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THE RELATIONSHIP BETWEEN BROAD AND NARROW PERSONALITY TRAITS AND CHANGE OF ACADEMIC MAJOR

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Abstract

The purpose of this study was to investigate the relationship between personality traits and academic major change in two samples of college undergraduates. Utilizing a field study design, a total number of 859 undergraduates completed an online inventory that included the "Big Five" and other -related, narrow personality traits, as well as academic major change and various demographic variables. A number of expected and unexpected findings emerged. As hypothesized, the traits of Sense of Identity and Extraversion were significantly and negatively related to decisions to change major, but only for certain grade levels. Contrary to expectations, Career Decidedness and Optimism were significantly and positively related to academic major change across groups, regardless of class ranking. When parsing the data by college year, additional and significant relationships appeared. Extraversion and Sense of Identity were positively related to academic major change among freshmen, sophomores and seniors, which was a significant and unexpected finding. Conscientiousness, and Emotional Stability were unrelated to academic major change overall, but were significantly and positively related to students changing major at least one time. Among non-directional hypotheses, Work Drive was negatively associated with academic major change across all groups, as well as among juniors and sophomores. Openness was both positively (sophomores) and negatively (juniors) related to major change. A final analysis that looked at students who changed majors two or more times, both Self-directed Learning and Work Drive significantly and positively correlated with the dependent variable. Both Career Decidedness and Optimism increased the odds of being a major changer in a logistic regression analysis of a residence hall sample. Implications for career planning and advising are discussed, along with future research recommendations.

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CHAPTER I

Background and Purpose of Study

The following study considers both Big Five and narrow personality traits as they relate to change of academic major in two samples of University of Tennessee undergraduate students.

Academic major change refers to the decision a student makes, for any number of reasons, to switch from a formerly declared major to another field of study at any time during their college tenure. Because major choice and subsequent change represent important developmental transitions and potentially, determinants of attrition and time to graduation, academic major change becomes a variable of interest to a variety of stakeholders in academic settings, including advisors, educators, and administrators**.**

Generally, academic major change appears to be a common occurrence, with estimates ranging from 50% to 75% of students changing their major at least once during their undergraduate education (Foote 1980; Gordon, 1984; 2007; Kramer, Higley & Olsen,1994), and only 30% of graduating seniors will major in the same field they selected as freshmen (Willingham, 1985). Academic major change happens for various reasons from a variety of influencers (Pascarella & Terenzini, 1991), such as family pressure and future earning potential (Malgwi, Howe & Burnaby, 2005); individual (i.e. aptitude, grades) or institutional barriers (i.e. oversubscribed or selective majors) to entry (Elliott, 1984; Gordon, 1998); and personal characteristics such as self-efficacy beliefs (Elias & Loomis, 2000; Lent, Brown & Larkin, 1984) and vocational immaturity (Crites, 1973; Holland & Holland, 1977). Previous studies have been published concerning academic major change as it relates to a number of student success measures, such as time to degree (Anderson, Creamer & Cross, 1989; Lu, 2005), graduation rates (Cuseo, 2005; Micceri, 2001; Titley & Titley, 1985) and attrition (Allen & Robbins, 2008).

However, there has been no attempt to establish a profile of the type of student most likely to change their major; in particular, there have be no studies to this author's knowledge using Big Five personality traits as predictors of academic major change.

The present study will attempt to address the dearth of research in the academic major change-personality domain.

Academic Major Change

The concept of an academic major, commonly described as the specialized discipline that an undergraduate studies, was introduced in the United States in 1910 by Abbott Lowell, president of Harvard University (McGrath, 2006). The act of formally "declaring" an academic major meant taking courses in some specific academic field, as well as courses in other subjects. Most four year institutions in the United States use this system, but they vary with regards to the admission policies that govern such details as when a student must decide on a major track, how long they can remain uncommitted to a major, how many times they can change their major, and so forth.

Major choice is a precursor of occupational choice (Holland, 1966) and perhaps one of the most important decisions college students make in their adult lives (e.g., Uthayakumar, Schimmack, Hartung & Rogers, 2010) . Decisions regarding choice of major are thought to be made at the beginning of a student's a career and, consequently, to have an effect on future job stability, satisfaction and well-being (Porter & Umbach, 2006; Uthayakumar et al., 2010). Because academic major change implies later career change and, possibly, future occupational uncertainty, a change of major field can have "important implications for one's immediate academic future and as well as one's entire life," (Theophilides, Terenzini & Lorang, 1984; p.

277). In fact, research has shown that college major choice is the most frequent life regret for Americans (Beggs, Bantham & Taylor, 2008).

Although estimates differ, Cuseo's recent article on academic persistence (2005) summarizes the literature by reporting that more than half of all students will change majors at least once before they graduate (Foote 1980; Gordon, 1984), and only 30% of graduating seniors will major in the same field they selected as freshmen (Willingham, 1985). Indeed, some studies estimate the major change rate to be as high as 75% (Gordon, 2007), which could mean that there are likely not many truly "decided" undergraduate students because most will change their minds about their career paths sometime during their college careers.

Academic major change is associated with a number of important academic outcomes. For example, academic major change has been linked to time to graduation, as well as retention and attrition and time to degree (see Anderson, 2000; Lu, 2005), with evidence supporting both increased and decreased graduation rates (Cuseo, 2005; Micceri, 2001; Murphy, 2000). Academic major change is also a variable of interest to institutions when setting admissions policies, or tracking graduation rates, addressing issues of retention, and improving student counseling effectiveness. Implications of major change also include well-being outcomes such as satisfaction with major and career. Therefore, information about academic major change can help administrators, policy makers, advisors and faculty select the best-fit students to a particular university, and help guide their decisions once they are admitted to college in pursuit of a particular field of study.

On the surface it might seem that labeling and defining the term "major change" would be straightforward--largely intuitive and readily stated. However, even a brief literature search reveals that this is not the case. For example, there are numerous ways in which to label major

change: “academic or college or university major change,” “major attrition,” “major migration;” and the converse terms for major change: “major persistence,” “major certainty” and “major field commitment.” When referring to those students who change their major, they might be labeled “undecided,” “deciding;” or--as Gordon (2007) succinctly defined them--“major-changers” are those students who enter college ostensibly decided about a major, but change their minds during the college years”(p. 86). For the purpose of the present study, the terms “academic major change” and “major changers” will be used because they most concisely reflect the variable of interest, defined as the event in which a student changes a formally declared major to a different major. This definition separates the academic major change group from undeclared students and indecisive students, which is an important distinction when parsing out studies in the literature base, as will be seen below.

Further defining academic major change: elements of career indecision and persistence

Academic major change can be viewed within the context of two broad, vocationally oriented nomothetic networks; namely career indecision (major changers as a type of undecided student) and persistence. The decision that a student makes when choosing an academic major is necessarily an antecedent to academic major change. Therefore, it is logical that academic major change would be associated with career decision-making, and, specifically, career indecision. Given the statistics regarding the percentage of students who change their major at some point between matriculation and graduation, it is apparent that many students struggle with the major choice decision process. As a result, major change has been called a special case of career indecision (Gordon, 1984; 1998). According to Gati and his colleagues (2012), career indecision is one of the most researched constructs in vocational psychology, with studies dating back to the 1920’s (Lewallen, 1994). Career indecision can be broadly defined as an inability to make a

decision about the vocation one wishes to pursue (Guay, Senécal, Gauthier & Fernet, 2003), or as a student who, while enrolled in a university, has not yet chosen a major field of study (Anderson, Creamer & Cross, 1989). These two definitions help to illustrate the conceptualization of career indecision as either a harmful state of uncertainty and cause for concern (Hartman & Fuqua, 1983), or as a natural part of the development and decision-making process (Gordon 1984; 1998; Grites, 1981; Lewallen, 1994; Titley & Titley, 1980). Gordon (1984) elaborates on these distinctions by noting that undecided students may have mixed feelings which are either "positive, flexible and curious" or "anxious, apologetic and negative" regarding their status.

Accordingly, current research distinguishes between two components of career indecision: cognitive indecision, which can typically be resolved by gathering information about self and careers; and affective indecision, involving psychological constructs such as anxiety and chronic indecisiveness, which are associated with more general emotional problems (see Chartrand, Rose, Elliott, Marmarosh & Caldwell, 1993; Gati, et al., 2011;Gati, Krausz, & Osipow, 1996). Thusly, although major changers may be simply going through normal internal, developmental transitions as they navigate their college careers, or they may change majors for extrinsic reasons, such as limited finances, ability, or access, frequent major changes might also be indicative of a type of early career indecision that could impact future employment, job satisfaction and well-being (Feldman, 2003). These "indecisive" students have a hard time making decisions or deciding among choices regardless of the situation (Fuqua, Newman, & Seaworth, 1988; Salomone, 1982). Although there are undoubtedly some major changers who fit this category, it is unlikely that chronic indecisiveness will add much to the explanation of academic major change, particularly when one remembers that well over half of undergraduate

students change their majors at some point during their college career (Gordon, 2007; Titley & Titley, 1980).

