

Running Head: PERSONALITY TRAITS AND COLLEGE MAJOR

Investigation of Broad and Narrow Personality Traits in Relation to Major Satisfaction
for Students in Engineering, Education, and Psychology Majors

Bradford J. Williams

University of Tennessee, Knoxville

Abstract

Big Five personality traits as well as narrow personality traits were measured on a sample of 1916 undergraduate students at a large public university in the southeast United States. Three majors were studied to find correlations of personality traits significant for each major as well as Satisfaction with College Major associated with each major. Engineering majors were found to be significantly higher in Tough Mindedness and Emotional Stability. Education majors were found to be significantly higher in Agreeableness and Sense of Identity. They were also found to be significantly lower in Tough Mindedness and Major Satisfaction. Psychology Majors were found to be significantly higher in Openness and Work Dive and significantly lower in Tough Mindedness. The personality traits as well as the correlations with College Major Satisfaction were discussed. In addition, implications for future research and significance for high school guidance counselors and college advisors were discussed.

1. Introduction

An individual's personality has always played a central role in Psychology and that emphasis has continued to grow resulting in a plethora of research surrounding the subject. During the course of the past few decades research has attempted to find correlations among personalities and a variety of other topics; most relevant to this paper specifically, occupation and college major choice. John Holland's research in 1966 was a ground-breaking study that linked vocational choice to six personality types that all individuals can be categorized in to; Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic. Since that time countless studies have validated (e.g. DeVoge 1975; Oliver & Waehler, 2005; Sverko & Babarovic, 2006; Walsh & Lacey, 1969), amended (e.g. Deng, Armstrong, & Rounds, 2007; Rees, Luzzo, Gridly, & Doyle, 2007), criticized (e.g. Carkhuff, Alexik, & Anderson, 1967; Morrow, 1971; Hughes, 1972), and added onto (e.g. Armstrong, Day, McVay & Rounds, 2008; Smart & Umbach, 2007; Holland, 1985) the original theory. This research has been especially useful to human resource professionals as well as networks, both personal and internet databases, that seek to match people to specific jobs and/or careers. Surprisingly, however, there is scant research on the relationships between college major choice and personality type.

Research in this field has varied greatly despite the relatively small number of studies. A wide range of majors and occupations have been explored using many different measures of personality including: the 16PF, the Bem Sex-Role Inventory, the Attitude Toward Women Scale, the Myers-Briggs Type Indicator, the California Psychological Inventory, the Minnesota Multiphasic Personality Inventory, the Omnibus Personality Inventory, the Strong Vocational Interest Blank, Blacky Pictures, Davis' Interpersonal Reactivity Index, the Vocational Preference Inventory, the Self-Directed

Search, the Strong-Campbell Interest Inventory, the NEO Personality Inventory, the Maudsley Personality Inventory, the Transition to College Inventory, and the Big Five Personality Inventory. Many of these tests are more focused on interests rather than personality, but the two features have been shown to have correlations and strong relations to complement the other (Apostal & Harper, 1972; Barrick, Mount, & Gupta, 2003; Hansen & Scullard, 2002; Larson, Rottinghaus, & Borgen, 2002). Holland's research (1970) has been done using the Self-Directed Search (SDS) which describes people according to their similarity to six personality types which include Realistic, Investigative, Artistic, Social, Enterprising and Conventional (RIASEC). One of the more popular inventories in recent decades has been the 16 Personality Factor Inventory (Cattell, Ebers, & Tatsuoka 1980), which has gained considerable support. Much research since 1980 has used this inventory to explore personality and its correlation to a variety of subjects including college major choice (DeVoge, 1975; Wikoff & Kafka, 2001). As noted an assortment of personality inventories have proven useful in previous studies, but the present study will use the Big Five personality traits.

The Big Five Personality Inventory (Costa & McCrae, 1992) was used in the present study to study correlations between personality and college major choice. These personality traits will include the Big Five (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) as well as narrow personality traits. Recent research in the Big Five personality traits has shown validity with an expansive consensus among personality researchers (Digman, 1990; Digman, 1997; Wiggins & Trapnell, 1997). In addition, narrow personality traits have displayed broad utility, especially in adding

validity to the Big Five personality traits (Ashton, 1998; Paunonen, 1998, Paunonen, Rothstein & Jackson, 1999; Lounsbury, Sundstrom, Loveland & Gibson, 2003).

The present research explored similarities in personality within three distinct majors; Psychology, Engineering, and Education. Students majoring in Psychology have been the subjects of most of the research because of their relative ease of accessibility. On the other hand, the other two majors have had considerably less focus and research. Two of these subjects-- Engineering and Education-- are colleges unto themselves. Below, I review research on personality in relation to a more specific major like Psychology

A majority of research on college major selection has reported on correlations between personality traits and: persistence (Barak & Rabbi, 1982; Yonge & Regan, 1975), intelligence (Garrison, 1928; Lavach, 1991; Wikoff & Kafka, 2001) or most copiously, college satisfaction (French 1961; Logue, Lounsbury, & Leong, 2007; Waterman & Waterman, 1970). Relevant to this paper, it was discovered that Social Science majors had the least satisfied students while Natural Science majors were found to have the highest rates of satisfaction (French, 1961). As stated earlier, little research has been done to find relations among college major choice and personality. Certainly college major persistence, intelligence and satisfaction all play important roles in the lives of college students, but personality is no different. The present research differs from the above, most notably because it precedes the selection of a college major. Persistence and satisfaction, when related to college major occur after the selection of a major. Therefore, the present study will be vitally helpful to counselors, specifically high school senior and college freshmen counselors, when advising their clients.

The benefits of studying the relationship between personality and college major choice are plentiful. An individual's interests can be assessed in a variety of ways leading to inconsistent results with counselors (Gati, 1987). New computer software building on Holland's theory (1973) has even been developed to remove the subjective nature of counselors (Zwibelman & Plant, 1994). Although the software is a positive advance, the authors admit some drawbacks leading to a need for further research.

John Holland's research beginning in the 1960s and enduring through today has been very influential to the topic of personality. Much of Holland's work can be seen in the present study, however several key distinctions must be clarified: 1) The present study will measure personality traits using, among other tests, the Big Five Personality Inventory as opposed to the six category RIASEC, 2) Rather than grouping occupations (in this case, majors) into categories based on personality type, we will find certain personality types that are prominent in specific majors, and most notably 3) The present study will explore personality as it correlates to college major selection rather than vocational choice.

Similar studies have attempted to find correlations between personality and college choice. Most of these studies have grouped a wide range of majors into categories (e.g. science majors compared to non-science majors). For example Wikoff and Kafka (2001) found that people in an undecided major were less willing to take risks and more dependent than their counterparts who had chosen a major. Few studies exist that attempt to find correlations among specific college major choice and personality. These previous studies can be useful to counselors advising high school or college students, but only give a general direction as opposed to a specific, detailed route. In addition a wide variety of

subjects can be engulfed into one category such as Science, non-Science, or Humanities. For example Psychology can be thought of as a major in the Humanities, but it has roots and present connections to Science majors by using methods such as the scientific method. This can greatly complicate counselors and their clients when categories are present. To further illustrate this point, a catch-all category such as, non-Science majors can include Music, History and Economics, Physical Education which can attract a wide range of interests as well as personalities.

