Graduate Theses and Dissertations   Graduate School

4-11-2007

The Association Between Risk Taking And Personality

Gabriella Anic
University of South Florida

Follow this and additional works at: https://scholarcommons.usf.edu/etd

Part of the American Studies Commons

The Association Between Risk Taking And Personality

by

Gabriella Anic

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Public Health
Department of Epidemiology and Biostatistics
College of Public Health
University of South Florida

Co-Major Professor: James A. Mortimer, Ph.D.
Co-Major Professor: Amy Borenstein, Ph.D.
John A. Schinka, Ph.D.
Yougui Wu, Ph.D.

Date of Approval:
April 11, 2007

Table of Contents

List of Tables

The Association Between Personality and Risk Taking

Gabriella Anic

ABSTRACT

The aim of this study was to examine the association between personality and risk taking in a sample of 461 older adults from the Charlotte County Healthy Aging Study (CCHAS). The personality factors of openness to experience, extraversion, neuroticism, agreeableness and conscientiousness were measured with the NEO Five Factor Inventory. Risk-taking was measured with an 8-item questionnaire and a single-item question that assessed subjects' participation in sensation seeking behaviors. Spearman correlation coefficients, hierarchical linear regression and hierarchical logistic regression were used to assess the association. As consistent with past research, high scores on openness to experience (β = 0.16, P<.0001) and low scores on neuroticism (β = -0.14, P<.01) and agreeableness (β = -0.16, P<.01) were associated with the total score of the 8-item risk taking questionnaire. The single-item risk question was also associated with openness [OR = 1.09; 95% CI: 1.05-1.13], neuroticism [OR = 0.94; 95% CI: 0.90-0.97] and agreeableness [OR = 0.95; 95% CI: 0.92-0.99]. After stratifying by gender, only openness was still significantly associated with risk-taking. Interaction terms including gender and personality factors were added to the models to test if gender was an effect modifier. Although personality differences existed between men and women, none of the interaction terms were statistically significant.

Chapter One

Introduction

Epidemiologic studies have consistently found an inverse association between risky behaviors, such as smoking, and Parkinson's disease (PD) (Evans et al., 2006; Allam et al., 2004; Herman et al., 2002; Checkoway et al., 2002). It has been suggested however that this association is being confounded by a third factor such as personality (Graves & Mortimer, 1994). A personality type characterized as being rigid, introverted, cautious, low on novelty seeking, conscientious, and aversive to risk-taking, has been described as a 'parkinsonian' personality (Ishihara & Brayne, 2006; Paulson & Dadmehr, 1991). Given that patients who develop PD are generally disinclined to engage in risk-taking behaviors such as smoking; it is possible that the 'parkinsonian' personality type is also inversely associated with risk-taking and that the inverse association seen between smoking and Parkinson's disease is due to the confounding effect of personality.

Dopamine's association with PD and personality lends biologic plausibility to an association between personality and risk taking. Dopamine is central to the reward system and provides the motivation to engage in risky behaviors (Chinta & Anderson, 2005). Since PD is associated with the loss of dopaminergic neurons in the substantia nigra of the midbrain (Chinta & Anderson, 2005), it is expected that PD patients are less likely to have traits associated with risk taking. A study comparing 50 PD patients and 31 controls with unrelated disease, found the PD patients to score significantly lower on novelty seeking, a trait characterized by impulsiveness, excitability and a quick-temper

(Menza et al., 1993). The trait of novelty seeking, which is associated with high levels of dopamine (Stuettgen et al., 2005), is also the basis of sensation seeking, a trait known to be associated with risk-taking (Zuckerman & Kulhman, 2001). Based on the observed associations between PD patients and risk taking, I hypothesize that risk-taking is inversely associated with a 'parkinsonian' personality characterized by high conscientiousness and agreeableness and low openness, extraversion, and neuroticism.

Knowledge about an association between personality and risk taking can also be important in preventing leading causes of mortality such as cardiovascular disease or cancer. Risky health behaviors such as smoking, excessive drinking and poor dietary habits are known risk factors for these diseases. If a personality type is determined to be associated with these risky behaviors, individuals with a risk-prone personality can be targeted for prevention programs. Therefore it is of great public health importance to explore what factors are associated with risk taking.

Purpose of the Study

The purpose of this study is to examine the association between the five personality domains of the Five Factor Model (FFM) and risk-taking in a sample of older adults.

Study Hypothesis

The hypothesis is that high scores on the extraversion and openness domains and low scores on the neuroticism, agreeableness and conscientiousness domains will be associated with risk-taking.

Chapter Two

Literature Review

Five Factor Model of Personality

Personality traits can be defined as "dimensions of individual differences in tendencies to show consistent patterns of thought, feeling, and actions" (McCrae & Costa, 1990, p23). The Five Factor Model (FFM) of personality is one of the most popular descriptive models used to study personality traits (McCrae & John, 1992). It was established largely by factor analysis studies of trait terms in natural language (Becker, 2005). This model consists of the following five personality factors: 1) Openness – willingness to try new activities, intellectual curiosity, attentiveness to inner feelings, and preference for variety; 2) Extraversion – sociability, excitement and stimulation-seeking, assertion, and being active; 3) Neuroticism – apprehension, fear, worry, impulsiveness and self-consciousness; 4) Agreeableness – altruism, trusting, cooperation and compliance; and 5) Conscientiousness – deliberate, self-disciplined, punctual, reliable, and competent. Each factor is made up of intercorrelated traits known as personality facets which measure the wide range of thoughts, behaviors and actions that make up each factor.