Furthermore, as Lewellan (1994) observed, given that a tremendous amount of resources are spent trying to identify, advise and retain undecided students; it makes sense to identify the similarities and differences between those on a stable, predictable path and those who have made tentative choices. Indeed, a substantial amount of research on career indecision has focused on differences between decided and undecided students (Ashby, Wall & Osipow, 1966; Baird, 1969; Foote, 1980; Gordon, 1984; Rose & Elton, 1971; Titley & Titley, 1980; Vondracek, Hostetler, Schulenberg, & Shimizu, 1990). More recently, however, career indecision has come to be thought of as less of a dichotomous variable and more of a continuous, heterogeneous construct, of which major change is a part. Many typologies of career indecision have been proposed (Cohen, Chartrand & Jowdy, 1995; Gati, et al., 1996; Gordon, 1998; Jones & Chenery, 1980; Kelly & Pulver, 2002; Larson, Heppner, Ham & Dugan, 1988). However, only Gordon specifically includes major changers as a type of undecided student (1998). She categorizes types of major changers using six categories: drifters, closet changers, externals, up-tighters, experts, and systematics (Gordon, 1984). Yet, as Steel (1994) noted, major changers are not necessarily indecisive. They have made a choice and. for some reason, their decision status has changed.

The inverse of academic major change, or major persistence, is investigated from the broad perspective of student attrition and its converse, student persistence. According to Leppel (2001), the definition of persistence is broad and can be defined in one of three ways: students can transfer from one university to another, but remain in college; they can continue in a particular major at a given university, or they can change majors but stay at a given university; it is this last definition that the current study is most interested in. Major persistence can be looked

at as a measure of collegiate satisfaction, such that satisfaction with one's academic environment contributes to a student's sense of commitment to college (Tinto, 1993). Consequently, academic major change is a variable of interest to attrition researchers who believe that changes in field of study can lead to increased time to graduation, unnecessary coursework and withdrawal from college (e.g., Allen & Robbins, 2008).

The research on college student persistence is well documented; although major persistence is considerably less so. There is an extensive body of research devoted to the subject of student attrition, largely because of the impact of attrition on student and university success, typically defined as graduation rates (Hamrick, Schuh & Shelley, 2004). Although there have been several theories advanced on the subject of student dropouts (Bean, 1985; Cabrera, Castañeda, Nora & Hengstler, 1992; Panos & Astin, 1968; Spady, 1970; Tinto, 1975; 1993), two leading theories have emerged in the extant literature: Tinto's Student Integration Model (1993) and Bean's Model of Student Attrition (1980). Although these two models are different in their theoretic origins and how they view the role of factors external to the institution and student performance (Cabrera et al., 1992), they share the general notion that a student's decision to persist in college (or in their choice of major) will be influenced by a successful fit between student and institution, as well as pre-college characteristics such as personality, aptitude and parental factors. These factors will, in turn, interact to influence the student's ability to assimilate, socially and academically, within the college environment. To the extent that the student successfully adapts to the university will determine their level of commitment, both to their educational goals and to the university to which they've entered. Accordingly, academic major change can be viewed within the context of college persistence and the factors that influence a student's decision to stay committed to a chosen path.

Personality as an Organizing Framework

For the purposes of this research project, personality trait theory will be the framework used to organize and interpret findings.

The examination of individual differences using trait-based theory has value in both explaining and predicting behavior related to academic major change. Because personality traits are thought to be relatively stable across the lifespan (McCrae et. al, 2000), consistent and predictable patterns of behavior can be found by the time an individual reaches adulthood (ibid). Indeed, the choice of personality traits as a framework for studies involving college students has been advocated by some of the most well-known researchers in the vocational decision literature (e.g., Chartrand et al., 1993). Moreover, Lounsbury, Hutchens and Loveland (2005) acknowledged the importance of studying Career Decidedness, a construct related to academic major change, from the perspective of personality. Lounsbury and his co-authors suggest that knowledge of the relationship between personality traits and vocational decision-making has both theoretical and practical implications. That is, understanding differences in personal characteristics can expand upon the theoretical explanations of career decision processes and can inform career interventions involving undecided individuals. Further, Virginia Gordon, a leading scholar in the undecided student literature, asserted that more research needs to be done to find out who the major changers are so more help can be provided to this large group of students. Identifying personality traits of those students who change their majors would be a step in that direction.

Personality

Although the study of personality has experienced a flux of investigative interest during that time, it has gained considerable momentum as a focus of inquiry, especially in the last 15

years. This revitalization of interest can, at least in part, be attributed to the Big Five taxonomy and the Five-Factor Model, which created a common trait "language" providing researchers a framework within which to compare and evaluate different research results. Hundreds of personality studies have been published since the development of the Big Five, which stands as testament to the FFM's usefulness as a unifying research tool.

The Big Five

In the 1980s, psychologists Robert R. McCrae and Paul T. Costa developed their now-eminent NEO Personality Inventory (NEO-PI). Beginning with an analysis of Cattel's 16PF, the construction of the NEO inventory relied heavily on empirical research, factor analysis and scale development methodologies. Originally, the NEO-PI scale did not measure five traits; rather, it was designed to measure only the broad traits and facets of Emotional Stability and Extraversion. Only when McCrae and Costa saw traits loading on a third factor that resembled Norman's "Intellect" dimension, did they add Openness (and the corresponding six facets) to their inventory. Eventually, McCrae and Costa became interested in the Big Five lexical taxonomy, replicating a five factor structure. The 240-item NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992) includes measurement of each Big Five dimension along with six facet sub-scales per dimension. The trait definitions and corresponding facets can be found in McCrae and John (1992).

The development of the NEO-PI provided a reliable, valid and efficient way to assess the Big Five traits, giving multitudes of experimental psychologists, clinicians and theorists ready access to a "common language" of personality measurement. Not surprisingly, there are many other assessments which incorporate the Big Five in some way, such as the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991; the Hogan Personality Inventory (HPI, Hogan & Hogan,

2007); the HEXACO model (Ashton & Lee, 2007) and the Personal Characteristics Inventory (PCI; Barrick & Mount, 1993), to name but a few. The next section will look at the Big Five's success as a robust psychometric tool over the past 20 years.

The Utility and Validity of the Big Five

The Big Five provides a systematic framework for distinguishing characteristics of individuals for use in personality psychology research. Each of the Big Five dimensions describes a set of traits or characteristics which tend to occur together and share common elements. For example, a person who is talkative, energetic and likes to be around people could be categorized as extraverted. Theoretically then, if you can keep classifying more and more traits under large groups, you will find the basic units of personality. Thus, the Big Five has a hierarchical structure; that is, the most basic units of behaviors are at the lowest level of the hierarchy, followed by groups of behavior units that share a common theme, followed by traits that further describe those behaviors, and at the top of the structure, the broadest personality dimensions or factors (see Figure 1 for an illustration of trait hierarchy). The utility of the Big Five lies in the fact that it specifies dimensions of personality characteristics, rather than examining separately the thousands of particular attributes that make human beings individual and unique.

Although myriad articles have been printed that utilize the Big Five, three influential papers published in the early 1990's helped engender broad support for the five-factor model. In particular, John Digman's (1990) literature review provided corroboration for the existence of a five dimensional personality structure. In addition, meta-analyses by Barrick and Mount (1991) and Tett, Jackson, and Rothstein (1991) provided evidence of the Big Five's validity in job performance criterion measures. Additional findings from recent research suggest that the Big

Five can help understand significant outcomes across many life domains such as academic achievement (Bauer & Liang, 2003; Chamorro-Premuzic & Furnham, 2003; de Fruyt & Mervielde, 1996; O'Connor & Paunonen, 2007; Trapmann, Hell, Hirn & Schuler, 2007) and retention (Tross, Harper, Osher & Kneidinger, 2000), as well as physical and mental health (Bogg & Roberts, 2004; Kendler, Kuhn, & Prescott, 2004). Increasingly, researchers are examining neural correlates of the Big Five traits (e.g., Canli, 2004; DeYoung, et al., 2010), and brain-behavior links in the context of the five-factor model (e.g., Moriguchi, 2009; Rothbart & Posner, 2006). To date, measures of the Big Five have been studied in at least 15 languages (Zhou, Saucier, Gao, & Liu, 2009) and researchers have shown the factor structure to be generalizable across many cultures (Benet-Martínez & John, 1998; Caprara, Barbaranelli, Bermudez, Maslach, & Ruch, 2000; McCrae & Allik, 2002; McCrae & Costa, 1997).

In summary, in Costa and McCrae's Big Five model an individual's personality, and the characteristics that define it, can be subsumed within the five-factor structure of Agreeableness, Conscientiousness, Emotional Stability (opposite of Emotional Stability), Extraversion, and Openness (Digman, 1990). The Big Five has been extensively validated across diverse cultures, occupational and educational settings, offering a practical, powerful tool for researchers in many different areas of inquiry.

Narrow Traits and the Bandwidth-Fidelity Debate

The FFM has repeatedly proven to be a useful heuristic for organizing research in the personality domain (De Raad, Hendriks, & Hofstee, 1992). However, there is mounting evidence that narrow traits can account for unique additional variance in validity criteria above and beyond the broad facets of the Big Five. The difference between narrow versus broad traits can

best be illustrated with a discussion of the "bandwidth-fidelity dilemma" (Cronbach, 1990; Cronbach & Gleser, 1965).