A number of majors have been the topic of research, especially after Holland's theory surfaced in 1966. Much of this research used personality traits to find similarities within specific majors. These majors include Physical Education (Batesky 1980), Recreation (Batesky, Malacos, & Purcell, 1980), Business (Logue, Lounsbury, & Leong, 2007; Eisenman, 1969), Medicine (Lievens, Coetsier, De Fruyt, & De Maeseneer, 2002), Engineering (Brown, 1997; Horn, Turner, & Davis 1975), Home Economics (Lindholm & Touliatos, 1995), Education (Mwamwendo, 1998; Omizo, 1979; Lee, Byrne, & Lee, 1990), Psychology (Barton & Cattell, 1972; Murray & Walsh, 1976; Marrs, Barb, & Ruggiero, 2007, Galluci 1997, McCray, King, & Bailly 2005; Harton & Lyons, 2003), Literature (Young & Shoemaker, 1928), English (Eisenman, 1969), and undecided majors (Wikoff & Kafka, 2001). The present study will examine three majors with previous research (Psychology, Engineering and Education).

Yonge and Regan's study (1975) built on Holland's theory and found that "Persisters", people who do not change their major, have some significant personality differences (as measured by the Omnibus Personality Inventory) when compared to "Changers", those who switch college major. However their study used the RIASEC

personality model rather than the Big Five model. The study did support Holland's theory that students' personalities do vary depending upon their choice of major. Other studies showed that internal consistency relates to such factors as persistence in college, stability of major choice and educational achievements which all agree with Holland (1966, 1973) (Barak & Rabbi, 1982). Teevan's study (1954) categorized majors into three groups and found that the Literature major group had the highest levels of Oral Eroticism, majors in the Social Sciences group had the highest levels of Oral Sadism, Oedipal Intensity, Guilt Feelings, and Analytic Love Object and majors in the Science group had the lowest scores in almost every category. These terms are dated but still have valid ties to some present personality tests and theories. There have been attempts to predict future majors of undecided majors using the RIASEC personality and major scales. It correctly matched personality to major category almost 50% of the time, which was significant (Pulver & Kelly, 2008). Although 50% was shown to be significant, further research is necessary to improve that number.

Marcel Goldschmid's (1967) was very influential and similar to the present study. Because it was completed over 40 years ago it has definite strengths but some weaknesses as well. He compared personality traits between Humanities and Science majors. He found Science majors tended to be Prudent, Conventional, Energetic, Practical, have low Self-Doubt, high control of impulses, restricted range of interests, unlikely to venture into new and different pursuits, high interest in science, low interest in people and social contacts, not Assertive or Dominant, Reserved, Socially Introverted, not Spontaneous, preference for logic, and values form and structure. Humanities majors, on the other hand, tended to be Participant, Ambitious, emphasis on success in life and

personal gain and pleasure, values personal independence, Self-Centered, seeks freedom from rules and constraints, given to complaining about physical and psychological status, Impatient, Demanding, Emotionally Expressive, Anxiety-Prone, wide range of interests, Ascendant, Persuasive, Clever, Imaginative, Outspoken, and seeks social contacts. Although none of these traits are in the Big Five traits unto themselves, many are narrow personality traits. These results are in accordance with previous studies linking personality to college major and are significant in showing strong differences among categories of college students. The present study will compare how current results compare to previous ones, as found by Goldschmid (1967).

A large number of studies have been done on Psychology majors, compared to other majors. The research has yielded an array of results that should be discussed before moving on. The number of females majoring in Psychology is rapidly increasing especially when comparing relative numbers to other majors (McDonald, 1997). Harton and Lyons (2003) was one study that explored personality differences between males and females and Psychology and non-Psychology majors. Studies have found that men and women are not significantly different in Empathy according to physiological measures but self-reports have shown women to report higher levels of Empathy than men (Eisenberg & Lennon, 1983). Her results found women were higher in empathic concern and perspective taking than men and Psychology majors were higher in empathic concern than non-majors and higher in perspective taking than minors and non-majors. Perspective taking and interest in a helping profession independently predicted choice of major showing that certain personality traits, in this case Empathy, can be correlated to specific majors, in this case Psychology. To add to that, Psychology majors, when

compared to Science majors, were found to be more Imaginative and less Tough-Minded (Barton & Cattell, 1972). Similar studies leading up to this found high Self-Assurance levels among Psychology majors (McCray, King, and Bailly 2005). Other studies compared students within the major of Psychology; upper-level students compared to lower-level students (Murray & Walsh, 1976). They found only a few differences between the two groups, most notably that upper-level students scored significantly higher on the Responsibility scale than lower-level students (Murray & Walsh, 1976).

The most similar and relevant study for the present study showed that Psychology majors scored significantly higher on the Openness trait when compared to non-Psychology majors (Marrs, Barb, & Ruggiero, 2007). The research by Marrs, Barb, and Ruggiero (2007) not only studied Psychology majors, but further more it measured personality traits using the Big Five model. The present research will attempt to validate Marrs, Barb, and Ruggiero's (2007) study as well as find narrow traits associated with the Psychology major.

Although, only a small amount of research has been conducted on Education majors compared to Psychology majors, the results still prove useful and overall somewhat consistent. Education majors have personality traits that vary in a range of ways. Mwamwendo (1998) categorized them as a "Fussy" type of personality illustrating them as Reliable, Conscientious, Punctual, Authority-Oriented and Meticulous. Other studies have described Education majors as Humble, Mild, Tough-Minded, Adaptable, Group Dependent, and Relaxed (Omizo, 1979). No previous study has explored Education majors with respect to the Big Five personality traits, but rather using narrower traits as seen above.

Engineering students have been the subjects of even less personality-based research. Previous studies showed that, when compared to Social Science majors, Engineers scored significantly lower on the Big Five trait of Neuroticism (Horn, Turner, & Davis, 1975). Other studies focus on within-major studies (e.g. gender, race) to discover differences and variances within the major rather than between majors (Brown, 1997).

The present study explored research questions relating the three majors of Psychology, Education, and Engineering to the Big Five personality traits as well as narrow personality traits. The following questions were addressed:

- 1) What were the Personality-Satisfaction relationships for each of the three majors of Engineering, Education, and Psychology?
- 2) What majors had similar traits related to personality and Major Satisfaction?
- 3) How do broad majors that can be colleges themselves (Education and Engineering) compare to more specific majors (Psychology) with respect to Personality-Satisfaction relationships?
- 4) How do Psychology majors differ on correlates of Major Satisfaction from previous studies conducted by Marrs, Barb, and Ruggiero (2007), Harton and Lyons (2003), Barton and Cattell (1972), and McCray, King, and Bailly (2005)?
- 5) How do Education majors differ on correlates of Major Satisfaction from previous studies conducted by Mwamwendo (1998) and Omizo (1979)?
- 6) How do Engineering majors differ on correlates of Major Satisfaction from previous studies conducted by Horn, Turner, and Davis (1975)?

