS NINE

Test for Equality of Means of RA

Categorized by values of GENDER

Method	df	Value	Probability
t-test	154	-1.251410	0.2127
Satterthwaite-Welch t-test	113.4693	-1.456318	0.1481
Anova F-test	(1, 154)	1.566028	0.2127
Welch F-test	(1, 113.469)	2.120861	0.1481

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	120.7617	120.7617
Within	154	11875.46	77.11339
Total	155	11996.22	77.39500

GENDER	Count	Mean	Std. Dev.	Std. Err. of Mean
1	64	12.01563	3.335676	0.416960
2	92	13.80435	11.08136	1.155311
All	156	13.07051	8.797443	0.704359

HYPOTHESIS TEN

Test for Equality of Means of LONG

Categorized by values of ETH2

Method	df	Value	Probability
Anova F-test	(8, 147)	0.485393	0.8651

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	8	62.67332	7.834165
Within	147	2372.557	16.13985
Total	155	2435.231	15.71117

ETH2	Count	Mean	Std. Dev.	Std. Err. of Mean
1	40	19.17500	3.875548	0.612778
2	31	18.22581	4.120758	0.740110
3	21	17.85714	4.316083	0.941847
4	56	18.87500	4.036481	0.539398
5	2	17.00000	2.828427	2.000000
6	1	21.00000	NA	NA
All	156	18.69231	3.963731	0.317352

HYPOTHESIS ELEVEN

Test for Equality of Means of LONG

Categorized by values of GENDER

Method	df	Value	Probability
t-test	154	1.807304	0.0727
Satterthwaite-Welch t-test	119.2594	1.749213	0.0828

Anova F-test	(1, 154)	3.266348	0.0727
Welch F-test	(1, 119.259)	3.059747	0.0828

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	50.57860	50.57860
Within	154	2384.652	15.48475
Total	155	2435.231	15.71117

GENDER	Count	Mean	Std. Dev.	Std. Err. of Mean
1	64	19.37500	4.347961	0.543495
2	92	18.21739	3.621748	0.377593
All	156	18.69231	3.963731	0.317352

HYPOTHESIS TWELVE

Test for Equality of Means of LONG

Categorized by values of YRS

Method	df	Value	Probability
Anova F-test	(10, 145)	1.042982	0.4107

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	10	163.4114	16.34114
Within	145	2271.819	15.66772
Total	155	2435.231	15.71117

HYPOTHESIS THIRTEEN

Test for Equality of Means of LONG

Categorized by values of MARITAL

Method	df	Value	Probability
Anova F-test	(2, 153)	1.229376	0.2953
Welch F-test	(2, 7.83577)	0.781653	0.4903

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	2	38.51588	19.25794
Within	153	2396.715	15.66480
Total	155	2435.231	15.71117

MARITAL	Count	Mean	Std. Dev.	Std. Err. of Mean
1	141	18.82979	3.874749	0.326313
2	10	16.80000	4.825856	1.526070
3	5	18.60000	4.615192	2.063977
All	156	18.69231	3.963731	0.317352

HYPOTHESIS FOURTEEN

Test for Equality of Means of SHORT

Categorized by values of ETH2

Method	df	Value	Probability
Anova F-test	(8, 147)	0.843664	0.5658

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	8	110.9889	13.87362
Within	147	2417.338	16.44448
Total	155	2528.327	16.31179

HYPOTHESIS FIFTEEN

Test for Equality of Means of SHORT

Categorized by values of GENDER

Method	df	Value	Probability
t-test	154	1.948753	0.0531
Satterthwaite-Welch t-test	114.5553	1.868638	0.0642
Anova F-test	(1, 154)	3.797637	0.0531
Welch F-test	(1, 114.555)	3.491808	0.0642

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	60.84798	60.84798
Within	154	2467.479	16.0225
Total	155	2528.327	16.31179

GENDER	Count	Mean	Std. Dev.	Std. Err. of Mean
1	64	15.92188	4.540137	0.567517
2	92	14.65217	3.583953	0.373653
All	156	15.17308	4.038785	0.323362