The personality factors contain the following facets: 1) Openness – fantasy, aesthetics, feelings, actions, ideas, and values; 2) Extraversion – warmth, gregariousness, assertiveness, activity, excitement-seeking, and positive emotions; 3) Neuroticism – anxiety, angry hostility, depression, self-consciousness, impulsiveness and vulnerability;

4) Agreeableness – trust, straightforwardness, altruism, compliance, modesty and tender-mindedness; and 5) Conscientiousness – competence, order, dutifulness, achievement striving, self-discipline and deliberation.

Excitement-seeking of the extraversion factor and deliberation of the conscientiousness factor are examples of facets that may play an important role in risk-taking. High scorers on excitement-seeking crave stimulation and excitement, while low scorers don't feel the need for thrills. A high score on deliberation is characterized by the tendency to think before acting, while a low score is characterized by spontaneity.

The Revised NEO Personality Inventory (NEO PI-R) is a 240-item scale that was developed to operationalize the FFM (Costa and McCrae, 1992). The NEO Five-Factor Inventory (NEO-FFI) is a short form of the NEOPI-R that contains 60-items. It provides scores for each personality factor, but does not provide scores for the corresponding facets.

The patterns of scores on the five factors may change slightly in early adulthood when agreeableness and conscientiousness scores increase and extraversion, neuroticism and openness scores decrease. However, after age 30 the score on each personality factor generally remains stable for the remainder of the lifespan (McCrae & Costa, 1990). This same pattern was found in a cross-sectional study of samples from Germany, Italy, Croatia, South Korea and Portugal (McCrae et al., 1999). This suggests that personality stability beyond age 30 can be generalized across cultures. The stability of personality domains has been shown in longitudinal studies that correlate peoples' scores on the factors over time and in cross-sectional studies that compare the score distributions of each factor among various age groups (Costa & McCrae, 1998).

Gender is also associated with the FFM personality factors. Costa et al. (2001) analyzed the association between gender and the 30 facets of the NEO PI-R in a sample of 26,031 people from 26 different cultures. They found that women were more likely to score high on the neuroticism and agreeableness factors. These findings were consistent across cultures.

Openness to Experience

A high score on the openness to experience domain is characterized by the desire to try new activities, having a preference for novelty instead of familiarity, and the tendency to experience deeper and differential emotional states (Costa & McCrae, 1992). The desire for novel experiences would serve as a motivation to participate in risk-taking activities. Also, the sensitivity to emotions may make the thrill of risk-taking more pleasurable. Therefore it is predicted that openness will be positively associated with risk taking.

Extraversion

An active, fast-paced life and a desire for excitement and stimulation (the excitement-seeking facet) are related to a high score on extraversion (Cost & McCrae, 1992). The excitement-seeking facet of extraversion is very similar to sensation seeking, which has already been found to be associated with risk taking (Zuckerman & Kuhlman, 2000). Like openness, extraversion supplies the motivation to take risks so it is predicted that high extraversion scores will be positively associated with risk-taking.

Neuroticism

A low score on neuroticism is characterized by being emotionally stable, calm relaxed and able to cope with stressful situations (Cost & McCrae, 1992). Conversely, a

high score on this domain corresponds with being prone to worry, fear, anxiety depression and impulsiveness. Impulsiveness in this context does not refer to spontaneity, instead it refers to the inability to control cravings or urges. Therefore, a person who scores high in neuroticism would be more likely to engage in addictive behaviors such as smoking and drinking. If risk-taking is defined by risky health behaviors, then high neuroticism should predict risk-taking. Conversely, Nicholson et al. (2005) found that among the neuroticism facets, a low score on the anxiety facet (β = -0.10, p <.001) was most strongly associated with overall risk-taking. A low level of anxiety is important because it corresponds to less worry over possible negative consequences of risky behaviors. Because this study looks at overall risk-taking, not just risky health behaviors, a low score on neuroticism associated with low levels of anxiety and fear is expected to be associated with risk-taking.

Agreeableness

The desire to be cooperative and a high concern for the well-being of others characterizes a high score on agreeableness (Cost & McCrae, 1992). Similar to low neuroticism, low agreeableness would protect against worry related to negative consequences of risk-taking. Agreeableness is therefore predicted to be inversely associated with risk-taking.

Conscientiousness

A high score on conscientiousness is characterized by organization, and the tendency to plan and think carefully before acting. Low scorers on the deliberation facet of conscientiousness are hasty and act without considering the consequences of their actions. It is predicted that low conscientiousness will be associated with risk-taking.

Previous Studies

Only a few studies have examined the relation between the FFM personality factors and risk-taking. One such study looked at a sample of 2,401 students and executives attending graduate courses at a local university (Nicholson et al., 2005). Risk-taking was measured with the Risk Taking Index, a scale developed to assess participants' frequency of risk-taking behaviors in the domains of health, career, recreation, finance, safety, and social risk. The NEO PI-R was used to measure personality. A comparison of mean overall risk taking scores found women to be less likely than men to take risks (β = 0.18, p<0.001). When examining specific domains, men took significantly more risk in the recreational (t = -4.06, p<.001), health (t = -3.41, p<.01), safety (t = -5.59, p<.001) and finance (t = -6.32, p<.001) domains. Women took more risk in the social and career domains, but this difference was not statistically significant. Overall, risk-taking was found to decrease with age (β = -0.28, p<.0001). Extraversion (β = 0.26, p<.001) and openness (β = 0.36, p<.001) were positively associated with risk-taking, while neuroticism (β = -0.18, p<.001), agreeableness (β = -0.31, P<.001) and conscientiousness (β = -0.20, P<.001) were inversely associated with risk-taking. This was true across all domains except the health risk domain where neuroticism (β = 0.11, p<.001) was positively associated with risk-taking. This study also found the extraversion facet of sensation seeking (β = 0.22, p<.001) to be the facet most strongly associated with overall risk-taking.