My hypotheses will be based upon previous data found for the three majors. I expect each major to be significantly different in terms of the Big Five personality traits from the sample. I also expect to see a wider variance among majors that can be colleges unto themselves (Engineering and Education) when compared with a more specific major (Psychology). More specifically, I expect Engineering majors to be lower in Neuroticism and Extraversion and higher on Conscientiousness. I predict Psychology majors to be higher in Openness, Empathy, and Extraversion while scoring lower on Neuroticism. Lastly I expect Education majors to score higher on Conscientiousness, Extraversion and lower on Neuroticism.

2. Method

2.1 Overview of Research Setting

The present study consists of a large number of students from a public, state university located in the southeast United States. Although the sample is limited in scope and does not represent a broad base of sampling, the results can be proven useful because of the sufficient variability of measures conducted. Meaningful statistical inferences can be made from the present data. More so, the present research is intended to be used as a foundation for future research conducted matching broad and narrow personality traits to specific college majors.

2.2 Participants

Participants across all majors at a large southeastern state university were recruited to participate in the present study. In total 1916 students participated. The study compared three specific majors to the general undergraduate population which consisted

of a wide range of majors. Engineering majors (n=63), Education majors (n=87), and Psychology majors (n=120) were respectively compared to the 1916 total participants.

2.3 Procedure

Students were asked to participate in a personality inventory on-line. The specifics of the inventory will be discussed later. For most students the participation was voluntary and not required or rewarded. This information may have varied from student to student in various classes, but teachers were not encouraged to give extra credit, however it is possible incentives were present. After the inventory was completed, participants received a report that summarized their personality. In addition they were given suggestions and/or advice on a variety of topics including study habits, area of study, social life, living situations, and how to best use campus resources. Therefore, the results given to us were shared with the individual participants to provide them with advice and suggestions to improve academic performance based on their personality traits.

2.4 Measures

The current study measured personality using the Resource Associates Adolescent Personal Style Inventory (APSI) for College Students. This inventory was chosen because it has been shown to be especially useful and accurate for adolescents aged from middle school through college (Jaffe, 1998). In addition the validity and reliability have been consistently accurate (Lounsbury, Gibson, & Hamrick, 2004; Lounsbury, Gibson, Sundstrom, Wilburn, & Loveland, 2003; Lounsbury, Hutchens, & Loveland, in press; Lounsbury, Loveland, & Gibson, 2003; Lounsbury, Steel, Loveland, & Gibson, 2004; Lounsbury, Sundstrom, Loveland, & Gibson, 2003; Lounsbury, Tatum, Gibson, Park,

Sundstrom, Hamrick, & Wilburn, 2003). The APSI has also generally shown a high convergence with other popular personality inventories, which include the 16 PF, NEO-PI-R, and the Myers-Briggs Temperament Inventory. More so, significant predictions have been shown in the areas of academic performance, as measure by GPA and individual course grades, absenteeism, leadership, satisfaction across a range of areas, vocational interests, adjustment, sense of community, teacher ratings of behavior, and personality factors such as, Rule-Adherence, Self-Esteem, Empathy, Vigilance, and Self-Actualization. For future studies it is important to note that there is an adult version of the APSI which has been shown to be useful in areas such as job performance, job satisfaction, and career satisfaction. Such inventory would be useful in a follow-up study.

The APSI uses a five-point Likert scale (1=Strongly Disagree, 2=Disagree, 3=Neutral/Undecided, 4=Agree, 5=Strongly Agree) across 118 statements that participants are asked to respond to. It measures 12 personality traits include the Big Five of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism or in this case Emotional Stability. The other traits include Aggression, Career Decidedness, Optimism, Self-Directed Learning, Sense of Identity, Tough-Mindedness, and Work Drive. A brief description of each trait will be listed at the end of this section.

In addition to the personality traits, College Major Satisfaction was measured. In total seven questions were asked using a 7-point Likert scale (1=Very Dissatisfied, 2=Dissatisfied, 3=Slightly Dissatisfied, 4=Neutral/Undecided, 5=Slightly Satisfied, 6=Satisfied, 7=Very Satisfied). Questions centered on “How much are you learning in school”. Sample questions for College Satisfaction include progress towards a degree, availability of courses, satisfaction with professors, and quality of academic advisors.

College Major Satisfaction measures was developed by Andrews and Withey (1976). These measures have been used in a variety of studies with respect to such outcomes as job satisfaction following a vacation (Lounsbury & Hoopes, 1986) and career decidedness among college students (Lounsbury, Tatum, Chambers, Owens, & Gibson, 1999). Operational definitions for each of the measured personality traits are given below.

2.5 Operational Definitions

Aggression – An inclination to fight, attack, and physically assault another person, especially if provoked, frustrated, or aggravated by that person; disposition to become angry and engage in violent behavior.

Agreeableness – Being agreeable, participative, helpful, cooperative, and inclined to interact with others harmoniously.

Career Decidedness – The degree to which an adolescent knows what occupational field s/he wants to go into after leaving school.

Conscientiousness – Being conscientious, reliable, trustworthy, orderly, and rule-following.

Emotional Stability – The overall level of adjustment and emotional resilience in the face of stress and pressure. We conceptualized this as the inverse of Neuroticism.

Extraversion – The tendency to be sociable, outgoing, gregarious, warmhearted, expressive, and talkative.

Openness – the Receptivity and openness to change, innovation, new experience, and learning.

Optimism – Having an optimistic, hopeful outlook concerning prospects, people, and the future, even in the face of difficulty and adversity as well as a tendency to minimize problems and persist in the face of setbacks.

Self-Directed Learning – Inclination to learn new materials and find answers to questions on one's own rather than relying on a teacher; setting one's own learning goals; and initiating and following through on learning without being required to for a course or prompted to by a teacher.

Sense of Identity – Knowing one's self and where one is headed in life, having a core set of beliefs and values that guide decisions and actions; having a sense of purpose.

Tough Mindedness – The disposition of rely on facts and data to appraise information and make decision; being analytical, realistic, objective, and unsentimental.

Work Drive – Being hard-working, industrious, and inclined to put in long hours and much time and effort to reach goals and achieve at a high level.

3. Results

Personality traits between the three specific majors of Engineering, Education, and Psychology when compared to the sample showed some significant differences. Generally there were only a small handful of traits that were significantly different for each major, but there were many traits related to Major Satisfaction for each major. To compare the correlation coefficients between majors and non-majors with respect to personality characteristics the study used the special *t* test. I examine each research question in more detail below.

Table 1 shows the correlations between personality traits and Major Satisfaction for each major. For Engineering majors correlations ranged from 0.216 (Extraversion) to 0.597 (Optimism) with respect to Major Satisfaction. Education majors had correlations ranging from 0.058 (Openness) to 0.425 (Work Drive) for Major Satisfaction. Psychology majors had correlations ranging from 0.106 (Extraversion) to 0.501 (Work Drive) for Major Satisfaction. Engineering major had nine traits significantly correlated to Major Satisfaction (Agreeableness, Emotional Stability, Openness, Aggression, Sense of Identity, Optimism, Self-Directed Learning, Work Drive, and Conscientiousness); each with $p < 0.05$. There were only four significant correlations between personality traits and Major Satisfaction for Education majors; specifically, Agreeableness, Work Drive, Emotional Stability, and Self-Directed Learning all had significant ($p < .05$), positive correlations with Major Satisfaction. Psychology majors had the most significant correlations between personality traits and Major Satisfaction with ten (Agreeableness, Conscientiousness, Emotional Stability, Sense of Identity, Optimism, Self-Directed Learning, Work Drive, Openness, Aggression, and Tough Mindedness).