"Bandwidth" refers to the breadth of traits and their ability to describe and predict a wide range of behaviors; "fidelity" refers to the accuracy or quality of the prediction. As Hogan and Roberts observed (1996), bandwidth-fidelity is analogous to a microscope and binoculars: "one provides a wide field of vision with little detail, and the other provides a narrow field of vision with great detail" (p. 627). The bandwidth-fidelity dilemma represents the decision a researcher must make when using personality traits to predict behavior, especially when faced with resource constraints; that is, whether to "trade off" the breadth (bandwidth) of the constructs measured in favor of measurement accuracy (fidelity). For example, a researcher might choose to use the 60 item short form Big Five factor inventory (NEO-FFI) over the 240 item Big Five inventory that includes facet measures (NEO-PI-R); the short form will predict criterion using broad traits, while the long form will predict criterion using both broad factor and narrower facets. Consequently, the bandwidth-fidelity "debate" concerns the idea of whether broad traits are better at predicting or explaining behavior than narrow traits.

As was discussed in the previous section, personality structure is considered by some researchers to be hierarchical in nature. Broad or global traits--such as the Big Five factors of "Conscientiousness" or "Extraversion"—are at the top of the hierarchy, and are thought to be comprehensive, theoretical and abstract, describing a wide array of behaviors. In contrast, specific, narrow traits (such as "Achievement Striving," a subfacet of Conscientiousness, or "Talkativeness," a subfacet of Extraversion) are narrower in conceptual scope than broad traits. For example, the dimension of Conscientiousness is a broad trait and can be described by many different adjectives and diverse behaviors. However, the sub-traits of Achievement and Order

(or Dependability) are two distinctly different facets of Conscientiousness, and can predict a more narrow set of behaviors than the global trait itself. Thus, the power of narrow traits lies in their ability to explain unique variance above and beyond that which can be explained by the broad construct. By way of example, Stewart (1999) investigated the global trait of Conscientiousness along with the narrow traits of Achievement and Order in a sample of salespeople in different stages of job tenure. Stewart found that, although Conscientiousness predicted overall job performance in both groups, narrow traits added incremental variance beyond the global trait, and differentially predicted performance among newly hired (transition stage) and veteran (maintenance stage) employees. More specifically, the qualities of being dependable and organized, thought to be useful in learning new skills, predicted positive performance of new employees; while achievement-striving, thought to be related to persistence and commitment, predicted successful performance of veteran employees.

Similarly, some researchers contend that an important aspect of narrow traits lies in the ability of narrow-scope measures to be closely tied to observable, easily recognizable behaviors (e.g., Schneider, Hough, & Dunnette, 1996). By way of illustration, both Warmth and Altruism are facets of Agreeableness. Because they are more specific descriptors, they are more easily linked to specific behaviors which can be thought of as representing attributes of Warmth or Altruism in an individual, such as giving money to charity or exhibiting organizational citizenship behaviors in the workplace. In looking at both narrow and broad traits from a fidelity-bandwidth perspective, a broad trait might be more appropriate when generalizing to a global criterion such as job performance, whereas a narrow trait may be better suited for identifying specific behaviors in a given dimension of job performance, such as written and oral communication ability (Schneider, et al., 1996).

Other scholars contend that narrow traits add predictive power, or incremental validity, above and beyond that which can be accounted for by global factors, such as the Big Five (Ashton, Jackson, Paunonen, Helmes, & Rothstein, 1995; Tett, Steele & Beauregard, 2003; Timmerman, 2006), especially when the narrow-scope measures align with more specific and conceptually related behavioral criteria (Ashton, et al., 1995; Hogan & Roberts, 1996; Stewart, 1999), although not all investigators have agreed with this conclusion (e.g., Chamorro-Premuzic & Furnham, 2003; Ones & Viswesvaran, 1996).

Review of the Literature

Academic Major Change

An examination of the literature reveals that academic major change has been studied by researchers in a multiple of domains and contexts, both in academic literature and in so called institutional "white papers," unpublished dissertations, conference proceedings and administrative reports at the university, state and local levels. Academic major change has been studied quantitatively and qualitatively, as both a predictor and a criterion variable in a number of contexts across a variety of research areas such as economics and sociology, and particularly in psychology and education. As a result, the literature is somewhat diffuse and lacks a cohesive focus and organizing framework. Although a complete review is beyond the scope of this paper, the introduction to this dissertation will attempt to consolidate and integrate the literature from various research domains as they relate to the academic major decision-making and attrition processes in the context of major change, and then will look more specifically at the role of personality in academic major change behavior.

Who, What, When and Why

Much of the existing literature on academic major change can be categorized in terms of major changer characteristics ("Who are they?"); What consequences, if any, does major change precipitate?; When does academic major change most often occur; and What are the reasons for major change ("Why do students change majors?")? I will look at each of these elements in turn.

Many studies have looked at academic major change in a relatively restricted context, investigating rates of change or persistence based on group differences such as gender (e.g., Adamek & Goudy, 1966; Beaudin, 1992; Jagacinski, LeBold, & Salvendy, 1988; Kramer, Higley & Olsen, 1994; Schmader, Johns, & Barquissau, 2004); ability (e.g., Allen & Robbins, 2008; Slaney, 1984) and race (e.g., Chang, Eagan, Lin & Hurtado, 2009; Himelhoch, Nichols, Ball & Black, 1997; Shaw & Barbuti, 2010); or within specific programs (Dodge, Mitchell & Mensch, 2009) and fields of study, especially Science, Technology, Engineering and Mathematics (STEM) disciplines (e.g., Ohland et al., 2008; Ost, 2010; Scott & Sedlacek, 1975; Shaw & Barbuti, 2010). Other studies have examined academic major change in relation to institutional variables such as faculty interactions, curriculum and culture (Akenson & Beecher, 1967; Krupka & Vener, 1978; Thistlethwaite, 1960). Academic major change has also been included amongst multiple variables such as gender, ACT scores and GPA, transfer status and economic standing in descriptive and correlational studies to describe various student populations in an effort to inform retention, graduation, advising and admission policies at specific institutions (Fredda, 2000; Grayson, 1994; Kramer et al., 1994; Krupka & Vener, 1978; Lu, 2005; Micceri, 2001; Pierson, 1962). For example, Kramer and colleagues (1994) investigated the differential effects of precollege, institutional and demographic variables on academic major change in a study of students graduating from Brigham Young University between 1980 and 1988. The

authors found that males change majors more than females (1.85 times versus 1.70 times, respectively); high school GPA correlated only slightly with major change (ranging from r=.111 to r=.186); transfer students tended to change majors less often (.96 versus 1.54 major changes, respectively), as did students who entered college with "undecided" majors. While time to graduation increased over the length of the study, major change remained relatively stable, indicating that changing majors did not necessarily increase the number of semesters attended.

Further exploring the characteristics of those students who change majors, several studies have investigated differences between major changers and non-changers using traditional variables (i.e. GPA, SAT, gender). By way of example, Anderson, Creamer and Cross (1989) conducted a four-year study following students from admission to graduation, comparing decided or undecided students on a number of performance and demographic variables. The authors found that there were no significant differences between groups on gender, race or SAT scores ($p>.05$), although major changers tended to be full time, unemployed, resident students. In a paper by Steel (1994) dedicated to addressing differences between major changers and undecided students, he noted both similarities—a need for self-assessment and career information; and differences—major changers have made a choice, have established academic histories, and aren't necessarily undecided at all, but might be responding to barriers of entry into their chosen field. Steel does make the point, though, that major changers are a larger group than undecided students and should be treated differently from an advising standpoint. On the other hand, some studies have found no differences between major changers and non-changers (Ashby, Watt & Osipow, 1966; Baird, 1969)

With regard to the consequences of academic major change, a number of studies have investigated outcomes such as attrition, time to graduation, completed coursework and

graduation rates. Subsequently, some researchers have looked at major change as cause for concern (Hartman & Fuqua, 1982; 1983), while others see major change as part of a normal developmental process (Akenson & Beecher, 1967; Anderson, et al., 1989; Gordon, 1981; Grites, 1981; Titley & Titley, 1980; Ware & Pogge, 1980). For instance, Anderson et al. (1989) found that one-time and multiple major changers had significantly higher rates of persistence (71%), completed credit hours, and graduation rates (54%) than decided students, suggesting that the condition of major indecision and major change "does not signal problems ahead for these students"(p.50), at least where degree or credit hour completion is concerned. Also, because major status was measured at the beginning of the study, those students who did not have a major declared may have been major changers or non-changers at some point. A later study by Micceri (2001) produced similar results when he followed seven "first time in college" freshman cohorts and found that major changers had higher graduation rates than students who never changed their major, regardless of major field, and did not spend significantly more time in school than non-changers. In contrast, Titley and Titley (1985) studied a group of entering freshman and found that students who switched majors during a one day orientation class had a lower overall graduation rate six years later. Others have reported similar findings (Fredda, 2000; Warren, 1961).