HYPOTHESIS SIXTEEN

Test for Equality of Means of SHORT

Categorized by values of MARITAL

Method	df	Value	Probability
Anova F-test	(2, 153)	0.867748	0.4220
Welch F-test	(2, 8.78278)	1.306824	0.3185

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	2	28.35742	14.17871
Within	153	2499.970	16.33967
Total	155	2528.327	16.31179

MARITAL	Count	Mean	Std. Dev.	Std. Err. of Mean
1	141	15.31206	4.069283	0.342695
2	10	13.90000	4.228212	1.337078
3	5	13.80000	2.280351	1.019804
All	156	15.17308	4.038785	0.323362

HYPOTHESIS SEVENTEEN

Test for Equality of Means of SHORT

Categorized by values of YRS

Method	df	Value	Probabilities
Anova F-test	(10, 145)	1.296600	0.2376

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	10	207.5276	20.75276
Within	145	2320.799	16.00551
Total	155	2528.327	16.31179

YRS	Count	Mean	Std. Dev.	Std. Err. of Mean
0	119	14.73950	3.893633	0.356929
1	9	17.33333	3.082207	1.027402
2	8	18.62500	3.961872	1.400733
3	8	15.50000	5.756983	2.035401
4	5	17.00000	5.147815	2.302173
5	1	13.00000	NA	NA
10	2	15.00000	2.828427	2.000000
14	1	15.00000	NA	NA
15	1	11.00000	NA	NA
20	1	13.00000	NA	NA
25	1	17.00000	NA	NA
All	156	15.17308	4.038785	0.323362

HYPOTHESIS EIGHTEEN

WITH TABULATION OF INTERNAL AND EXTERNAL LOC

Number of categories: 2

Value	Count	Percent	Count	Percent

0	58	37.18	58	37.18
1	98	62.82	156	100.00
Total	156	100.00	156	100.00

LOC1 and RA

Method	df	Value	Probability
Anova F-test	(15, 140)	0.848514	0.6225

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	15	3.036420	0.202428
Within	140	33.39948	0.238568
Total	155	36.43590	0.235070

HYPOTHESIS NINETEEN

Test for Equality of Means of LOC1

Categorized by values of RA1

I/E. LOC by Hi/Low Risk Aversion

Method	df	Value	Probability	
t-test	154	0.631909	0.5284	
Satterthwaite-Welch t-test	55.91291	0.619145	0.5383	
Anova F-test	(1, 154)	0.399309	0.5284	
Welch F-test	(1, 55.9129)	.383341	0.5383	

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	0.094231	0.094231
Within	154	36.34167	0.235985

Total	155	36.43590	0.235070

RA1	Count	Mean	Std. Dev.	Std. Err. Of Mean
0	120	0.641667	0.481521	0.043957
1	36	0.583333	0.500000	0.083333
All	156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY

LOC1 with short and short 1

Tabulation of SHORT1

Number of categories: 2

Value	Count	Percent	Count	Percent
0	58	37.18	58	37.18
1	98	62.82	156	100.00
Total	156	100.00	156	100.00

Test for Equality of Means of LOC1

Categorized by values of SHORT

Method	df	Value	Probability
Anova F-test	(18, 137)	0.816810	0.6780

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	18	3.531262	0.196181
Within	137	32.90464	0.240180

Total	155	36.43590	0.235070	

SHORT	Count	Mean	Std. Dev.	Std. Err. of Mean
5	5	0.600000	0.547723	0.244949
7	4	0.500000	0.577350	0.288675
8	2	0.500000	0.707107	0.500000
9	1	1.000000	NA	NA
10	3	0.666667	0.577350	0.333333
11	9	0.555556	0.527046	0.175682
12	8	0.625000	0.517549	0.182981
13	15	0.800000	0.414039	0.106904
14	11	0.818182	0.404520	0.121967
15	35	0.485714	0.507093	0.085714
16	11	0.636364	0.504525	0.152120
17	9	0.666667	0.500000	0.166667
18	8	0.500000	0.534522	0.188982
19	16	0.687500	.478714	0.119678
20	4	1.000000	0.000000	0.000000
21	7	0.714286	0.487950	0.184428
22	2	1.000000	0.000000	0.000000
23	4	0.250000	0.500000	0.250000
25	2	0.500000	0.707107	0.500000
All	156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY ONE