Another study of 683 university students examined the association between eight personality types and the risky behaviors of smoking, drinking, risky sexual behavior and drug use (Vollrath & Torgersen, 2002). The personality types were a combination of

scores on neuroticism, extraversion and conscientiousness. The scores of each of these factors were split at the median and individuals were classified as scoring high on a factor if they scored above the median and classified as scoring low on a factor if they scored below the median. Eight personality types were constructed by combining high and low scores on the three factors studied. For example, the personality type labeled as "impulsive" consisted of a high score on extraversion and neuroticism and a low score on conscientiousness. Individuals who scored high on extraversion or neuroticism and low on conscientiousness were most likely to engage in multiple risky behaviors. Individuals classified as scoring high on conscientiousness and low on extraversion were the least likely to engage in risky behaviors.

Lauriola & Levin (2001) studied the association between the five-factor personality domains and risk-taking in an experimentally controlled study. The sample included 76 men and women separated into 3 age groups: 21-40, 41-60, and 61-80. Risk was measured in trials where subjects were forced to choose between two choices, one that offered a sure gain (or loss) and a risky one that offered a potential gain (or loss) and stated the probability of that outcome. Males scored lower than females in agreeableness and neuroticism; there were no gender differences in openness, extraversion and conscientiousness. Age was inversely associated with extraversion and openness. The 21-40 age group scored significantly higher on extraversion and openness than the other age groups. There was a significant main effect of gender on risk-taking, with males taking the risky option more frequently than females. On the trials where risk-taking could achieve a gain, there was a significant association with low neuroticism and high

openness. No personality domains were significant with the trials that required risk to avoid loss.

There also has been research on the association between the five personality domains and risky health behaviors such as smoking and drinking. A meta-analysis of nine studies found a statistically significant association between smoking and neuroticism ($r = 0.11$, p= .006), conscientiousness ($r = -0.16$, P = .006) and agreeableness ($r = -0.12$, P<.001) (Malouff et al., 2006). High neuroticism ($r = 0.26$, p<.001) and low conscientiousness ($r = -0.33$, p<.001) were also associated with drinking (Ruiz et al., 2003). This study also found women to score significantly higher on the neuroticism ($r = -0.22$, P<.01) and agreeableness ($r = 0.23$, p<.01) domains.

Zuckerman and Kuhlman (2000) examined the relationship between personality and risk-taking; however, they did not use the NEO to measure personality. Their sample consisted of 260 subjects from an introductory psychology class. Personality was measured with the Zuckerman-Kuhlman Personality Questionnaire that assessed the traits of Impulsive Sensation Seeking (ImpSS), Neuroticism-Anxiety (N-Anxiety), Aggression-Hostility (Agg-Hos), Activity and Sociability. They identified sensation-seeking and impulsiveness as the personality traits most relevant to risk-taking. Sensation-seeking is described as seeking novel experiences and the willingness to take physical, social, financial and legal risks. This is similar to the excitement-seeking facet of extraversion in the NEO PI. Impulsiveness refers to entering situations without planning or worries about consequences. This is equivalent to low conscientiousness in the NEO. A questionnaire was developed for the study to measure risk behavior in drinking, smoking, drugs, sexual behavior, driving habits and gambling. ImpSS, Agg-Hos and Sociability

were significantly associated with overall risk-taking. Men scored higher on the ImpSS trait (t = 4.78, p<.0001). Women scored higher on N-Anxiety (t = 4.20, p<.0001) and Sociability (t = 2.42, p<.05). Men also scored significantly higher (t = 2.24, p<.05) on a composite measure of risk-taking that averaged the scores of all six areas measured.

There is evidence to show that risk-taking is consistent across different domains. Cross-domain consistency implies that people have a stable risk disposition that may be based on personality. Domain-specific risk behavior means that risk-taking may be influenced by situational factors (e.g. perceived risk, framing) rather than personality. For example, people may be more inclined to take risks in the work domain than in the health domain. However if risk-taking in general is associated with a particular personality profile, then people with this personality type will be consistent in their risk-taking across all domains. Soane & Chmiel (2005) studied whether people are consistent in risk-taking across the domains of work, health, and personal finance. Subjects included academics, chess players, firefighters, mountaineers and financial traders to produce a sample with people from a broad array of backgrounds and risk-taking domains. Individuals who were consistently risk-avoidant across the three domains scored significantly higher on agreeableness and conscientiousness and lower on neuroticism. High scores on extraversion and openness predicted risk-taking in the work domain. Conscientiousness predicted risk aversion in all three domains. Overall, extraversion and openness predicted risk-taking while conscientiousness predicted risk aversion. These findings of risk-taking and risk aversion consistency support the idea of an association between personality and risk-taking.

Chapter Three

Methodology

Study Design

Secondary data analysis was conducted on data from the Charlotte County

Healthy Aging Study (CCHAS). The CCHAS is a cross-sectional community-based

study of older adults in Charlotte County, Florida.