Looking at academic major change in terms of when it occurs, Kramer et al. (1994) found that over the course of a nine year study, the majority of major changes took place in the freshman and sophomore years (81% and 45%, respectively); however, students still changed majors one or more times in both their junior (38%) and senior (25%) years. The authors also noted that freshmen major change increased during the years of the study, from 46% in 1980 to 69% in 1988. Theophilidies and associates (1984) took a unique look at academic major change

when they studied 3088 college underclassmen over a two year time period. Controlling for pre-college characteristics such as abilities and values, they divided participant responses into groups: non-changers, early changers (major change in freshman but not sophomore year), late changers (major change in sophomore year but not freshman year) and constant changers (major change in both freshman and sophomore year). Only 23% of students remained in their chosen major from the time they entered college through their sophomore year; roughly 16% were "early changers," 17% were "late changers" and 45% were "constant changers." Students that did not change their major were higher performers, had higher levels of institutional and goal commitment and had few non-classroom interactions with faculty. Constant changers had lower levels of both goal and institutional commitment. Distinctions could be made between "early changers" and "later changers" as well; students who changed majors in their freshman year indicated their likelihood of changing majors even before they started college, and continued to develop academically and intellectually during their sophomore year compared to "late changers," who struggled. For all groups, freshman year performance and commitment levels, as well as perceptions of intellectual and academic development, were primary predictors of academic major change.

Finally, looking at explanations as to why students change majors, Malgwi, Howe and Burnaby (2005) indicated that academic major change occurs for a variety of reasons, including familial influences, disparate abilities or interests, or job characteristics like earning potential or opportunity. Other reasons for academic major change include subject matter characteristics, peers and teachers (Holland & Nichols, 1964; Ost, 2010), individual (i.e. aptitude, grades) or institutional barriers (i.e. oversubscribed or selective majors) to entry (Elliott, 1984; Gordon, 1998); and personal characteristics such as self-efficacy beliefs (Elias & Loomis, 2000; Lent,

Brown & Larkin, 1984) and vocational immaturity (Crites, 1973; Holland & Holland, 1977). Moreover, Steel (1994) suggests that students who are poorly prepared to enter college, with little understanding of the curricular requirements of their chosen major, or who discover new options or changes in vocational interests during their college experience are more likely to change majors.

The next section will explore academic major change in the context of career indecision and persistence.

Career Indecision and Persistence

Personality and Career Indecision

The construct of career indecision also offers a foundation upon which to further explore academic major change within the framework of individual differences. In the last several decades, personality traits have been related empirically to Career Decidedness both by examining single traits as well as composite measures of personality.

According to Lewallen (1994), anxiety is the trait most commonly associated with career indecision. Numerous studies have explored this relationship and have consistently found significant and positive correlations between anxiety and career indecision (e.g., Campagna & Curtis, 2007; Hartman & Fuqua, 1983; Kelly & Lee, 2002; Leong & Chervinko, 1996; Newman, Gray & Fuqua, 1999). Other traits have been investigated, as well. For example, Chartrand et al. (1994) found self-esteem to be differentially related to various types of career indecision in a sample of university students seeking career information. Leong and Chervinko (1996) examined career indecision in a sample of 217 college students by looking at correlations with three multidimensional, "negative" personality traits: perfectionism, self-Conscientiousness and fear of commitment. Career indecision was predicted by fear of commitment and socially

prescribed perfectionism; self-oriented perfectionism was a negative predictor of career indecision.

One of several studies that used a composite personality measure was Newman et al.'s (1999) investigation of career indecision and personality traits using the California Personality Inventory (CPI; Gough, 1987). Univariate analyses indicated that the undecided students had significantly lower scores than decided ("low indecision") students on the personality traits of Dominance, Capacity for status (ambition), and Sociability; Responsibility, Socialization, Good impression and Communality (conformity to social norms), Well-being and Tolerance; Achievement via conformance (rule abiding), and Intellectual efficiency (tendency to complete tasks); and Psychological mindedness (low curiosity regarding others' behavior). The authors suggested two themes that distinguish decided from undecided students--high indecision group members appear to be lower in Dominance and Leadership potential and also are less able or willing to conform to rules and norms. Factor analysis of the CPI scales showed high indecision students to be lower on the factors of Extraversion, Control (similar to the Big Five dimension of Conscientiousness) and Consensuality (similar to the Big Five dimension of Agreeableness).

Not surprisingly, the Big Five has become a useful taxonomy to study career indecision.

A 2008 study by Page, Bruch and Haase examined Big Five personality in relation to Career Decidedness. Multiple regression analysis showed that the FFM accounted for a significant amount of variance in predicting Career Decidedness and commitment (R_2=.301, p <.0001); both Emotional Stability and Conscientiousness uniquely predicted career commitment. So, in general terms, those students who are least likely to experience anxiety and negative emotions, and more likely to be organized and self-disciplined, will also be more confident about and committed to their career decisions. Further, Chartrand and colleagues (1993) explored Big

Five personality traits as they relate to antecedents of career indecision, problem-solving skills and decision making style. Using path analysis to explore the relationships between variables, the authors found that Emotional Stability was a significant predictor of both emotional and informational career indecision; Emotional Stability also predicted a dependent decision making style and a lack of problem solving skills. Thus, less emotionally stable students would perceive more anxiety and decision making difficulties regarding their career choices. Similarly, in a study of 249 undergraduate psychology students, Lounsbury, Tatum, Chambers, Owens and Gibson (1999), found that students who were more Conscientiousness, more Agreeable and more Emotionally Stable were more likely to be decisive in their career choices. The authors suggest that these three traits function in such a way as to allow students who are less anxious and worried, more self-disciplined and more willing to listen to advice from others to be more successful in the career decision-making process. Feldt and Woelfel (2009) reported similar correlations. Also, in the first part of a three part study, Shafer (2000) sampled 200 undergraduates, reporting low to moderate and significant correlations with certain facets of career indecision and the Big Five traits of Conscientiousness, Emotional Stability and Extraversion. However, the effects of Conscientiousness and Extraversion were mediated by the "progress" factor, a measure of self-efficacy and success. Only Emotional Stability proved to be a direct predictor of career indecision.

Personality and Persistence

The relationship of personality to both college and academic major persistence has received a good deal of attention for many decades. Like many investigative domains, early academic scholars interested in trait research employed a tremendous number of traits to predict or explain retention. For example, as cited in Okun and Finch (1998), compared to persisting

students, dropouts were described as being more anxious (Freedman, 1956; Sexton, 1965); more rebellious (Rose & Elton, 1966); less flexible (Stern, Stein & Bloom, 1956); less achievement-oriented (Heilbrun, 1964); and less decisive (Brown, Abeles & Iscoe, 1954). In addition, Lent et al., (1984) found major persisters to be higher in academic self-efficacy, and Pappas and Loring (1985) found that anxiety could predispose students to dropping out of school.

Subsequent persistence research began to utilize composite measures of personality, such as the MBTI, the 16PF, OPI and most recently, the Big Five. For example, several studies on student persistence have utilized the Myers Briggs Type Indicator (MBTI; 1998; Kahn, Nauta, Gailbreath, Tipps & Chartrand, 2002; Schurr, Ruble, Palomba, Pickerill & Moore, 1997; Van, 1992). The recent study by Kahn et al. (2002), for instance, found that MBTI Extraversion and Sensing preferences predicted persistence better than Introversion and Intuition ($p < .05$). Specifically, being Extraverted resulted in more than a 100% increase in the odds of persisting; thus, college student persisters tended to be more socially oriented, perhaps allowing them to seek out resources that proved helpful in successfully integrating with and acclimating to the demands and requirements of college life. Persisters also reported a preference for a Sensing style, perhaps because a more practical, fact-based approach to gathering information is more functional to success in early college life than a conceptual, abstract learning style. Further, Okun and Finch (1998) analyzed personality traits in a sample of 240 first time, entering freshmen students in relation to university departure using a Big Five short form measure (BFI-V-44; John, Donahue & Kentle, 1991). Conceptualizing a model of departure based on personality and social interaction, the authors reported a significant, direct and negative effect for Conscientiousness on intent to leave ($r=-.160$); and an indirect effect ($r=-.130$) via commitment and ability. Tross et al. (2000) reported that Conscientiousness was a better predictor of retention

than high school GPA, SAT scores or resiliency in their study of 844 college freshmen. On the other hand, Lufi, Parish-Plass and Cohen (2003) found no associations between college persistence and personality traits as measured by the 16PF (Cattel & Ebel, 1964).

Prevailing Issues

Summary

In summary, although career indecision and persistence constructs can shed light upon the relationship between personality traits and academic major change, no studies were found that directly investigate academic major change and Big Five or narrow personality traits. The present study aims to address this gap in the literature.

As outlined in this introduction, academic major change has been studied in both the college persistence and career decision literature, and has been conceptualized in terms of personality trait theory. While there is a large and diverse literature spanning more than 50 years dedicated to career decision-making and persistence, and attention is increasingly being paid to the role of individual differences and academic variables, academic major change continues to represent a specific subgroup of undecided and persisting students which has not generated the attention it merits as a topic of research. In fact, this literature review did not uncover any studies that specifically addressed academic major change and personality traits.

Nevertheless, personality is important to the study of academic major change, both in its own right and as a part of the undecided student literature. As noted by Lewellan (1994), career indecision is a complex, multi-dimensional construct. The study of personality traits can increase our understanding of the dynamics of academic major change and indecision, especially since personality is thought to precede the formation of self-concept, career identity and vocational interests.

Indeed, the choice of personality traits as a framework for the study of academic major change has been advocated by some of the most well-known scholars in the vocational decision literature. (e.g., Chartrand et al., 1993). In this vein, Lounsbury et al. (2005), acknowledged the importance of studying Career Decidedness from the perspective of personality as a way to inform theory, construct validity, and the development of successful interventions and programs aimed at career undecided individuals.