Table 1

Engineering Majors

Major Satisfaction

Agreeableness: 0.348*
Conscientiousness: 0.259**
Emotional Stability: 0.547*
Openness: 0.415*
Aggression: -0.328*
Optimism: 0.597*
Self-Directed Learning: 0.403*
Sense of Identity: 0.549*
Work Drive: 0.338*

n = 63

Education Majors

Major Satisfaction

Agreeableness: 0.304*
Emotional Stability: 0.231**
Self-Directed Learning: 0.269**
Work Drive: 0.425*

n = 87

Psychology Majors

Major Satisfaction

Agreeableness: 0.239*
Conscientiousness: 0.360*
Emotional Stability: 0.240*
Openness: 0.202**
Aggression: -0.204**
Optimism: 0.403*
Self-Directed Learning: 0.330*
Sense of Identity: 0.453*
Tough Mindedness: -0.226**
Work Drive: 0.501*

n = 120

*p < 0.001, **p < 0.005

My first research question laid the foundation for the research. Each major had unique traits characteristic of the field of study. Table 2 shows the results for Engineering majors. Engineering majors were found to be significantly higher in Tough Mindedness: $t(2034) = -6.646, p < 0.01$ as well as Emotional Stability: $t(2034) = -2.723, p < 0.01$. Table 3 shows the data for students majoring in Education. Education majors were found to be significantly higher in Agreeableness: $t(2034) = -3.152, p < 0.01$ and in Sense of Identity: $t(2034) = -2.866, p < 0.01$. In addition they scored significantly lower in Tough Mindedness: $t(2034) = 5.031, p < 0.01$ and in Major Satisfaction: $t(2031) = -2.270, p < 0.01$. The data for Psychology majors is listed on Table 4. Psychology majors were found to be significantly higher in Openness: $t(2034) = -2.434, p < 0.01$ and Work Drive: $t(2034) = -2.342, p < 0.01$. Psychology majors also scored significantly lower in Tough Mindedness: $t(2034) = 4.821, p < 0.01$.

Table 2

Engineering Majors

Engineering		n	Mean	Std. Deviation	Std. Error Mean
Aggression	Non-Majors	1973	2.2140	.80509	.01813
	Majors	63	2.3333	.86253	.10867
Agreeableness	Non-Majors	1973	3.7392	.61809	.01392
	Majors	63	3.6402	.72441	.09127
Conscientiousness	Non-Majors	1973	3.3786	.49896	.01123
	Majors	63	3.3393	.51609	.06502
Emotional Stability	Non-Majors	1973	3.1657	.69462	.01564
	Majors	63	3.4074	.65339	.08232
Extraversion	Non-Majors	1973	3.6790	.73550	.01656
	Majors	63	3.5853	.73979	.09320
Openness	Non-Majors	1973	3.5722	.60186	.01355
	Majors	63	3.5397	.50593	.06374
Optimism	Non-Majors	1973	4.0141	.57210	.01288
	Majors	63	4.0295	.58066	.07316
Sense of Identity	Non-Majors	1973	3.9764	.60145	.01354
	Majors	63	3.8611	.64097	.08075
Tough Mindedness	Non-Majors	1973	2.3046	.64646	.01455
	Majors	63	2.8549	.66240	.08345
Work Drive	Non-Majors	1973	3.1807	.62371	.01404
	Majors	63	3.1993	.57947	.07301
Major Satisfaction	Non-Majors	1970	5.2837	.88416	.01992
	Majors	63	5.2682	.83611	.10534
Life Satisfaction	Non-Majors	1970	5.3331	.77975	.01757
	Majors	63	5.4215	.85248	.10740

Table 3

Education Majors

	Education	n	Mean	Std. Deviation	Std. Error Mean
Aggression	Non-Majors	1949	2.2241	.80956	.01834
	Majors	87	2.0747	.73642	.07895
Agreeableness	Non-Majors	1949	3.7270	.62411	.01414
	Majors	87	3.9413	.52741	.05654
Conscientiousness	Non-Majors	1949	3.3769	.49844	.01129
	Majors	87	3.3879	.52379	.05616
Emotional Stability	Non-Majors	1949	3.1721	.69766	.01580
	Majors	87	3.1992	.62237	.06673
Extraversion	Non-Majors	1949	3.6758	.73827	.01672
	Majors	87	3.6839	.67768	.07265
Openness	Non-Majors	1949	3.5765	.59891	.01357
	Majors	87	3.4511	.59288	.06356
Optimism	Non-Majors	1949	4.0106	.57624	.01305
	Majors	87	4.1051	.46697	.05006
Sense of Identity	Non-Majors	1949	3.9647	.60589	.01372
	Majors	87	4.1537	.50062	.05367
Tough Mindedness	Non-Majors	1949	2.3369	.65501	.01484
	Majors	87	1.9787	.52127	.05589
Work Drive	Non-Majors	1949	3.1789	.62368	.01413
	Majors	87	3.2350	.59048	.06331
Major Satisfaction	Non-Majors	1946	5.2739	.88574	.02008
	Majors	87	5.4932	.78266	.08391
Life Satisfaction	Non-Majors	1946	5.3290	.78609	.01782
	Majors	87	5.4899	.67062	.07190

Table 4

Psychology Majors

Psychology		n	Mean	Std. Deviation	Std. Error Mean
Aggression	Non-Majors	1916	2.2218	.80876	.01848
	Majors	120	2.1521	.77804	.07103
Agreeableness	Non-Majors	1916	3.7323	.61975	.01416
	Majors	120	3.7981	.65139	.05946
Conscientiousness	Non-Majors	1916	3.3763	.49554	.01132
	Majors	120	3.3948	.55972	.05110
Emotional Stability	Non-Majors	1916	3.1752	.69359	.01585
	Majors	120	3.1417	.71094	.06490
Extraversion	Non-Majors	1916	3.6788	.73528	.01680
	Majors	120	3.6344	.74317	.06784
Openness	Non-Majors	1916	3.5606	.59975	.01370
	Majors	120	3.7396	.56383	.05147
Optimism	Non-Majors	1916	4.0141	.57087	.01304
	Majors	120	4.0226	.59582	.05439
Sense of Identity	Non-Majors	1916	3.9689	.60338	.01378
	Majors	120	4.0354	.59369	.05420
Tough Mindedness	Non-Majors	1916	2.3390	.65455	.01495
	Majors	120	2.0440	.57645	.05262
Work Drive	Non-Majors	1916	3.1732	.61969	.01416
	Majors	120	3.3102	.65122	.05945
Major Satisfaction	Non-Majors	1913	5.2849	.87981	.02012
	Majors	120	5.2571	.92817	.08473
Life Satisfaction	Non-Majors	1913	5.3404	.77793	.01779
	Majors	120	5.2638	.84497	.07713

Question two found that both Psychology and Education majors scored significantly lower on Tough Mindedness. The opposite is true of Engineering majors. A discussion of why this could be true will be examined below.