Sample

The sample of 466 individuals came from Charlotte County, Florida, which at the

time of the 1990 Census, had the highest proportion of residents aged 65 and older (Small

et al., 2000). Two census tracts were sampled: the first had 7,093 inhabitants (45.2% of

whom were aged 85 and older) and the second had 6,233 inhabitants (37.4% of whom

were aged 65 and older). The sample size goal was 504 participants aged 60 to 84. From

each tract, the goal was to obtain 126 persons aged 65 to 74, and 126 personas aged 75 to

84. Potential participants were sampled from randomly selected census blocks, which

were surveyed sequentially until the sample size goal was reached. Extensive publicity

efforts, including newspaper articles, and radio and television appearances, were made

before the surveying began. Publicity was done to familiarize the community with the

goals of the study and the requirements of participation.

Trained staff members went to each house in the selected census blocks to collect

the name, age and sex of each member of the household. A household was considered

unreachable if staff members visited the home twice without any answer. Individuals

aged 60 to 84 were considered eligible to participate in the study. A letter was sent out to all eligible individuals explaining the goals and requirements of the study and informing them that a staff member would contact them by telephone in 3 or 4 days to invite them to participate in the study. Study staff made up to nine attempts to reach eligible individuals before the potential participant was considered unreachable.

A total of 4,107 households were surveyed, and 2,164 (53%) of which gave census data information. From the surveyed households, 1,394 individuals were considered eligible. Among the eligible participants 584 (42%) were unreachable, 306 (22%) refused to participate in the study, and 38 (3%) decided to participate and then later declined. The response rate was 57.8% and the final sample size was 466 participants. Five participants were missing data on personality and were not included in the current analyses, resulting in a sample size of 461 participants for this study.

Personality Measure

Personality was measured with the NEO-FFI (Costa and McCrae, 1992), a measure of personality that is known to be reliable and valid. Participants read statements such as "Occasionally I act first and think later"(conscientiousness) and "I like to be where the action is" (extraversion) and then record their opinion of each statement using a 5-point Likert scale where 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1=Strongly Disagree. Since the NEO-FFI is a short version of the NEO PI-R, it does not provide data about the facets of each domain.

Risk Taking Measure

Two measures of risk taking were used in the analysis. The first was the total score of a questionnaire about sensation seeking that was administered as part of the

Charlotte County Aging Study. It consisted of ten questions asking about participation in sensation seeking activities. Questions included "Have you ever parachuted out of an airplane?" and "Have you ever swam far from shore or in very heavy surf?" If subjects answered "No" to engaging in an activity they were then asked, "Is this something you ever wanted to do?" (0=No, 1=Maybe/Not Sure, 2=Yes). If they did participate in an activity they were asked, "Did you enjoy this activity?" (1=Not at all, 2=Sort of, 3=Moderately, 4=Very Much).

The items on this questionnaire were reduced to dichotomous variables so they could be summed up to obtain a continuous total score. Items were scored as 1 if the subject responded yes to doing the activity **and** enjoying it 'moderately' or 'very much' or if they have not done the activity but said it is something they have wanted to do. The items were scored as 0 if they have done the activity but only enjoyed it 'sort of' or 'not at all' or they have not done the activity and responded 'not sure' or 'no' to the question "is this something you ever wanted to do?"

A single-item measure of risk taking asked subjects which of the following statements best describes their attitude toward risk-taking: 1) "During most of my life, I have avoided risky situations, because I believe that it is better to be safe than sorry"; 2) "During most of my life, I found some danger or risk exciting, but only if I had control of the situation"; or 3) "During most of my life, I found dangerous or risky situations exhilarating and was willing to give up some control for the thrill." This question was collapsed it into a dichotomous variable because only 4.5% of the total sample responded that they found risky situations exhilarating.

A second questionnaire that assessed risk avoidance was also considered as a measure of risk taking. The 5 questions asked about whether the subject used seat belts regularly, liked to drive fast, enjoyed flying, liked to visit a new location without planning, and if they enjoyed being in high places such as a tall building or mountain. Because reliability analysis (see Table 2) showed this 5-item questionnaire to have a low alpha, it was decided not to use this questionnaire as a measure of risk-taking.

Statistical Analysis

Univariate analyses including frequencies, mean, range and standard deviation were performed for all study variables. Spearman correlation coefficients were then computed to assess the relations between all independent and dependent variables. A hierarchical linear regression model was estimated for the 8-item risk taking questionnaire. The five personality factor variables were entered simultaneously at Step 1. Next the demographic variables of gender (0=male, 1=female), age (in years), education (in years) and income were entered together in Step 2. Finally, in Step 3 interaction terms between gender and the personality factors were entered. Hierarchical logistic regression was used when the dichotomous single-item risk taking question was analyzed as the dependent variable. The predictor variables were entered in the same order as in the linear regression. Both regression analyses were first run with the entire sample and then run again after stratifying by gender to assess if gender was an effect modifier.

Chapter Four

Results

Reliability Analysis

Item-scale correlations, which test the relation between each test item and the total test score, and Cronbach's alpha coefficients, were computed to evaluate the internal consistency of the risk taking measures. If the inter-item correlations are high, then there is evidence that the items are measuring the construct of risk taking. If an item is not correlated with the other items in the questionnaire, then it should be removed. When all 10 items of the sensation seeking questionnaire were included, the Cronbach's alpha was 0.628. After removing the two gambling questions, the Cronbach's alpha increased to 0.649 and the remaining eight variables were all moderately correlated with each other. Table 1 presents the corrected item-scale correlations and Cronbach's alpha when single items are deleted.