In conclusion, it is clear that both broad and narrow personality traits are being used successfully to predict a variety of outcomes. From an educational perspective, academic major change is an important variable that relates to the success of students, career advisors and university administrators tasked with the recruitment and retention of an able and talented student body. By linking personality traits to the prediction of academic major change I hope to provide a missing element to the extant literature on individual differences and decision-making within an academic context.

The Present Study

Hypotheses

The FFM and narrow traits provide the framework within which to investigate the differential effects of personality characteristics on academic major change. The Big Five was chosen to assess the traits of the current study's sample because it is a widely accepted taxonomy across multiple investigative domains and has become a useful heuristic with which to organize research in the study of personality. Narrow traits were included in the analyses to assess additional variance.

In addition, it is anticipated that the results will reflect differences in the occurrence and frequency of academic major changes due to the effect of year in school. The reasoning here is

that class ranking establishes non-comparable groups with regard to the criterion variable. For example, first year freshman students would have less opportunity to change majors than juniors and seniors— by aggregating the sample across all grades there is a risk of missing an effect if one exists. Moreover, developmental differences would be expected between freshman and sophomores compared to juniors or seniors with regards to traits such as Career Decidedness and Sense of Identity due to normal and expected increases in self-knowledge, self-awareness and vocational maturity. Therefore, each directional hypothesis will contain a separate set of analyses to allow for the influence of college class (year in school).

What follows is a series of directional hypotheses and research questions.

Big Five and Academic Major Change

The most commonly researched Big Five trait found to have significant associations with career decision-making difficulties, career indecision and career indecisiveness is Emotional Stability (e.g., Chartrand et al., 1993; Feldt & Woelfel, 2009; Gati et al., 2011; Germeijs & Verschueren, 2011; Lounsbury et al., 2005; Lounsbury et al., 1999; Shafer, 2000). Anxiety, a component of Emotional Stability, is said to be the disposition most often linked to career indecision (Lewallen, 1994); and Tokar, Fischer and Mezydlo-Subich (1998) contend that Emotional Stability underlies career indecision in their review of the literature on personality traits and vocational behavior. Inasmuch as academic major change behaviors can be related to career indecision, the present study investigates the following hypothesis:

- H1a: Emotional stability will be negatively associated with academic major change.
- H1b: Emotional stability will be negatively and differentially associated with academic major change depending on grade level (year in school).

Another personality trait that has been examined in conjunction with career decision making is Conscientiousness. Several investigators have found associations between Conscientiousness and career indecision or persistence. For instance, Okun and Finch (1998) reported a significant, inverse effect for Conscientiousness on university departure (r=-.293). Tross et al. (2000) reported that Conscientiousness was a better predictor of retention than high school performance scores in a sample of college freshmen. In a study by Lounsbury and colleagues investigating Big Five traits and Career Decidedness (Lounsbury et al., 2005), Conscientiousness was found to be positively and significantly associated with Career Decidedness in three groups of adolescents. Similarly, Page et al. (2008) reported positive associations between Conscientiousness and career commitment. Further, Newman et al. (1999) showed high indecision students to be lower on the factor of Control (similar to the Big Five dimension of Conscientiousness) than low indecision students. Considering that elements of major change behavior can be shared with career decision making and persistence constructs, the following hypothesis is advanced:

- H2a: Conscientiousness will be negatively associated with academic major change.
- H2b: Conscientiousness will be negatively and differentially associated with academic major change depending upon grade level.

Extraversion is another Big Five trait that has been found to be related to career indecision and persistence. Specifically, Kahn et al. (2002) found that being Extraverted resulted in more than a 100% increase in the odds of persisting. Gati and colleagues (2011) reported a relationship between lower levels of Extraversion and career decision-making difficulty. Additionally, factor analysis of the 20 CPI scales showed high indecision students to be lower on

the factor of Extraversion (Newman et al., 1999). Thus, the existing literature provides a foundation on which to assert the following hypothesis:

- H3a: Extraversion will be negatively associated with academic major change.
- H3b: Extraversion will be negatively and differentially associated with academic major change depending on grade level.

Narrow Traits and Academic Major Change

As described above, the present study also utilizes narrow traits to examine the personality-major change relationship. Previous researchers have argued the importance of using non-Big Five traits to explain or predict behavior (e.g., Ashton, 1998; Hough, 1992; Paunonen & Jackson, 2000). Following suit, hypotheses for three narrow traits are described next.

The narrow trait of Career Decidedness, which is defined having a clear sense of career direction, is conceptually related to academic major change. Also, major decidedness, which can be considered the inverse of major change, has been associated with Career Decidedness. A study by Bergeron and Romano (1994) indicated that students who had low levels of major decidedness also had low levels of Career Decidedness, and vice versa. Furthermore, Gordon defines major changers in the context of decidedness as those students who "enter college ostensibly decided about a major, but change their minds during the college years" (2007; p. 86). In her review of the literature addressing undecided student typologies (Gordon, 1998), she considers major changers as a type of undecided student, and includes them among the "Somewhat Decided" group. These students may be comfortable or uncomfortable in their decision status, and reasons may differ as to why they are changing majors (e.g., institutional barriers or a lack of self and career-based knowledge). Accordingly, career indecision and major changing behavior can be seen to be closely related to the Career Decidedness construct.

Although there is no evidence directly supporting a relationship between academic major change or persistence behaviors and Career Decidedness, studies have investigated career indecision and persistence variables. For example, several authors suggest that academic major and career indecision contributes to college attrition (Bergeron and Romano, 1994; Foote, 1980; Groccia and Harrity, 1991; Titley & Titley, 1980), although other studies have found no relationship between persistence and decidedness (Anderson et. al, 1989; Lewallen, 1993).

Because the narrow trait of Career Decidedness is conceptually related to major decision certainty and change, and there is some evidence to support a relationship between decidedness and instability, this dissertation study advances the following hypothesis:

- H4a: Career decidedness will be negatively associated with academic major change.
- H5b: Career decidedness will be negatively and differentially associated with academic major change depending upon grade level.

With regard to the importance of Sense of Identity to change in major, several studies have looked at the role of identity in the academic decision making process. For instance, Wessel, Ryan and Oswald (2008) surveyed 198 undergraduates on measures of both perceived major fit (goals and values of various major titles) and objective major fit (based on the Strong Interest Inventory; SII; Hansen & Campbell, 1985) and intent to change majors. The authors found that measures of perceived fit and objective fit did not relate to one another (either non-significant or low correlations), and suggested that one possible explanation for this finding is that students may lack information about themselves, suggesting a low self-identity, when making major choices. Barak and Rabbi (1982) examined consistency of major choice (determined by the dominant Holland personality type assigned to the subjects' top two major choices) and incidences of major change five years later, and found a significant and positive

correlation between consistency level and major changing (r =.22, p <.05). These results support the inference that when a person's interests are integrated (i.e. they have well developed a sense of identity and vocational maturity) they will experience more stability and success in their vocational choices. Additionally, Holland and Holland (1977) reported that the lack of a clear sense of identity was one of the biggest indicators of differences between career decided and undecided students. Further, a review of the literature by Hartman and Fuqua (1983) reported findings that undecided students experience identity confusion, and similarly, Vondracek, Schulenberg, Skorikov, Gillespie and Wahlheim (1995) reported that students scoring high on identity achievement also scored higher on measures of Career Decidedness.

Accordingly, one would expect a negative relationship between Sense of Identity and academic major change. Therefore, the following hypothesis is advanced:

- H5a: Sense of Identity will be negatively associated with academic major change.
- H5b: Sense of Identity will be negatively and differentially associated with academic major change depending upon grade level.

I turn now to the narrow trait of Optimism, operationalized in the present study as having a hopeful outlook about the future and the ability to persist in the face of setbacks. Optimism's relationship to major change behavior is important to examine because it has functional, adaptive value in the decision making process. For example, an optimistic student might tend to remain positive and motivated even in the face of failure or negative feedback (low course grades; challenging coursework; pressure from family and friends) and choose to persist in, rather than abandon, their chosen path.

Optimism has been positively associated with Career Decidedness (Creed, Patton & Bartrum, 2002; Lucas & Wanberg, 1995), but no studies were found that investigated academic

major change and Optimism. However, high levels of self-efficacy (defined as confidence in one's ability to achieve what they set out to do) are associated with optimist dispositions (Scholz, Dona, Sud, & Schwarzer, 2002). Many studies have explored the relationship between academic self-efficacy and major persistence. For instance, Lent, Brown and Larkin (1986) conducted a study of 105 undergraduates enrolled in a career planning class to explore relationships between major persistence and self-efficacy beliefs and found that 100% of the students who reported either high-levels of self-efficacy or confidence in their abilities stayed with their major choice for all four quarters, compared to 58% and 50%, respectively, of the students reporting low-levels of self-efficacy and low confidence. Lent and his colleagues also ran a study in 1987 with the same student sample, investigating self-efficacy and vocational interests in relation to career indecision and major persistence. Again, academic self-efficacy beliefs significantly predicted persistence above and beyond ability measures. Similar results have been reported (Elias & Loomis, 2000; Shaw and Barbuti. 2010). In addition, career self-efficacy has been found in a number of studies to be negatively related to career indecision (e.g., Betz & Luzzo, 1996; Taylor & Betz, 1983; Taylor & Popma, 1990) and positively related to retention (Robbins et al., 2004).