Test for Equality of Means of LOC1

Categorized by values of SHORT1

Method	df	Value	Probability
t-test	154	1.219744	0.2244
Satterthwaite-Welch t-test	125.2944	1.237782	0.2181
Anova F-test	(1, 154)	1.487777	0.2244
Welch F-test	(1, 125.294)	1.532104	0.2181

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	0.348635	0.348635
Within	154	36.08726	0.234333
Total	155	36.43590	0.235070

SHORT1	Count	Mean	Std. Dev.	Std. Err. of Mean
0	58	0.689655	0.466675	0.061277
1	98	0.591837	0.494021	0.049904
All	156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY TWO

LOC1 With long and long 1

Tabulation of LONG1

Number of categories: 2

Value	Count	Percent	Cumulative Count	Cumulative Percent
0	13	8.33	13	8.33
1	143	91.67	156	100.00
Total	156	100.00	156	100.00

Test for Equality of Means of LOC1

Categorized by values of LONG

Method	df	Value	Probability
Anova F-test	(17, 138)	0.919575	0.5525

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	17	3.707505	0.218089
Within	138	32.72839	0.237162
Total	155	36.43590	0.235070

LONG	Count	Mean	Std. Dev.	Std. Err. of Mean
5	3	0.333333	0.577350	0.333333
6	1	1.000000	NA	NA
9	1	0.000000	NA	NA
10	2	0.000000	0.000000	0.000000
12	2	1.000000	0.000000	0.000000
13	2	0.500000	0.707107	0.500000

14	2	0.500000	0.707107	0.500000
15	16	0.625000	0.500000	0.125000
16	7	0.428571	0.534522	0.202031
17	17	0.529412	0.514496	0.124784
18	14	0.714286	0.468807	0.125294
19	23	0.521739	0.510754	0.106500
20	15	0.666667	0.487950	0.125988
21	14	0.642857	0.497245	0.132894
22	7	0.857143	0.377964	0.142857
23	18	0.777778	0.427793	0.100832
24	4	0.750000	0.500000	0.250000
25	8	0.750000	0.462910	0.163663
All	156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY THREE

Test for Equality of Means of LOC1

Categorized by values of LONG1

Method	df	Value	Probability
t-test	154	-1.297391	0.1964
Satterthwaite-Welch t-test	13.93840	-1.216838	0.2439
Anova F-test	(1, 154)	1.683223	0.1964
Welch F-test	(1, 13.9384)	1.480695	0.2439

Source of Variation	df	Sum of Sq.	Mean Sq.

Between	1	0.393939	0.393939
Within	154	36.04196	0.234039
Total	155	36.43590	0.235070

LONG1	Count	Mean	Std. Dev.	Std. Err. of Mean
0	13	0.461538	0.518875	0.143910
1	143	0.643357	0.480692	0.040197
All	156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY FOUR

LOC1 with Years

Tabulation of YRS

Number of categories: 11

Value	Count	Percent	Count	Percent
0.	119	6.28	119	76.28
1	9	5.77	128	82.05
2	8	5.13	36	87.18
3	8	5.13	144	92.31
4	5	3.21	149	95.51
5	1	0.64	150	96.15
10	2	1.28	152	97.44
14	1	0.64	153	98.08
15	1	0.64	154	98.72

20	1	0.64	155	99.36
25	1	0.64	156	100.00
Total	156	100.00	156	100.00

LOC1 By Years

Method	df	Value	Probability
Anova F-test	(10, 145)	0.739635	0.6862

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	10	1.768367	0.176837
Within	145	34.66753	0.239086
Total	155	36.43590	0.235070