Table 2 presents the reliability analysis of the 5-item risk taking questionnaire. The items were minimally correlated and the questionnaire had a low Cronbach's alpha of 0.348. Based on the low Cronbach's alpha, it was decided not use this questionnaire as a measure of risk taking.

The third measure of risk assessed was a single-item question about overall risk taking. Being only one item, item-analysis could not be preformed, but the question was found to be moderately correlated with the total score of the 8-item questionnaire (r = 0.41, p <.0001).

After the reliability analyses were performed, the 10-item questionnaire, minus

the gambling items, and the single-item question about overall risk taking were chosen to

be used as the measures of risk taking in the final analysis.

Table 1. Reliability Analysis of the 10-Item Risk-Taking Questionnaire

Scale with each of the following items deleted:	Corrected Item-Scale Correlations	Alpha with the Item deleted	Final Alpha
Riding a large rollercoaster.	0.168	0.633	
Gambling for large or moderate sums three or more times.	0.167	0.627	
Gambling for small sums three or more times.	0.168	0.633	
Parachuting out of a plane.	0.325	0.601	
Parasailing.	0.408	0.583	
Downhill skiing.	0.322	0.597	
Water skiing.	0.398	0.577	
Swimming far from shore.	0.332	0.594	
Riding on a motorcycle.	0.322	0.597	
Flying in a small plane.	0.277	0.607	
			0.628

Table 2. Reliability Analysis of the 5-Item Risk-Taking Questionnaire

Scale with each of the following items deleted:	Corrected Item-Scale Correlation	Alpha with the Item Deleted	Final Alpha
Like to drive fast.	0.238	0.274	
Enjoy flying in planes.	0.271	0.208	
Travel without planning.	0.173	0.297	
Enjoy being in high places (e.g. tall building, mountain).	0.127	0.351	
Never wear a seat belt.	0.093	0.358	
			0.348

Description of Sample and Study Variables

The sample included 461 older adults who were predominantly Caucasian and ranged in age from 60 to 85. The average age of the sample was 72.5 (SD = 6.2) and there was an even distribution of men and women (51% women). Most of the sample was married (78%) and the mean years of education was 13.9 (SD = 3.0, range = 0 to 21). Only 13.3% of the sample had an income less than $20,000 per year.

Univariate analyses of the continuous variables stratified by gender are presented in Table 3. The independent variables were not assumed to be normally distributed so the non-parametric Wilcoxon Rank-Sum test was used to test if there were differences by gender. Loss of statistical power from using a non-parametric test was not a concern because of the relatively large sample size. Income was a categorical variable and not included in the above table, however men had a significantly higher income than women (χ^2 = 116.3, p<.0001).

Table 3. Univariate Analyses of Continuous Independent Variables by Gender

	Males (N=226)		Females (N=235)		
	Mean (SD)	Range	Mean (SD)	Range	Z Score
Extraversion	27.2 (5.5)	10-44	28.3 (5.9)	12-41	-1.93*
Openness	25.0 (6.0)	11-41	26.5 (5.1)	15-42	-2.71*
Neuroticism	14.5 (7.1)	0-37	15.9 (6.8)	0-44	-2.34*
Agreeableness	31.6 (5.4))	16-46	35.5 (4.9)	20-47	-7.50***
Conscientiousness	34.5 (6.0)	16-48	34.9 (6.5)	3-48	-0.88
Age	73.0 (6.1)	60-85	71.9 (6.3)	60-83	1.66
Education	14.6 (3.2)	0-21	13.2 (2.6)	3-21	4.73***

* p≤.05; **p<.01;*** p<.001.

The mean total score of the 8-item risk taking questionnaire was 3.1 (SD = 2.0, range = 0 to 8) for the whole sample. After stratifying by gender the total score was significantly higher in men than Reliability Analysis of the 10-Item Risk-Taking Questionnaire women (p=<.0001). The mean score for me Reliability Analysis of the 10-

Item Risk-Taking Questionnaire was 3.7 (SD = 2.0, range = 0 to 8) and the mean score

for women was 2.5 (SD = 1.8, range = 0 to 8).

Table 4 presents the frequency distribution of the single item risk-taking question.

As mentioned before, the single item risk-taking question variable was reduced from a 3

level variable to a dichotomous variable. The variable was coded as 1 if the subject

responded yes to either statement one or statement two in the table below. The variable

was coded as 0 if the subject chose statement three to best describe themselves. There is a

clear difference in how men and women responded to the single-item question about risk-

taking. Women were almost evenly split between avoiding risk and finding risk exciting.

Men, however were less likely to avoid risk with only 39.3% agreeing that they feel it is

better to be safe than sorry.

Table 4. Frequency Distribution of the Single-Item Risk Taking Question

	Whole Sample	Men	Women
	%	%	%
1. During most of my life, I found dangerous or risky situations exhilarating and was willing to give up some control for the thrill.	4.5	5.8	3.4
2. During most of my life, I found some danger or risk exciting, but only if I had control of the situation.	56.2	65.0	47.7
3. During most of my life, I have avoided risky situations because I believe that it is better to be safe than sorry.	39.3	29.2	48.9

Correlations

In the whole sample, the total score on the 8-item risk taking questionnaire was

significantly correlated with openness (r = 0.21, p<.0001), neuroticism (r= -0.15, p =

0.001) and agreeableness (r = -0.11, p = 0.017). This measure of risk taking was also

significantly correlated with gender (r = -0.30, <.0001) and education (r = 0.28, <.0001).