Consequently, a sixth hypothesis is advanced:

- H6a: Optimism will be negatively related to academic major change.
- H6b: Optimism will be negatively and differentially related to academic major change depending upon grade level.

Research Questions

The next part of the study aims to evaluate a series of non-directional research questions. The first research question (RQ1) looks at other broad and narrow traits conceptualized as being important components of major change behavior. However, current literature does not provide

adequate direction with regards to the traits of Agreeableness, Openness, Self-Directed Learning and Work Drive, so I will consider these traits together in the first research question:

- RQ1: How do other Big Five (Agreeableness, Openness) and narrow traits (Self-Directed Learning and Work Drive) relate to academic major change in an aggregated sample of undergraduates as well as those differentiated by class standing?

The next research question (RQ2) addresses whether the narrow traits, as a set, contributed significantly to the prediction of academic major change above and beyond the Big Five traits. Answering this question sheds further light on the issue addressed in other contexts of whether the Big Five traits are sufficient predictors of behavior, or whether narrow traits are also useful in accounting for variance in a criterion of interest such as major change behavior (see, e.g., Paunonen and Nicol 2001). Thus, the second research question is:

- RQ2: Do narrow traits add predictive variance above and beyond Big Five traits?

The third research question (RQ3) examines the effect of broad and narrow personality traits in those students who experience multiple major changes. Although the criterion of interest in the current study is academic major change, regardless of the number of times the change has been made, personality differences could be expected to emerge among multiple changers. For example, multiple major changes might indicate a more chronic type of career indecisiveness which some researchers believe is distinct from more developmentally–oriented decision-making (e.g., Feldt et al., 2009; Gati et al., 2011; Germeijs & Verschueren, 2011). Examining trait relationships with academic major change frequency could help illuminate such relationships. Thus, the next research question is:

- RQ3: What is the relationship between Big Five and narrow personality traits and multiple major changes?

CHAPTER II

METHODOLOGY

Data for this study were acquired using two similar but distinctly different questionnaires that were developed for two separate studies conducted on campus via online formats between November, 2011 and October, 2012. The samples include responses from two populations: students living in campus residence halls and undergraduate students enrolled in psychology classes requiring research participation credits using the Human Participation in Research (HPR) subject pool. Although differing in scope, focus and areas of interest, both studies shared the same personality inventories and academic major change variables.

Research Design

Sample I: Student housing residents

Procedures

Upon receiving approval from the university's Internal Review Board (IRB), a residence hall employee and fellow researcher contracted Student Voice--a survey administration company--to administer online surveys. Letters were emailed to resident hall occupants across campus. The letters included a brief introduction to the study, voluntary consent information and a link to the survey. Data were then downloaded from Student Voice password-accessed servers into the SPSS program.

Participants

Student Housing Residents: Of the total sample of 437 participants (approximately 6,000 emails were sent via a residence hall listserve managed by student housing in the fall of 2011 and the spring of 2012, 754 students responded and 444 completed the survey. Four surveys were eliminated because the respondent was younger than 18 years of age, and three surveys were

discarded because they were completed by graduate students who do not typically change majors); 27% were male; 73% were female. Relative frequencies by age group were: 18-20—85%; 21-25—14%; 26-30—less than 1%; Over 30—less than 1%; Race/ethnic data were as follows: Caucasian/White, 84%; African-American/Black, 7%; Multi-racial, 4%; Asian, 2%; Hispanic/Latino, 2%; Native American, Arabic, and Indian(n), each less than 1%. Of the sample, 48% were Freshmen; 27% Sophomores; 14% Juniors; and 11% Seniors.

Sample II: HPR participants

Procedure

After receiving IRB approval, an application was submitted to HPR administrators. Once the study was admitted into the HPR system, an introductory letter, consent form and survey link was uploaded into the HPR website. Specifically, the study recruited undergraduate students enrolled in Psychology 110 classes, excluding respondents under the age of 18. As part of their class requirements, students could log on to the HPR website and choose a study in which to participate. Each student earned three points of class credit for completing the survey.

Participants

HPR system recruits: Data were collected from July through October, 2012. A total of 473 students signed up to take the survey via the HPR website; 426 students successfully completed the survey. Three surveys were eliminated because the respondents were under the age of 18; one survey was discarded because the respondent was enrolled as a non-degree seeking student for a final sample of 422 participants. 34% respondents were male; 66% were female. Relative frequencies by age group were: 18-22—97%; 23-29—1.4%; 30-39—1.4%; Over 40—, less than 1%. Caucasian/White, 84%; African-American/Black, 5%; Multi-racial,

3%; Asian, 3%; Hispanic/Latino, 2%; India(n), 1%; Native American, 1%; Arabic, less than 1%. Of the sample, 78% were Freshmen; 10% Sophomores; 7% Juniors; and 4% Seniors.

Samples I and II

As mentioned above, both samples, although different in their overall scope and emphasis, contained identical measures for the variables of interest in the present investigation. The details of these measures are discussed next.

Measures

Personality traits

The personality measure used in this data source was the Personal Style Inventory (PSI), a normal, personality inventory developed by Resource Associates, Inc. and contextualized for both academic and work-based populations. It has been used in a variety of settings internationally, for career development and pre-employment screening purposes. Responses for each item were made on a five-point Likert-type scale with choices ranging from "Strongly Agree" to "Strongly Disagree." The inventory includes scales for the Big Five traits and the five narrow traits of Career Decidedness, Optimism, self-identity, self-directed learning, and Work Drive. All measures have been shown to display sound reliability and extensive construct validity (e.g., Lounsbury, Gibson, Steel, Sundstrom, & Loveland, 2004). Reliability and validity information on the PSI is provided by Lounsbury and Gibson (2006).

A brief description of each of the personality constructs included in the present study is given below, along with the number of items in each scale and Cronbach's coefficient alpha for each scale.

Big Five

• Agreeableness— Disposition to be pleasant, amiable, equable, and cooperative; inclined to work harmoniously with others; will avoid disagreements, arguments, and conflict in interactions with other people. Coefficient alpha = .77.

• Conscientiousness— Being reliable, dependable, trustworthy, and rule-following; strives to honor commitments and do what one says one will do in a manner others can count on. Coefficient alpha = .84.

• Emotional Stability—This trait is the inverse of what others term Neuroticism; it reflects overall level of adjustment and resilience; indicative of ability to function effectively under conditions of pressure and stress. Coefficient alpha = .86.

• Extraversion— Tendency to be sociable, outgoing, expressive, talkative, gregarious, warmhearted, congenial, and affiliative; attentive to and energized by other people and interpersonal cues in social situations. Coefficient alpha = .83.

• Openness—receptivity and openness to change, innovation, novel experience, and new learning. Coefficient alpha = .80.

Narrow Traits

• Career Decidedness— Having a clear sense of career direction and knowing what kind of occupational field or type of job one wants to work in. Coefficient alpha = .93.

• Optimism—having an upbeat, hopeful outlook, concerning situations, people, prospects, and the future, even in the face of difficulty and adversity; a tendency to minimize problems and persist in the face of setbacks. Coefficient alpha = .85.

• Self-Directed Learning— Inclination to learn new materials and find answers to questions on one's own rather than in response to curriculum requirements or requests by one's

instructor; taking personal responsibility for one's continued learning, academic progress and career development; showing active concern for and engaging in activities to continuously improve one's knowledge, skills, and abilities. Coefficient alpha = .85.

• 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; and having a sense of purpose. Coefficient alpha = .86.

• Work Drive— Disposition to study hard and for long hours, investment of one's time and energy into school and career, and being motivated to extend oneself, if necessary, to finish projects, meet deadlines, and achieve success. Coefficient alpha = .81

Variables

Academic Major Change

Incidents of academic major change were assessed in the following manner: participants were asked to state their current major, with response options "Yes" (coded "1") or "No" (coded "0").

Respondents were also asked how many times they changed their major, with five choices: 0, 1, 2, 3, 4 or more.

Class Standing

Class standing was assessed by asking participants to state whether they were freshmen, sophomores, juniors or seniors. There was also a choice for "graduate student" and "undeclared student" which were not included in the analysis.

CHAPTER III

RESULTS

Data Analyses

The present study focused on the relationship between change in academic major and personality traits. Before conducting analyses for the directional hypotheses and research questions, the data from both samples were analyzed for normalness, skewness, and equality of variance. Descriptive statistics are provided in Table 1 and 2. Both Sample I (student housing residents) and Sample II (HPR participants) denoted normal distributions of continuous variables. However, the dichotomous and rank-ordered variables indicated violations of the assumptions of normality. Both skewness and kurtosis values were well above 1.0/-1.0 indicating data that was not normally distributed. Non-normal distributions were expected in both samples given the relatively large number of freshmen students and small instances of major change overall; in addition, academic major change is a dichotomous variable and is not normally distributed. Thusly, non-parametric test statistics were used in all analyses (e.g., point biserial correlations, Spearman's rho and logistic regression). Table 3 and 4 show mean comparisons for all personality traits examined in the study for both samples. Reliability analyses for the ten personality scales are included as well (see Tables 5 and 6).

The following sections summarize the results of six two-part directional hypotheses and three research questions, reported separately for each sample. All data were analyzed using SPSS version 20.0.