The third question dealt with variance among specific versus broad majors. Contrary to my belief, Psychology majors showed the largest variance with an average standard deviation of 0.14267 across the 12 traits. Education showed an average standard deviation of 0.07809 and Engineering majors averaged the smallest value with 0.04462. This is surprising because both majors that can be, and usually are, colleges unto themselves had less variance than a specific major such as Psychology.

Question four through six compared previous studies on specific majors to the current study. In general, the present study was consistent with previous studies on personality traits and college major. For Engineering majors the present study agreed with Horn, Turner, and Davis (1975) who found that Engineering majors had significantly lower Neuroticism scores. Horn, Turner, and Davis's (1975) study is in accordance with the present study in that Engineering majors had significantly higher Emotional Stability scores. The Education major yielded ambiguous results with respect to previous studies. Mwamwendo (1998) found Education majors to be Reliable, Conscientious, Punctual, and Meticulous. In contrast, the present study's results did not find Education majors to be significantly higher in Conscientiousness. Additionally, Omizo's (1979) study found persons majoring in Education to be more Humble, Tough Minded, Adaptable and Group Dependent. The current study contradicted Omizo's study in that Education majors had significantly lower levels of Tough Mindedness. Previous studies have found Psychology majors to be higher on Openness (Marrs, Barb, &

Ruggiero, 2007) and lower on Tough Mindedness (Barton & Cattell, 1972). My study found consistent results, but did not find results in accordance with Harton and Lyons (2003) or McCray, King, and Bailly (2005). The present study did not find Psychology majors to be significantly higher on Empathy or Self-Assurance. The implications for each result will be discussed in further detail.

4. Discussion

A number of implications can be drawn from the present study. The three college majors of Engineering, Education, and Psychology all have characteristics and traits both unique unto them and common to each other. It is important to discuss what factors made each major unique and explore explanations for the findings as well as find similarities among the three. Although only three majors at one university were examined, it is important to note that the present study attempts to lay the foundation for future studies by examining specific majors across a wide range of personality traits and explore what traits relate to major and Major Satisfaction. First, I will describe each of the three majors in more detail and later give broad conclusions for my study and lastly give direction for future studies on the topic.

The results supported some of my hypotheses regarding the personalities of those majoring in Engineering. I correctly predicted Engineers to have significantly higher levels of Emotional Stability, but the study did not find Engineering majors to be significantly lower in Extraversion or significantly higher in Conscientiousness. Both Extraversion and Conscientiousness were not significantly different for Engineering majors compared to the sample therefore refuting that part of my hypothesis.

The present study found Engineering majors to be significantly higher in Tough Mindedness and Emotional Stability than the sample. Both of these traits seem to be fitting for a future Engineer because it is a field based on analysis of objective facts. Being Tough Minded means being analytical and/or unsentimental; such a person would seem to be a successful Engineer. In addition Emotional Stability would be a useful tool to Engineering majors because of the value placed on being calm and objective when being presented with strenuous and stressful projects.

Having significantly high levels of Emotional Stability agreed with the results of Horn, Turner, and Davis (1975), who found persons majoring in Engineering to have low Neuroticism levels. As stated by our definition of Emotional Stability, lower levels of Neuroticism equate to higher levels of Emotional Stability and visa versa since they are opposites. The second part of Horn, Turner, and Davis's (1975) studied variance within the Engineering major which will be discussed later.

With regard to Major Satisfaction Engineering majors were found to have many significant correlations with personality traits. Aggression was found to have a negative correlation with Major Satisfaction. Engineering majors were found to be significantly higher in Emotional Stability. In addition Emotional Stability was found to have a significantly positive correlation with Major Satisfaction. Emotional Stability can be a useful trait for counselors and advisors to use when discussing major choice with their clients because it is found to have significantly higher levels in the Engineering major as well as Major Satisfaction for persons majoring in Engineering.

Sense of Identity and Optimism also were strongly related to Major Satisfaction for Engineering majors. Having a high level of Sense of Identity would seem to be

relevant to satisfaction with any college major. Having a general goal in life and knowing one's self are useful characteristics for most college majors. The same can be said for Optimism. Having a positive outlook on life will usually translate into life satisfaction as well as Major Satisfaction.

I predicted Education majors to be significantly higher on Conscientiousness and Extraversion and significantly lower on Neuroticism. None of these hypotheses were supported for Education majors. Levels of Conscientiousness, Extraversion, and Neuroticism for Education majors were not found to be significantly different from other majors. Therefore my hypothesis predicting Education majors to be significantly higher in Conscientiousness and Extraversion and significantly lower in Neuroticism was not supported with my study.

There were more significant differences for trait scores in the case of Education majors than either Education or Psychology majors. Significantly higher levels of Agreeableness and Sense of Identity as well as significantly lower levels of Tough Mindedness and Major Satisfaction were associated with Education majors.

Agreeableness may be a helpful trait for Education majors because of the stress put on a pleasant, courteous, open classroom. Agreeableness may explain the significantly lower levels of Tough Mindedness as well, because of the subjective nature of teaching.

Education majors must be more caring in their field when compared to more objective, analytical majors such as Engineering. Sense of Identity could be important to Education majors because of the altruistic nature of the field. Caring and giving are highly valued in school settings and this may give Education majors a sense of purpose or meaning to their life. Their significantly lower level of Major Satisfaction could be a result of

students being ill-advised or having misconceptions about the Education major. Another hypothesis is that the major attracted less satisfied students. The other three traits should be the focus of counselors and advisors to attempt to reduce the number of people dissatisfied with the major. I am confident with more research and focus on personality traits related to the Education major the level of satisfaction would increase.

The present results surprisingly contradicted the result found by Omizo (1979) which found education majors to be Tough Minded. One explanation for such a lack of agreement may be that 30 years have passed since the time of his study and in that time personality traits that were once attracted to the major may have changed. The present study found no evidence to support Mwamwendo's (1998) research finding education majors to be highly Conscientious. The other traits found by Mwamwendo (1998) of Reliable, Punctual, and Meticulous, and the traits found by Omizo (1979) of Humble, Adaptable, and Group Dependent were also not supported in the present study.

Education majors had the fewest number of traits significantly correlated with Major Satisfaction. Agreeableness, Emotional Stability, Self-Directed Learning, and Work Drive were significantly correlated with Major Satisfaction. Agreeableness being correlated with Major Satisfaction seems to make sense since it was one of the traits found to be significantly higher for Education majors compared with the sample. It may be useful for guidance counselors and advisors to focus on that trait since it is correlated both with the major as well as satisfaction with the major. Work Drive had the strongest correlation with Major Satisfaction. The importance of this may be the after hours work teachers put in grading test, talking to parents, tutoring students, etc that is required of them. If an individual has a high Work Drive, these extra tasks may not frustrate them

which would lead to increased satisfaction. Another explanation may be that hard work led to greater rewards for students in Education than students in Psychology or Engineering.

The present study shows that Education majors vary less than the sample compared to Engineering and Psychology majors with respect to Major Satisfaction. In other words, there were a fewer number of traits correlated with one's satisfaction of the Education major when compared to the other two. One explanation may be the intense personal interactions that take place in the Education major. Education is a highly social field of study where one usually develops social bonds with students (Pinta, 1994). As a result, persons majoring in Education may place more emphasis on external relationships rather than internal personality traits; resulting in fewer traits being significantly correlated with Major Satisfaction for Education majors.