YRS	Count	Mean	Std. Dev.	Std. Err. of Mean
0	119	0.605042	0.490909	0.045002
1	9	0.777778	0.440959	0.146986
2	8	0.625000	0.517549	0.182981
3	8	0.750000	0.462910	0.163663
4	5	0.800000	0.447214	0.200000
5	1	1.000000	NA	NA
10	2	0.500000	0.707107	0.500000
14	1	0.000000	NA	NA
15	1	0.000000	NA	NA
20	1	1.000000	NA	NA

25	1	1.000000	NA	NA
All	156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY FIVE

LOC1 by Gender by RA1

Test for Equality of Means of LOC1

Categorized by values of GENDER and RA1

Method	df	Value	Probability
Anova F-test	(3, 152)	1.052113	0.3714
Welch F-test*	(3, 46.3004)	1.065258	0.3730

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	3	0.741214	0.247071
Within	152	35.69468	0.234833
Total	155	36.43590	0.235070

RA1	GENDER	Count	Mean	Std. Dev.	Std. Err. of Mean
0	1	47	0.723404	0.452151	0.065953
0	2	73	0.589041	0.495413	0.057984
1	1	17	0.647059	0.492592	0.119471
1	2	19	0.526316	0.512989	0.117688
All		1560	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY SIX

LOC1 by Marital and RA1

Test for Equality of Means of LOC1

Categorized by values of MARITAL and RA1

Method	df	Value	Probability
Anova F-test	(4, 151)	1.549189	0.1909

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	4	1.436317	0.359079
Within	151	34.99958	0.231785
Total	155	36.43590	0.235070

RA1	MARITAL	Count	Mean	Std. Dev.	Std. Err.of Mean
0	1	106	0.641509	0.481835	0.046800
0	2	9	0.444444	0.527046	0.175682
0	3	5	1.000000	0.000000	0.000000
1	1	35	0.600000	0.497050	0.084017
1	2	1	0.000000	NA	NA
1	3	0	NA	NA	NA
All		156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY SEVEN

LOC1 by Short 1 and RA1

Method	df	Value	Probability
Anova F-test	(3, 152)	0.787881	0.5024
Welch F-test	(3, 44.3756)	0.760543	0.5222

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	3	0.557913	0.185971
Within	152	35.87798	0.236039
Total	155	36.43590	0.235070

RA1	SHORT1	Count	Mean	Std. Dev.	Std. Err. of Mean
0	0	38	0.710526	0.459606	0.074558
0	1	82	0.609756	0.490807	0.054201
1	0	20	0.650000	0.489360	0.109424
1	1	16	0.500000	0.516398	0.129099
All		156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY SEVEN

LOC by LONG1 and RA1

Method	df	Value	Probability
Anova F-test	(3, 152)	0.678938	0.5662
Welch F-test	(3, 13.6537)	0.529975	0.6692

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	3	0.481789	0.160596
Within	152	35.95411	0.236540

Total	155	36.43590	0.235070

RA1	LONG1	Count	Mean	Std. Dev.	Std. Err. of Mean
0	0	7	0.428571	0.534522	0.202031
0	1	113	0.654867	0.477529	0.044922
1	0	6	0.500000	0.547723	0.223607
1	1	30	0.600000	0.498273	0.090972
All		156	0.628205	0.484840	0.038818

HYPOTHESIS TWENTY NINE

LOC1 by Years and RA1

Method	df	Value	Probability
Anova F-test	(15, 140)	0.754996	0.7247

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	15	2.726812	0.181787
Within	140	33.70909	0.240779
Total	155	36.43590	0.235070

RA1	YRS	Count	Mean	Std. Dev.	Std. Err. of Mean
0	0	90	0.611111	0.490229	0.051675
0	1	7	0.857143	0.377964	0.142857
0	2	7	0.714286	0.487950	0.184428
0	3	6	0.833333	0.408248	0.166667