Directional Hypotheses

Hypotheses 1a-6a looked at the relationship between change of major and personality traits. Point-biserial correlations (r_{pb}) were conducted because they are the appropriate coefficient

for the dichotomous criterion variable of academic major change ("Have you ever changed your major? "Yes" or "No"). Statistical significance was assessed using one-tail tests at the p <.05 and p <.01 levels. The first three hypotheses (1a-3a) addressed the Big Five traits of Emotional Stability, Conscientiousness and Extraversion. Hypotheses 4a-6a examined the narrow traits of Career Decidedness, Optimism and Sense of Identity.

Sample I: Student housing residents

As shown in Table 7 in the column labeled "All Groups", only hypotheses 4a Career Decidedness, r=.178) and 5a (Optimism, r=.113) reached significance at the p <.01 level. However, although both Career Decidedness and Optimism were significantly related to change of academic major change, they relationship was in a positive direction, contrary to predictions. The other four traits were non-significant.

Sample II: HPR participants

According to Table 8, none of the directional hypotheses were supported; findings were non-significant at the p <.05 level.

For Hypotheses 1b-6b, the same personality traits (Emotional Stability, Conscientiousness and Extraversion; Career Decidedness, Optimism and Sense of Identity) were examined in the context of academic major change according to class standing. Thusly, analyses were conducted for each of four academic levels: freshmen, sophomores, juniors and seniors. Tables 9-12 contain the frequency distributions for the breakdown of class membership as it relates to major change for both samples. Figures 2 and 3 provide a graphical representation of the data, as well. It is apparent that the data is skewed towards freshmen students in both samples (freshmen students =48 % of all students in Sample I and 78% in Sample II), with higher ratios

of academic major change in other class levels. As a result, some sample sizes are small (N equal or less than 30), and the following findings should be interpreted with caution.

Additionally, correlations between class standing and change of major were significant for Sample I (r= -.122; p <.010) and for Sample II (r= -.368; p <.010). These results suggest an influence of class standing on incidence of academic major change, so that differences should be expected when parsing data based on class standing (see Tables 13 and 14).

Sample I: Student housing residents

Table 7 shows that for freshmen students (n =210; representing 48% of the total sample; 19% of freshmen had changed majors; accounted for 35% of major changers) there were no significant findings regarding the relationship of personality traits and academic major change. In the case of sophomores (n =120; representing 27% of the total sample; 34% of sophomores had changed their major; they accounted for 35% of major changers), Extraversion was significant at the p <.05 level (r=.172). In addition, Career Decidedness was significantly and positively related to academic major change (r= .198; p <.05), as was Optimism (r=-.153; p <.05). All correlations were in opposite directions than predicted, and no other traits for this subsample reached significance. For those students reporting junior class standing (n =60; representing 14% of the total sample; 37% of juniors had changed their majors, accounting for 19% of major changers in the sample), Career Decidedness and Optimism were significantly and positively related to academic major change (r= .233; p <.05; r= .290; p <.05, respectively). Of the seniors in the sample (n =47; representing 11% of the total sample; 30% of seniors had changed their majors, accounting for 12% of the major changers in the residence hall sample), Career Decidedness was significant but positive, contrary to prediction (r= .321, p <.05). In

addition, Sense of Identity was also positively related to academic major change (.274; p <.01), again in a direction contrary to hypotheses. All other traits were non-significant.

Sample II: HPR participants

For the HPR sample, breakdown of results by class can be found in Table 8. There were no significant findings to report for the freshmen-only data (n =331, representing 78% of the total sample; 5% of the freshmen had changed their majors, accounting for 33% of the major changers in the sample) or Juniors-only data (n =31, representing 7% of the total sample; 39% of juniors had changed their majors accounting for 23% of the total number of students who changed majors). For those students reporting sophomore class standings (n =44, representing 10% of the total sample; 36% of sophomores had changed their majors, accounting for 31% of the total major changers in the sample), Sense of Identity was negatively and significantly associated with academic major change at the p <.05 level (r= -.273), as predicted. Both Emotional Stability and Optimism approached significance at the p <.10 level (r=.221, p =075; r=.207, p =.089), respectively. Moving on to the seniors (n =16, which represented only 4% of the total sample of HPR participants; 38% of seniors reported changing their majors, accounting for 12% of the total major changers in the sample), the trait of Extraversion reached significance at the p <.05 level (r= -.430), correlating negatively with academic major change, as predicted.

Research Questions

The first research question (RQ1) examined the relationship between incidence of academic major change and the Big Five and narrow personality traits that were not included in the directional hypotheses: Agreeableness, Openness, Self-Directed Learning and Work Drive (see Tables 7 and 8). Correlations were computed using two-tailed test at the p <.01 and p <.05 significance levels.

Sample I: Student housing residents

Neither the aggregated group data nor the freshmen data yielded any additional significant correlations between academic major change and the remaining four personality traits. However, Openness was positively and significantly related to academic major change for the sophomore group (r= .224; p <.01) and was significant for the juniors (r= -.246; p <.05), although correlating in opposite directions (positively for the sophomores and negatively for the juniors). In addition, Work Drive was significant and negatively correlated at the p <.05 level (r= -.227).

Sample II: HPR participants

For the aggregated sample, as well as the four groups separated out according to class membership, only Work Drive was significantly at the p<.05 level. Work Drive was negatively and weakly related to academic major change in the combined sample (r= -.095; p<.05), and negatively associated with academic major change for the sophomore students (r= -.316).

For RQ2, logistic regression procedures were used to test the significant contribution of narrow spectrum traits over and above the traditional Big Five. Because the criterion variable (change of academic major) was a dichotomous variable, and therefore violated the assumption of linearity required in multiple linear regression, binomial logistic regression was employed to assess the relationship between traits and change in academic major. Thus, logistic regression was used to estimate the probability of a student being a major changer or not being a major changer based on their level of each independent variable (personality traits).

Responses that indicated "Yes" to major change were coded 1 and "No" responses were coded zero. The regression analysis was done in two blocks, analogous to a two-step hierarchical multiple regression. In the first step the Big Five traits were entered into the

regression model, and the second step, the narrow traits were entered. Tables 15-16 show results for both samples, discussed below.

Sample I: Student housing residents

When entering all Big Five traits (the first step in the analysis), the results were non-significant. That is, none of the Big Five traits were shown to increase the likelihood of predicting academic major change (X_2=2.44; df=5) over the null model. Upon adding the five narrow traits to the model (Step 2), the second analysis was significant (X_2=25.266; df=10, p <.001), and more accurately fit the data (final value of the -2 Log likelihood value was 484.522 versus 507.346). Specifically, the traits of Optimism and Career Decidedness significantly predicted membership into the major change group, after controlling for the Big Five traits (Exp(B)=1.676; p <.05; Exp(B)=2.936; p <.001, respectively). These results indicate that when levels of either Optimism or Career Decidedness increase, the odds of changing majors also increase. For instance, for every one unit increase in a student's Optimism levels, the likelihood of changing majors increases by 1.68 times; for Career Decidedness, every unit increase in the trait level increases the odds of a student changing majors by nearly 3 times. No other traits were significant.

Sample II: HPR participants

The regression model in this sample was non-significant (second step: X_2= 8.288; df=10, p > *.05*). Neither the Big Five nor the five narrow traits were significant predictors of academic major change in the HPR dataset. Results such as these indicate that knowing a student's level of the personality traits in the current study do no better than chance at predicting incidence of academic major change.

Turning to the final research question (RQ3), Tables 17 and 18 show the descriptive statistic for comparisons of mean scores according to number of academic major changes. It is apparent that levels of each trait go up or down depending on the number of times a student has changed their major. In addition, Tables 19 and 20 show the number of academic major changes by class standing for both samples. Figures 4 and 5 provide a graphical representation of the data, as well. It is helpful to note the sample sizes for each group, as some of them were quite small (less than N =30).

Correlations between class standing and number of academic major changes were significant for Sample I (r= .144; p <.05) and for Sample II (r= .344; p < .01; see Tables 13 and 14). Such results suggest an influence of class standing on number of major changes, so that differences should be expected when analyzing the data based on class standing.

Spearman's rank-order correlation (Rho) coefficients were used to examine the relationship between multiple major change, an ordinal level variable, and the Big Five traits of Agreeableness, Conscientiousness, Emotional Stability, Extraversion and Openness, as well as the narrow traits of Career Decidedness, Optimism, Self-Directed Learning (SDL), Sense of Identity, and Work Drive. Statistical significance was using two tailed tests, evaluated at the p < .05 and p < .01 levels. Tables 21 and 22 contain the results, summarized below.

Sample I: Student housing residents

Looking at the "all groups" data as well as those grouped by class standing, the personality traits which significantly correlated with number of academic major changes were Agreeableness, Conscientiousness, Emotional Stability, and Extraversion. Emotional Stability was positively and significantly related to number of academic major changes in the aggregated sample (r=.230; p <.05). Conscientiousness and Extraversion were also positively and

significantly associated with one or more changes in the freshmen group (r=.333; p <.05 and r=.308; p <.05, respectively). Agreeableness was positively and significantly correlated with academic major change frequency in the seniors-only group (r=.597; p <.05). Career Decidedness and Work Drive neared significance at the p <.05 level in the group of juniors (r= -.398; p =.067 and r= -.420; p =.051, respectively).