I hypothesized Psychology majors to be significantly higher in Openness, Empathy and Extraversion and significantly lower in Neuroticism. My research only confirmed one of my predictions. The present study found Psychology majors to be significantly higher than the sample in Openness. If Empathy can be thought of as a component for low Tough Mindedness, then two of my hypotheses regarding Psychology majors were confirmed. No evidence was found to support my prediction for Psychology majors to be significantly higher in Extraversion or significantly lower in Neuroticism.

The current study found mixed results when compared to previous studies with Psychology majors. Psychology majors were found to have significantly higher levels of Openness and this supports previous studies (Marrs, Barb, & Ruggiero, 2007). The present study also partially supported Barton and Cattell's (1972) finding that females

majoring in Psychology were significantly less Tough Minded. Although the current study examined males and females, the result is still useful and relevant to counselors and advisors since low levels of Tough Mindedness have been shown for Psychology majors among both sexes. Barton and Cattell (1972) also found female Psychology majors to be more Imaginative than their sample. Our research found no support for that claim.

Additionally, Harton and Lyon's (2003) research found Psychology majors to have significantly higher levels of Empathy. Since part of our definition of Tough Mindedness included unsentimental; Empathy can be viewed as a component of lower levels of Tough Mindedness, since being empathetic and being unsentimental seem to be inversely related. McCray, King and Bailly (2005) found that persons majoring in Psychology had significantly higher levels of Self Assurance. Sense of Identity was the closest trait to Self Assurance in the present study. No evidence was found to support persons majoring in Psychology to have either a significantly higher level of Self Assurance or Sense of Identity.

Persons majoring in Psychology were found to have the highest number of traits related to Major Satisfaction. Both Tough Mindedness and Aggression had negative correlations with Major Satisfaction. Since Tough Mindedness was also related to the major the findings were especially relevant. Significantly lower levels of Tough Mindedness were found for Psychology majors as well as satisfaction with the major. Since Empathy and subjectivity are vital parts of the Psychology major it makes sense that this trait is correlated with the major and satisfaction with the major. The strongest correlations were Sense of Identity and Work Drive. It may be that that a person could not be effective in helping other people find themselves, etc. if s/he did not have a secure

sense of personal identity. Work Drive may be related to the Psychology major since many undergraduates in Psychology go on to graduate school. It would make sense for Work Drive to be correlated with Major Satisfaction since Psychology majors often times spend much time in school pursuing their personal goals (Briehl, 2001).

There were a few traits that were correlated with all three majors. Agreeableness, Emotional Stability, Self-Directed Learning, and Work Drive were all found to be related to Major Satisfaction for the three majors. This pattern of results may hold up across a variety of majors. Self-Directed Learning and Work Drive are likely to play a substantive role in coursework at the university level. Being industrious, hard-working and having an inclination to learn new material are all important characteristics of the higher education learning process. In addition, Agreeableness and Emotional Stability may help one form bonds with peers and professors in the major, which in turn could result in higher satisfaction.

Interesting results were found in the present study involving variance within the specific majors. My study found personality traits to vary greatest among Psychology majors and least among Engineering majors. Horn, Turner, and Davis's (1975) study found low levels of Neuroticism consistent regardless of whether person was already majoring in Engineering or just intending to. Stated differently, the Engineering major attracts people with high levels of Emotional Stability. Drawing on Holland's theory, it may be that personality changes as a result of selecting a major (i.e. that college major can shape personality) or it may mean that a major such as Engineering attracts and recruits students with specific personality characteristics like higher levels of Emotional Stability. De Voge (1975) found results consistent with Holland's theory when

comparing college freshman with college seniors across majors. She found the seniors in each group to have much less variance and higher correlations of specific traits than the freshman. Horn, Turner, and Davis's (1975) study does not support that idea and in fact contradicts it. Holland's and de Voge's research, however, looks at occupational types using Holland's RIASEC model to categorize subjects into their respective groups and is not classified by college major. These are broad categories that can perhaps include many majors. The majors that fit into each category of the RIASEC have not been studied and may account for the discrepancy. This could potentially result in personality conformity in the RIASEC groups, but not in specific majors.

Personality has been shown to have profound impacts across various aspects of life. Research has shown personality traits to be correlated with life satisfaction at different stages in the life cycle (Boland & Cappeliez, 1997; DeNeve & Cooper, 1998; Hart, 1999; Herringer, 1998; Lounsbury, Park, Sundstrom, Williamson, & Pemberton, in press; Ramanah, Detweiler, & Byravan, 1997). Personality changes can impact what traits are significant during the college years of one's life cycle since personality traits have the potential to change during the course of one's life. Implications could include standardized personality tests as part of college major admission to complement other factors such as ACT score and GPA (Lounsbury, Saudargas, et al, in press). Increases in satisfaction within one's major as well as general life satisfaction could be a result. Further research will be needed to assess the impact this has with respect to college major.

The implications of the current study are extensive and can have significant implications for guidance counselors and college advisors. Of note are the similarities

between the majors of psychology and engineering. The two majors are not thought to share many personality traits or interests, but, surprisingly, they displayed many parallel characteristics in regard to major and life satisfaction. The majors share no significant personality traits (Engineering majors have significantly higher levels of Tough Mindedness and Emotional Stability whereas Psychology majors have significantly higher levels Openness and Work Drive and significantly lower levels of Tough Mindedness), but there are many overlaps with Major Satisfaction. Both majors have Agreeableness, Conscientiousness, Emotional Stability, Openness, Sense of Identity, Optimism, Self-Directed Learning, and Work Drive positively correlated with Major Satisfaction. Aggression was also negatively correlated with Major Satisfaction for both majors. Explaining this can be difficult, but one explanation is the heavy adult interaction Psychology majors and Engineering majors encounter everyday compared with the adolescent social contact Education majors experience.

Although only three majors were used in the current study, each had unique personality traits. Only one trait was found to be characteristic of more than one major. Significantly lower Tough Mindedness levels were found for both Education and Psychology majors. Significantly lower Tough Mindedness levels makes sense as both majors tend to value and use empathy and subjectivity in their respective fields. More research on specific majors will need to be conducted to show the personality traits characteristic of each major.

Overall, the present findings indicate that satisfaction varies among personality traits and among majors. The results of the present study are consistent with other research which has demonstrated significant relationships between personality traits and

satisfaction (Benjamin & Hollings, 1995; Lounsbury, Saudargas, Gibson, & Leong, in press). Much research has shown how one's personality can change over time especially during the years one is enrolled in college (e.g. Lodi-Smith, Geise, Roberts, & Robins, 2009; Robins, Fraley, Roberts, & Trzesniewski, 2001). Problems may arise when personality changes take place within a four or five year span. Guidance counselors and advisors could have a difficult time accurately advising clients if these personality changes are not understood better.

There are several limitations of the present study as well as direction for future studies. Since the present study used only subjects at one large public southeast university, we do not know how the results generalize to other settings. Future research could use subjects from several universities varying in size, type and location. Additionally, studying a variety of majors may prove to be helpful. Using the Big Five personality traits as well as the narrow traits discussed, might improve consistency of future studies. Many large scale studies will be needed to show consistent correlations among the specific majors so that counselors and advisors can successfully advise their clients.