The single-item measure of risk-taking was significantly correlated with extraversion (r = 0.16, p<0.001), openness (r = 0.27, p<.0001) and neuroticism (r = -0.22, <.0001). It was also correlated with gender (χ^2 = 18.8, p<.0001) and education (r = 0.29, <.0001).

Correlations were calculated to examine the associations between the demographic variables and personality. Moderate correlations existed between gender and agreeableness (r = 0.35, p <.0001) and between education and openness (r = 0.27, p <.0001) and neuroticism (r = -0.25, p <.0001). Gender was also significantly correlated with education (r = -0.22, p<.001).

Spearman's rank correlation coefficients were computed to determine if there was any multicollinearity among the independent variables that could distort the association with risk-taking. There were no correlation coefficients between independent variables that were greater than 0.40. Therefore, multicollinearity was determined not to be present, allowing all of the independent variables to be included in the regression analysis.

Hierarchical Linear Regression

Table 5 summarizes the results of the hierarchical linear regression model estimate of the 8-item risk questionnaire total score. The five personality domains explained 7% of the variance in risk taking and the demographic variables explained an additional 10% of the variance. Individuals had higher risk scores when they were more open, less neurotic and less agreeable. No significant findings emerged for extraversion or conscientiousness. Among the demographic variables, male gender, younger age and more years of education were significant predictors of risk taking.

Table 5. Hierarchical Linear Regression Model of the Total Score of the 8-Item Risk Taking Questionnaire in the Whole Sample

Step	Variables Entered	Standardized β	t	R^2	ΔR^2
				Risk Taking Total Score	
1	Openness	0.16	3.27**	0.07***	0.07
	Extraversion	0.01	0.09		
	Neuroticism	-0.14	-2.62**		
	Agreeableness	-0.16	-3.28**		
	Conscientiousness	0.01	0.10		
2	Gender	-3.20	-6.59***	0.17***	0.10
	Age	-0.09	-1.97*		
	Education	-0.03	-0.72		
	Income	0.10	2.32*		
3	Gender X Openness	0.28	1.27	0.18***	0.01

*$p \leq 0.05$; **$p < .01$; ***$p < .0001$.

The hierarchical regression model was run again after stratifying by gender (see Table 6) Openness increased the total risk score in women but was not a significant predictor of risk in men. Adding the demographic variables to the model for women did not explain any additional variance in risk taking. Demographic variables explained an additional 4% of the variance of risk taking in men, where more years of education and younger age were significant predictors of risk.

Effect-modification by gender was suspected after observing that openness was only significantly associated with risk-taking among women. Gender X Domain interactions were added to the model (only Gender X Openness is presented in the table) to test for effect-modification. None of the interaction terms was significant, confirming that gender was not a statistically-significant effect-modifier in the association between personality and total risk score.

Table 6. Hierarchical Linear Regression Model of the Total Score of the 8-Item Risk Taking Questionnaire Stratified by Gender

Step	Variables Entered	Men Standardized β	t	R^2	Women Standardized β	t	R^2
1	Openness	0.13	1.71	0.06*	0.32	4.73***	0.09**
	Extraversion	0.05	0.62		0.03	0.44	
	Neuroticism	-0.13	-1.54		0.04	0.51	
	Agreeableness	-0.08	-1.19		0.04	0.54	
	Conscientiousness	0.01	0.06		-0.03	-0.47	
2	Age	-0.13	-1.97*	0.10**	-0.04	-0.55	0.09*
	Education	0.17	2.43*		0.08	1.19	
	Income	-0.013	-0.20		-0.05	-0.72	

*p≤0.05; **p<.01; ***p<.0001.

Hierarchical Logistic Regression

Table 7 summarizes the results of the hierarchical logistic regression model used to assess the association between personality and the single-item risk taking question. Individuals most likely to find risk exciting are those who scored high on openness and low on agreeableness and neuroticism, just as in the regression model of the 8-item questionnaire. Participants who were younger, male and who had more education were also more likely to enjoy risk. After stratifying by gender, openness increased the likelihood of enjoying risk in both the men and women (see Table 8). A higher number of years of education in women and younger age in men also increased the odds of risk taking.

Table 7. Hierarchical Logistic Regression Model of the Single-Item Risk Taking Question in Whole Sample.

Step	Variables Entered	Wald χ^2	Odds Ratio (95% CI)
1	Openness	17.12***	1.09 (1.05, 1.13)
	Extraversion	0.66	1.02 (0.98, 1.06)
	Neuroticism	14.76***	0.94 (0.90, 0.97)
	Agreeableness	5.33*	0.95 (0.92, 0.99)
	Conscientiousness	2.52	0.97 (0.94, 1.01)
2	Gender	13.50***	0.41 (0.25, 0.66)
	Age	5.25*	0.96 (0.93, 0.990
	Education	9.98*	1.14 (1.05, 1.23)
	Income	0.80	1.00 (0.99, 1.01)
3	Gender x Openness	0.13	1.02 (1.93, 1.11)

*p≤0.05; **p<.01; ***p<.0001.