0	4	3	0.666667	0.577350	0.333333
0	5	1	1.000000	NA	NA
0	10	2	0.500000	0.707107	0.500000
0	14	1	0.000000	NA	NA
0	15	1	0.000000	NA	NA
0	20	1	1.000000	NA	NA
0	25	1	1.000000	NA	NA
1	0	29	0.586207	0.501230	0.093076
1	1	2	0.500000	0.707107	0.500000
1	2	1	0.000000	NA	NA
1	3	2	0.500000	0.707107	0.500000
1	4	2	1.000000	0.000000	0.000000
1	5	0	NA	NA	NA
1	10	0	NA	NA	NA
1	14	0	NA	NA	NA
1	15	0	NA	NA	NA
1	20	0	NA	NA	NA
1	25	0	NA	NA	NA
All	156		0.628205	0.484840	0.038818

HYPOTHESIS THIRTY

LOC1 by RA1 and ETH2

Method	df	Value	Probability
Anova F-test	(12, 143)	1.051981	0.4053

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	12	2.955578	0.246298
Within	143	33.48032	0.234128
Total	155	36.43590	0.235070

ETH2	RA1	Count	Mean	Std. Dev.	Std. Err. of Mean
01	0	1	1.000000	NA	NA
01	1	0	NA	NA	NA
03	0	0	NA	NA	NA
03	1	1	1.000000	NA	NA
04	0	3	1.000000	0.000000	0.000000
04	1	0	NA	NA	NA
1	0	35	0.714286	0.458349	0.077475
1	1	5	0.800000	0.447214	0.200000
2	0	18	0.500000	0.514496	0.121268
2	1	13	0.538462	0.518875	0.143910
3	0	17	0.705882	0.469668	0.113911
3	1	4	0.500000	0.577350	0.288675
4	0	43	0.627907	0.489083	0.074585
4	1	13	0.538462	0.518875	0.143910

5	0	2	0.000000	0.000000	0.000000
5	1	0	NA	NA	NA
6	0	1	0.000000	NA	NA
6	1	0	NA	NA	NA
All		156	0.628205	0.484840	0.038818

HYPOTHESIS THIRTY ONE

YEARS by GENDER

Method	df	Value	Probability
t-test	154	0.299293	0.7651
Satterthwaite-Welch t-test	153.3308	0.322229	0.7477
Anova F-test	(1, 154)	0.089576	0.7651
Welch F-test	(1, 153.331)	0.103832	0.7477

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	0.978418	0.978418
Within	154	1682.099	10.92272
Total	155	1683.077	10.85856

GENDER	Count	Mean	Std. Dev.	Std. Err. of Mean
1	64	1.171875	2.453082	0.306635
2	92	1.010870	3.783988	0.394508
All	156	1.076923	3.295233	0.263830

HYPOTHESIS THIRTY TWO

YEARS INVESTING by MARITAL

Method	df	Value	Probability
Anova F-test	(2, 153)	17.45611	0.0000
Welch F-test*	(2, 7.43758)	2.845085	0.1209

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	2	312.6989	156.3495
Within	153	1370.378	8.956719
Total	155	1683.077	10.85856

MARITAL	Count	Mean	Std. Dev.	Std. Err. of Mean
1	141	0.624113	2.082372	0.175367
2	10	4.700000	5.982382	1.891795
3	5	6.600000	10.50238	4.696807
All	156	1.076923	3.295233	0.263830

HYPOTHESIS THIRTY THREE

YEARS BY ETHNICITY

Method	df	Value	Probability
Anova F-test	(8, 147)	3.128668	0.0027

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	8	244.8786	30.60983
Within	147	1438.198	9.783662

Total	155	1683.077	10.85856

ETH2	Count	Mean	Std. Dev.	Std. Err. of Mean
01	1	5.000000	NA	NA
03	1	0.000000	NA	NA
04	3	1.333333	2.309401	1.333333
1	40	1.475000	4.248605	0.671763
2	31	1.161290	3.110164	0.558602
3	21	1.238095	4.346318	0.948444
4	56	0.410714	1.005020	0.134301
5	2	0.000000	0.000000	0.000000
6	1	15.00000	NA	NA
All	156	1.076923	3.295233	0.263830

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