John Holland has been a very influential psychologist studying personality over the course of the last few decades. His research has had a profound impact on vocational choice and personality (Holland, 1966; Holland, 1970). It would, however be very useful to match personalities to college majors. Holland's Self-Directed Search (1970) is a form of that, but matches college major to vocational interest using his RIASEC model. Both personality traits and vocational interests may be useful in advising students on selecting a college major. Continued research on this topic may greatly help high school guidance

counselors and college advisors assisting students in choosing a major. It has the potential to revolutionize the advising process helping students choose a college major that best fits their personality, ultimately reducing the time spent in school by lowering the number of times they change majors, losing credits and more importantly increase satisfaction in life as well as with their chosen major.

References

- Andrews, F. M. & Withey, S. B. (1976). *Social indicators of well-being*. New York: Plenum.
- Apostal, R. A. & Harper, P. (1972). Basic interests in personality. *Journal of Counseling Psychology, 19*(2), 167-168.
- Armstrong, P. I., Day, S. X., McVay, J. P., & Rounds, J. (2008). Holland's RIASEC Model as an integrative framework for individual differences. *Journal of Counseling Psychology, 55*, 1-18.
- Ashton, M. C. (1998). Personality and job performance: The importance of narrow traits. *Journal of Organizational Behavior, 19*, 289-303.
- Barak, A. & Rabbi, B. (1982). Predicting persistence, stability, and achievement in college by major choice consistency: A test of Holland's consistency hypothesis. *Journal of Vocational Behavior, 20*(2), 235-243.
- Barrick, M. R., Mount, M. K., & Gupta, R. (2003). Meta-analysis of the relationship between the five-factor model of personality and Holland's occupational types. *Personnel Psychology, 56*, 45-74.
- Barton, K & Cattell, H. (1972). Personality characteristics of female psychology, science and art majors. *Psychological Reports, 31*(3), 807-813.
- Batesky, J. A., Malacos, J. A. & Purcell, K. M. (1980). Comparison of personality characteristics of physical education and recreation majors, and factors which affect career choice. *Perceptual and Motor Skills, 51*(3), 1291-1298.
- Benjamin, M. & Hollings, A. E. (1995). Toward a theory of student satisfaction: An

- exploratory study of the "Quality of Student Life". *Journal of College Student Development*, 36(6), 574-586.
- Boland, A. & Cappeliez, P. (1997). Optimism and neuroticism as predictors of coping and adaptation in older women. *Personality and Individual Differences*, 22(6), 909-919.
- Briihl, D. S. (2001). Life after college: Psychology students' perceptions of salary, business hiring criteria, and graduate admission criteria. *North American Journal of Psychology*, 3, 321-330.
- Brown, N. W. (1997). Description of personality similarities and differences of a sample of Black and White female engineering students. *Psychological Reports*, 81(2), 603-610.
- Carkhuff, R. R., Alexik, M., & Anderson, S. (1967). Do we have a theory of vocational choice? *Personnel and Guidance Journal*, 46, 335-345.
- Cattell, R., Ebers, H., & Tatsuoka, M. *Handbook for the 16 Personality Factor Questionnaire*. Champaign, IL: Institute for Personality and Ability Testing, 1980.
- Costa, P. T. & McCrae, R. R. (1992). *NEO PI-R Professional manual*. Lutz, FL: Psychological Assessment Resources.
- de Voge, S. D. (1975). Personality variables, academic major, and vocational choice: A longitudinal study of Holland's theory. *Psychological Reports*, 37(3), 1191-1195.
- DeNeve, K. M. & Cooper, H. (1998). The happy personality: A meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin*, 95, 542-575.

- Deng, C. P., Armstrong, P. I., & Rounds, J. (2007). The fit of Holland's RIASEC Model to US occupations. *Journal of Vocational Behavior*, 71, 1-22.
- Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, 41, 417-440.
- Digman, J. M. (1997). Higher-order factors of the Big Five. *Journal of Personality and Social Psychology*, 73, 1246-1256.
- Eisenberg, N. & Lennon, R. (1983). Sex differences in empathy and related capacities. *Psychological Bulletin*, 94, 100-131.
- Eisenman, R. (1969). Creativity and academic major: Business versus English majors. *Journal of Applied Psychology*, 53(5), 392-395.
- French, J. W. (1961). Aptitude and interest score patterns related to satisfaction with college major field. *Educational and Psychological Measurement*, 21, 287-294.
- Galluci, N. T. (1997). An evaluation of the characteristics of undergraduate psychology majors. *Psychological Reports*, 81, 879-889.
- Garrison, K. C. (1928). Intelligence test scores and choice of major field. *School and Society*, 28, 630-632.
- Gati, I. (1987). Description and validation of a procedure for the interpretation of an interest inventory score profile. *Journal of Counseling Psychology*, 34, 141-148.
- Goldschmid, M. L. (1967). Prediction of college majors by personality tests. *Journal of Counseling Psychology*, 14(4), 302-308.
- Hansen, J. C. & Scullard, M. G. (2002). Psychometric evidence for the Leisure Interest Questionnaire and analyses of the structure of leisure interests. *Journal of Counseling Psychology*, 49(3), 331-341.

- Hart, P. M. (1999). Predicting employee life satisfaction: A coherent model of personality, work, and nonwork experiences, and domain satisfactions. *Journal of Applied Psychology, 84*, 564-584.
- Harton, H. C. & Lyons, P. C. (2003). Gender, empathy, and the choice of the psychology major. *Teaching of Psychology, 30*(1), 19-24.
- Herringer, L. G. (1998). Facets of extraversion related to life satisfaction. *Personality and Individual Differences, 24*(5), 731-733.
- Holland, J. L. (1966). A psychological classification scheme for vocations and major fields. *Journal of Counseling Psychology, 13*, 278-288.
- Holland, J. L. (1970). *The self-directed search*. Palo Alto: Consulting Psychologists Press.
- Holland, J. L. (1985). *Making vocational choices: A theory of vocational personalities and work environments* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Horn, J. M., Turner, R. G., & Davis, L. S. (1975). Personality differences between both intended and actual social sciences and engineering majors. *British Journal of Educational Psychology, 45*(3), 293-298.
- Hughes, H. M. (1972). Vocational choice, level and consistency: A test of Holland's theory on an employed sample. *Journal of Vocational Behavior, 2*, 377-388.
- Jaffe, M. L. (1998). *Adolescence*. New York: Wiley.
- Larson, L. M., Rottinghaus, P. J., & Borgen, F. H. (2002). Meta-analyses of big six interests and big five personality factors. *Journal of Vocational Behavior, 61*, 217-239.
- Lavach, J. F. (1991). Cerebral hemispherecity, college major, and occupational choices.