Table 8. Hierarchical Logistic Regression Model of the Single-Item Risk Taking Question Stratified by Gender

		Males		Females	
Step	Variables Entered	Wald χ^2	Odds Ratio (95% CI)	Wald χ^2	Odds Ratio (95% CI)
1	Openness	8.08**	1.09 (1.03, 1.16)	14.06**	1.13 (1.06, 1.20)
	Extraversion	0.27	1.02 (0.95, 1.09)	0.90	1.03 (0.97, 1.01)
	Neuroticism	3.75	0.95 (0.90, 1.00)	3.33	0.95 (0.91, 1.00)
	Agreeableness	1.49	0.96 (0.91, 1.02)	0.18	1.02 (0.95, 1.08)
	Conscientiousness	0.80	0.97 (0.92, 1.03)	2.35	0.96 (0.92, 1.00)
2	Age	3.84	0.95 (0.90, 1.00)	1.68	0.97 (0.92, 1.02)
	Education	2.31	1.09 (0.98, 1.21)	7.87**	1.20 (1.06, 1.36)
	Income	0.04	1.00 (0.97, 1.03)	0.20	1.00 (0.98. 1.01)

*p≤0.05; **p<.01.

Chapter Five

Discussion

Findings

As hypothesized and consistent with previous studies, higher scores in openness and lower scores in neuroticism and agreeableness were associated with both measures of risk-taking (Lauriola & Levin, 2001; Nicholson et al., 2005; Soane & Chmiel, 2005). Conscientiousness was inversely associated with risk taking as hypothesized, but this association was not statistically significant.   Extraversion, hypothesized to also be positively associated with risk-taking, was significantly correlated with the single-item risk measure ($r = 0.16$, $p<.001$), but was not significantly associated with either risk measure in the regression analyses.

The demographic variables accounted for the majority of the variance (10%) in the hierarchical linear regression model, with gender having the strongest association with risk-taking ($\beta = -3.20$, $p<.0001$). All four demographic variables were independently associated with risk-taking for one or both risk-taking measures. Male gender and younger age were associated with both measures of risk. There were also positive associations between income and the 8-item questionnaire and education and the single-item question.

Gender was not an effect-modifier of the personality and risk taking relationship in this analysis as demonstrated by the lack of statistical significance of all the gender X personality domain interaction terms. Gender may however be a confounder in the

23

relationship between personality and risk-taking, as it is associated with both risk taking and personality traits. Gender was significantly correlated with both the 8-item questionnaire (r = -0.30, P<.0001) and the single-item risk question (r-0.20, p<.0001), where men were more likely to score high in risk taking. Previous research has shown gender differences in personality traits, with women generally scoring higher on neuroticism and agreeableness (Costa et al., 2001). As expected, women in this study scored significantly higher on both neuroticism (15.9 vs. 14.5, Z-score = - 2.34, p<.05) and agreeableness (35.5 vs. 31.6, Z-score= -7.50, P<.0001). After stratifying by gender, openness remained statistically significant, but neuroticism and agreeableness were no longer significantly associated with risk taking in either regression model.

Strengths and Weaknesses

A strength of this study is that a community-based sample was used. Several of the past studies assessing the association between personality and risk-taking used samples composed of college students with a mean age in their twenties (Zuckerman & Kuhlman, 2000; Vollrath & Torgersen, 2001; Nicholson et al., 2005). Using such a sample restricts the generalizability of the results. The sample in this study may have more external validity than a sample of college students; however, the results cannot be applied to the general population because the sample is predominantly Caucasian and of high socio-economic status.

The cross-sectional design of this study is also a weakness. Often in cross-sectional designs it is not possible to determine whether the exposure or the outcome came first, making it difficult to establish a causal association. However, research has shown that personality is established in early adulthood and stable over one's lifetime

(Costa & McCrae, 1998). Given that the sample used in this study was aged 60 and older and that the risk measures collected data about behaviors over the entire lifetime, it is highly probable that each individual's personality was established before they engaged in many of the risk taking activities they reported on.

A limitation of this study is the use of the NEO-FFI instead of the NEO PI-R. The reason that the short form of the NEO was used in this study is that the risk factor and medical and family histories were lengthy, requiring about three hours of the subjects' time. Nevertheless, the NEO-FFI does not measure the facets that make up each personality domain. Examination of only higher order personality domains may indicate that associations are being missed between personality and risk-taking that only emerge in facet level analysis. A study examining the association between personality and alcohol use found associations at the facet level that were not apparent at the domain level (Ruiz et al., 2003). Facets of extraversion and agreeableness were associated with drinking; however those domains were not significantly associated with drinking.

The NEO-FFI does not contain statements from the deliberation facet of conscientiousness and only includes one statement from the excitement-seeking facet of extraversion (Becker, 2005). Both of these facets are likely associated with risk taking. Deliberation involves thinking carefully before acting. A person is more likely to engage in a risky behavior, such as parasailing, if the consequences of their actions, such as physical harm, are not considered. It is already known that the excitement-seeking facet of extraversion is associated with risk-taking (Zuckerman & Kulhman, 2000). Therefore, using a personality measure with only one excitement-seeking statement may explain why extraversion was not statistically significantly associated with risk-taking in this

study. If the data were available to perform facet level analysis there may have been statistically significant associations between conscientiousness and extraversion.

Future Directions

Except for one experimental study (Lauriola & Levin, 2001), all the studies that examined the relation between personality and risk-taking have been cross-sectional. The lifetime stability of personality makes it possible to assess this relationship with a cross-sectional design; however, a prospective study design would provide more convincing evidence of a causal association if one exists.

A standard measure of risk-taking that is valid and reliable is also needed in future studies. Every study reviewed used a different measure of risk taking. It is difficult to compare the results of studies that measure a concept differently, so a standard measure of risk taking needs to be developed.

Finally, future studies should use samples that are more representative of the general population. College students are often used in this type of research because they are a convenient sample, but they may produce results that are not applicable to populations with a more diverse ethnic or socioeconomic make up. Though the current study is representative of people aged 65 to 85 living in the community, a sample with more socio-economic and racial diversity may be more representative of the general population.

So far there have not been many studies performed on the association between personality and risk taking. However, there are consistent statistically significant findings among the studies that have been completed. If future studies use a prospective design, a

standard measure of risk taking and a representative sample there will be strong evidence

for an association between personality and risk taking.

References

Allam, M.F., Campbell, M.J., Hofman, A., Del Castillo, A.S., & Fernandez-Crehuet Navajas, R. (2004). Smoking and Parkinson's disease: systematic review of prospective studies. *Movement Disorders, 19,* 614-621.

Becker, G. (2005). NEO_FFI scores in college men and women: A view from McDonald's unified treatment of test theory. *Journal of Research in Psychology, 40,* 911-941.

Checkoway, H., Powers, K., Smith-Weller, T., Franklin, G.M., Longstreth Jr., W.T. & Swanson, P.D. (2002). Parkinson's disease risk associated with cigarette smoking, alcohol consumptions and caffeine intake. *American Journal of Epidemiology, 155,* 732-738.

Chinta, S.J., & Anderson, J.K. (2005). Dopaminergic neurons. *The international Journal of Biochemistry & Cell Biology, 37,* 942-946.

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

Costa Jr., P.T. & McCrae, R.R. (1998). Longitudinal stability of adult personality. In: Hogan, R. Johnson, J. & Briggs, S. (Eds.), Handbook of Personality Psychology. Academic Press, New York, pp.269-290.

Costa Jr., P.T., Herbst, J.H., McCrae, R.R., & Siegler, I.C. (2000). Personality at midlife: stability, intrinsic maturation, and response to life events. *Assessment, 7,* 365-378.

Costa Jr., P.T., Terracciano, A., & McCrae, R.R. (2001). Gender differences in personality traits across cultures: Robust and surprise findings. *Journal of Personality and Social Psychology, 81,* 322-331.

Evans, A.H., Lawrence, A.D., Potts, J., Katzenschlager, R., Shaw, K., Zijlmans, J. & Lees, A.J. (2006). Relationship between impulsive sensation seeking traits, smoking, alcohol and caffeine intake, and Parkinson's disease. *J Neurol Neurosurg Psychiatry, 77,* 317-321.

Graves, A.B., & Mortimer, J.A. (1994). Does smoking reduce the risks of Parkinson's and Alzheimer's diseases? *Journal of Smoking-Related Disease, 5(Suppl 1),* 79-90.

Herman, M.A., Takkouche, B., Caamano-Isorna, F. & Gestak-Otero, J.J. (2002). A meta-analysis of coffee drinking , cigarette smoking, and the risk of Parkinson's disease. *Annals of Neurology, 52,* 276-284.

Ishihara, L. & Brayne, C. (2006). What is the evidence for a premorbid personality: A systematic review. *Movement Disorders, 21,* 1066-1072.

Lauriola, M., & Levin, I.P. (2001). Personality traits and risky decision-making in a controlled experimental task: an exploratory study. *Personality and Individual Differences, 31,* 215-226.

Malouff, J.M., Thorsteinsson, E.B., & Schutte, N.S. (2006). The Five-Factor Model of personality and smoking: A meta-analysis. *Journal of Drug education, 36,* 47-58.

McCrae, R.R. & Costa, P.T. (1990). Personality in Adulthood. Guilford, New York.

McCrae, R.R., Costa Jr., P.T., Pedroso de Lima, M., Simoes, A., Ostendorf., F., Angletiner, A., Marusic, I., Bratko, D., Caparara, G.V., Barbarabelli, C., Chae, J.H., & Piedmont, R.I. (1999). Age differences in personality across the adult life span: parallels in five cultures. *Developmental Psychology, 35(2),* 466-477.

Menza, M.A., Golbe, L.I., Cody, R.A. & Forman, N.E. (1993). Dopamine-related personality traits in Parkinson's disease. *Neurology, 43,* 505-508.

Nicholson, N., Soane, E., Fenton-O'Creevy, M., William, P. (2005). Personality and domain-specific risk taking. *Journal of Risk Research, 8(2),* 157-176.

Paulson, G.W. & Dadmehr, N. (1991). Is there a premorbid personality typical for Parkinson's disease? *Neurology, 41(suppl),* 73-76.

Ruiz, M.A., Pincus, A.L., & Dickinson, K.A. (2003). NEO PI-R predictors of alcohol use and alcohol-related problems. *Journal of Personality,8,* 226-236.

Small, B.J., Graves, A.B., McEnvoy, C.L., Crawford, F.C., Mullan, M.M., & Mortimer, J.A. (2000). Is APOE-[epsilon]4 a risk factor for cognitive impairment in normal aging? *Neurology, 54(11),* 2082-2088.

Soane, E. & Chmiel, N. (2005). Are risk preferences consistent? The influence of decision domain and personality. *Personality and Individual Differences, 38,* 1781-1791.

Stuettgen, M.C., Hennig, J., Reuter, M., & Netter, P. (2005). Novelty seeking but not BAS is associated with high dopamine as indicated by a neurotransmitter challenge test using mazindol as a challenge substance. *Personality and Individual Differences, 38,* 1597-1608.

Vollrath, M. & Torgersen, S. (2002). Who takes health risks? A probe into eight personality types. *Personality and Individual Differences, 32,* 1185-1197.

Zuckerman, M. & Kuhlman, D.M. (2000). Personality and risk taking: common biosocial factors. *Journal of Personality, 68,* 999-1029.