- Journal of Creative Behavior*, 25 (3), 218-222.
- Lee, L. N., Byrne, R. L., & Lee, M. M. (1990). Personality variables of education majors: A four-year study. *Journal of Human Behavior & Learning*, 7(2), 31-34.
- Lievens, F., Coetsier, P., De Fruyt, F., & De Maeseneer, J. (2002). Medical students' personality characteristics and academic performance: A five-factor model perspective. *Medical Education*, 36(11), 1050-1056.
- Lindholm, B. W. & Touliatos, J. (1995). Personality traits and curricular choices of undergraduate women in home economics. *Psychological Reports*, 76(2), 579-586.
- Lodi-Smith, J., Geise, A. C., Roberts, B. W., & Robins, R. W. (2009). Narrating Personality. *Journal of Personality and Social Psychology*, 96(3), 679-689.
- Logue, C. T., Lounsbury, J. W., & Leong, F. T. L. (2007). Vocational interest themes and personality traits in relation to college major satisfaction of business students. *Journal of Career Development*, 33(3), 269-195.
- Lounsbury, J. W., Gibson, L. W., & Hamrick, F. L. (2004). The development of a personological measure of work drive. *Journal of Business and Psychology*, 18(4), 347-371.
- Lounsbury, J. W., Gibson, L. W., Sundstrom, E., Wilburn, D., & Loveland, J. (2003). An empirical investigation of the proposition that "School Is Work". A comparison of personality-performance correlations in school and work settings. *Journal of Education and Work*, 17, 119-131.
- Lounsbury, J. W., Hutchens, T., & Loveland, J. (in press). An investigation of Big Five personality traits and career decidedness among early and middle adolescents.

Journal of Career Assessment.

Lounsbury, J. W., Loveland, J. L. & Gibson, L. W. (2003). An investigation of Big Five personality traits in relation to psychological sense of community. *Journal of Community Psychology*, 31(5), 531-541.

Lounsbury, J. W., Park, S. H., Sundstrom, W., Williamson, J., & Pemberton, A. (in press). Personality, career satisfaction, and life satisfaction: Test of a directional model. *Journal of Career Assessment.*

Lounsbury, J. W., Saudargas, R. A., Gibson, L. W., & Leong, F. T. (in press). An investigation of broad and narrow personality traits in relation to general and domain-specific life satisfaction of college students. *Research in Higher Education.*

Lounsbury, J. W., Steel, R. P., Loveland, J. M., & Gibson, L. W. (2004). An investigation of personality traits in relation to adolescent school absenteeism. *Journal of Youth and Adolescence*, 33, 457-466.

Lounsbury, J. W., Sundstrom, E., Loveland, J. M., & Gibson, L. W. (2003). Intelligence, “Big Five” personality traits, and work drive as predictors of course grade. *Personality and Individual Differences*, 35, 1231-1239.

Lounsbury, J. W., Tatum, H. E., Chambers, W., Owens, K., & Gibson, L. W. (1999). An investigation of career decidedness in relation to “Big Five” personality constructs and life satisfaction. *College Student Journal*, 33(4), 646-652.

Lounsbury, J. W., Tatum, H. E., Gibson, L. W., Park, S. H., Sundstrom, E., Hamrick, F. L., & Wilburn, D. (2003). The development of a Big Five adolescent personality scale. *Psychoeducational Assessment*, 21, 111-133.

- Marrs, H., Barb, M. R. & Ruggiero, J. C. (2007). Self-reported influences on psychology major choice and personality. *Individual Differences Research*, 5(4), 289-299.
- McCray, J. A., King, I. R., & Bailly, M. D. (2005). General versus gender-specific attributes of the psychology major. *The Journal of General Psychology*, 132, 139-150.
- McDonald, D. G. (1997). Psychology's surge in undergraduate majors. *Teaching of Psychology*, 24, 22-26.
- Morrow, J. M. (1971). A test of Holland's theory of vocational choice. *Journal of Counseling Psychology*, 18, 422-425.
- Murray, R. E. & Walsh, R. P. (1976). Personality differences between levels of psychology majors. *Psychological Reports*, 39(1), 215-220.
- Mwamwendo, T. S. (1998). Personality types of Education majors in South Africa. *Psychological Reports*, 83(2), 666.
- Oliver, K. E. & Waehler, C. A. (2005). Investigating the validity of Holland. *Journal of Counseling Psychology*, 52(3), 448-452.
- Omizo, M. M., Morrow, J. R., Ward, R. G., Disch, J. G., & Michael, W. B. (1979). The validity of a composite of nineteen personality variables in differentiating between American world class Olympic contenders and undergraduate education majors. *Educational and Psychological Measurement*, 39, 977-983.
- Paunonen, S. V. (1998). Hierarchical organization of personality and prediction of behavior. *Journal of Personality and Social Psychology*, 74, 538-556.
- Paunonen, S. V., Rothstein, M. G., & Jackson, D. N. (Narrow meaning about the use of

- broad personality measures for personnel selection. *Journal of Organizational Behavior*, 20(3), 389-405.
- Pinta, R. C. (1994). Patterns of relationships between children and kindergarten teachers. *Journal of School Psychology*, 32, 15-31.
- Pulver, C. A. & Kelly, K. R. (2008). Incremental validity of the Myers-Briggs Type Indicator in predicting academic major selection of undecided university students. *Journal of Career Assessment*, 16(4), 441-455.
- Ramanah, N. V., Detwiler, F. R., & Byravan, A. (1997). Life satisfaction and the five-factor model of personality. *Psychological Reports*, 80, 1208-1210.
- Rees, A. M., Luzzo, D. A., Gridley, B. E., & Doyle, C. (2007). Relational personality theory and Holland's typology among women: An exploratory investigation. *Career Development Quarterly*, 55(3), 194-205.
- Robins, R. W., Fraley, R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A longitudinal study of personality change in young adulthood. *Journal of Personality*, 69, 340-352.
- Smart, J. C. & Umbach, P. D. (2007). Faculty and academic environments: Using Holland's theory to explore differences in how faculty structure undergraduate courses. *Journal of College Student Development*, 48(2), 183-195.
- Sverko, I. & Babarovic, T. (2006). The validity of Holland's theory in Croatia. *Journal of Career Assessment*, 14(4), 490-507.
- Teevan, R. C. (1954). Personality correlates of undergraduate field of specialization. *Journal of Consulting Psychology*, 18(3), 212-214.
- Walsh, W. B. & Lacey, D. W. (1969). Perceived change and Holland's theory. *Journal of*

Counseling Psychology, 16(4), 348-352.

- Waterman, A. S. & Waterman, C. K. (1970). Cross-institutional study of personality variables relating to satisfaction with college. *Proceedings of the Annual Convention of the American Psychological Association*, 5(1), 451-452.
- Wiggins, J. S. & Trapnell, P. D. (1997). Personality structure: The return of the Big Five. In Hogan, R., Johnson, J., & Briggs, S (Eds.), *Handbook of personality psychology* (pp. 737-765). San Diego, CA: Academic.
- Wikoff, R. L. & Kafka, G. F. (1978). Interrelationships between the choice of college major, the ACT and the Sixteen Personality Factor Questionnaire. *Journal of Educational Research*, 71(6), 320-324.
- Yonge, G. D. & Regan, M. C. (1975). A longitudinal study of personality and choice of major. *Journal of Vocational Behavior*, 7(1), 41-65.
- Young, J. B. & Shoemaker, E. (1928). Selection of college majors as a personality expression. *School & Society*, 27, 119-120.
- Zwibelman, B. B. & Plant, R. T. (1994). Choosing a college major: A prototype decision support system. *Computers in Human Behavior*, 10(3), 231-242.