Sample II: HPR participants

No traits in this sample reached significance within the p <.05 limit set by the current analysis. However, Openness to Experience neared significance at the p<.05 level for both the combined group analysis (r=.266; p=.56) as well as the juniors-only group (r=.682; p=.05).

A final analysis was performed to examine the relationship between the ten personality traits and students who had changed their major two or more times (see Table 23). Only the Residence Hall sample was used because the HPR sample did not have enough cases of multiple major changers for an analysis to be conducted. Also, the analysis was not done for each class grouping because there were not enough respondents who changed their major two or more times.

For this group (n =33), Self-Directed Learning was significantly and positively related to the group of students who had changed their major two or more times (r= .433; p <.05), as was Work Drive (r= .363; p <.05).

The next section will discuss the results of the study.

CHAPTER IV

DISCUSSION

The present investigation examined the relationship between personality traits and the occurrence of academic major change among college undergraduates. Several significant findings emerged; some supported the hypotheses, as predicted, and some findings were unexpected. Results are discussed below.

Directional Hypotheses

Six directional hypotheses were assessed using two-part hypothesis statements. To reiterate, the first part (a) examined the relationship between personality and academic major change in a sample of students living in campus housing and in a sample of HPR participants; the second part (b) looked at the same samples according to class standing. Results are organized by personality trait, and each of the six postulates is addressed in turn.

Hypothesis #1: Emotional Stability

This Big Five trait did not reach significance for academic major change in aggregate samples of student housing residents or HPR participants. Indeed, the general lack of significant correlations is somewhat surprising. For example, anxiety (a component of Emotional Stability) is the trait most commonly associated with career indecision (Lewallen, 1994), and many studies have found significant and negative correlations between these two variables (e.g., Campagna & Curtis, 2007; Hartman & Fuqua, 1983; Kelly & Lee, 2002; Newman, Gray & Fuqua, 1999). Others have found Emotional Stability (or Neuroticism, the inverse of Emotional Stability), predictive of career commitment and indecision (e.g., Page et al., 2008; Shafer, 2000; Uthayakumar et al., 2010).

In the present study, perhaps the lack of significant findings supports the notion that major changing behaviors are part of a normal developmental process. As mentioned previously in this paper, career indecision can be conceptualized as both a harmful state of uncertainty and cause for concern (Hartman & Fuqua, 1983), or as a natural part of the development and decision-making process (Gordon 1984; 1998; Grites, 1981; Lewallen, 1994). Gordon (1984) further distinguishes between two types of undecided students by noting that they are either "positive, flexible and curious" or "anxious, apologetic and negative" regarding their undecided status. Thus, the major changers in the present study may be "cognitively undecided," a status that can resolved by gathering information about one's self and career options; rather than "affectively undecided," a condition which involves anxiety and chronic indecisiveness, constructs theoretically and empirically related to Emotional Stability (see Chartrand et al., 1993; Gati, et al., 2011; Gati, Krausz, & Osipow, 1996).

To reiterate, the overall findings in the current investigation could reflect evidence of "cognitive" major change rather than "affective" major change, in that most major changers are simply navigating the college experience and making decisions based on trial and error--free from excessive anxiety, worry or negative emotions.

Hypothesis #2: Conscientiousness

Despite predictions to the contrary, no significant relationships were found between Conscientiousness and academic major change. While it would be reasonable to predict that Conscientiousness could be related to change in major in that high scorers on this trait might experience higher course grades and greater overall academic success (e.g., de Vries, de Vries and Born, 2011), thereby being less likely to change majors due to poor performance, the evidence does not support this assertion. In fact, Conscientiousness was the only trait of the six

personality traits in the directional hypotheses that didn't reach significance, even at the $p < .10$ level. Moreover, the results do not correspond with published findings from previous literature (Feldt and Woelfel, 2009; Lounsbury, et al., 1999; 2005; Page et al., 2008).

In attempting to explain these unexpected findings, one could postulate that, like career indecision, academic major change is a complex and multi-dimensional process (i.e. Lewallen, 1994) which Conscientiousness cannot explain. As noted previously, academic major change occurs for many reasons, such as incongruent interests, family pressures, or job characteristics like earning potential (Malgwi, et al., 2005); individual ability or institutional barriers to entry (Elliott, 1984; Gordon, 1998); and personal characteristics (Elias & Loomis, 2000; Lent, Brown & Larkin, 1984). So, while students are liable to change major for many reasons, a conscientious disposition will not likely influence their decisions to do so.

Hypothesis #3: Extraversion

Extraversion, the only Big Five trait in the directional hypothesis for which there were significant correlations with academic major change in this study, was associated with academic major change in both the sophomore group of student housing occupants (r= .172), and in the HPR sample of seniors (r= -.430; $p < .05$). The negative correlation provides support for the directional hypothesis, in that high levels of Extraversion have been shown to be related to major persistence (Kahn et al., 2002), a construct conceptually (and inversely) related to academic major change. Also, other research has reported links between low levels of Extraversion and academic constructs related to academic major change, such as lack of persistence and career indecision (Kahn, et al., 2002; Newman, et al., 1999; Uhl, Pratt, Reichard & Goldman, 1981). In addition, Hamer and Bruch (1997), found that shyness (the inverse of Extraversion and Emotional Stability) was related to delayed career maturity, which could provide a partial

explanation for the results established here, given that the finding involved senior-level students. For instance, low Extraversion could delay career development, of which major change is a symptom. However, the sophomore group showed positive correlations between Extraversion and academic major change, such that higher levels of Extraversion would indicate a greater likelihood of major changing behavior. This result could be due to the facets of Extraversion that promote sociability, interpersonal communications and other-directed behaviors. It could be that these students are experiencing distractions from their studies that negatively affect their coursework, forcing a major change. Alternatively, the fact that positive and significant findings occurred only within the sophomore group could suggest, from a developmental perspective, that these second year students are busier exploring their career options than either incoming freshmen or more established upperclassmen, and are necessarily more involved with activities that involve information seeking and self-exploration. Extraversion has been directly and indirectly associated with career exploration behaviors in previous studies (Reed, Bruch & Haase, 2004; Rogers, Creed & Glendon, 2008), thusly, positive Extraversion might be a functional trait for this group of evolving students.

Hypothesis #4: Career Decidedness

Career Decidedness (CD) was the trait most often and significantly associated with academic major change in the present study, which intuitively makes sense given its theoretical relationship with major change as a decision-oriented construct. However, all of the significant relationships in this study were positive for the aggregated data as well as for each group classified by class standing, indicating that the more decided a student is about their career direction, the more likely they will be to change their major. Furthermore, the correlations became stronger as class standing increased (e.g., the relationship between CD and academic

major change increased threefold between freshmen and senior groups, although smaller sample sizes could play a factor here). These findings run contrary to the directional hypothesis, and are somewhat inconsistent with conclusions found in existing literature on Career Decidedness and other related decision-oriented academic variables (e.g., Crites, 1973; Holland & Holland, 1977; Lounsbury, Saudargas & Gibson, 2004). Moreover, Gordon (1998) terms *major changers* as a special type of undecided student, with doubts and uncertainty about their major choice decision. However, as indicated, the current findings are all positive in relation to academic major change.

One explanation for these results can be found when looking at the current study's methodology. Inasmuch as the reported findings are from data collected across class standing for one moment in time versus during the entire length of one's academic career, it is possible that for these students, their decision to change majors has moved them successfully out of Career Undecided status and into Career Decided status. As Steel (1994) noted, major changers are not necessarily undecided; they have actually made a decision regarding their majors, but for some reason, their decision status has changed. Thus, whether their decision status is permanent or temporary (and again, there is no way of knowing without more data), it is possible that their major change has resulted in a decisive, knowledgeable and satisfied choice. In this way, academic major change could signify a type of decided student.

Hypothesis #5: Optimism

Along with Career Decidedness, Optimism was the other trait most often related to change of academic major in this study, showing that higher levels of Optimism were associated with academic major change. Although once again contrary to the hypothesized correlational relationship, the result makes sense when viewing Optimism as a disposition that infers a positive and hopeful outlook toward the future. For example, a positive attitude can supply the

motivation one needs to successfully work through the challenging decision-process that academic major change can require. The potential for additional coursework and extra tuition, the possibility of disappointing family members, or switching to a major that might not be what one hoped or expected, could keep less optimistic students from venturing outside of their current major, regardless of how unsatisfied they might be. This premise, although feasible, is not consistent with other literature which has examined Optimism and found positive associations with academic constructs such as career decidedness (Creed et al., 2002), and university retention, academic motivation and success (Lounsbury et al., 2004; Ruthig, Perry, Hall & Hladkyj, 2006; Solberg, Evans & Segerstrom, 2009). Also, high levels of self-efficacy have been linked with optimist dispositions (Scholz et al., 2002), and many studies have reported on the relationship between academic self-efficacy and major persistence (Lent, Brown & Larkin, 1984;1986; Shaw & Barbuti, 2010). Therefore, the relationship between Optimism and academic major change in the present study might be similar to the one hypothesized above in the discussion of Career Decidedness. Perhaps these students have made a decision regarding their career and subsequently changed majors; in doing so, they now experience optimistic outlooks about their education and future career plans. Only additional studies can parse out these discrepant explanations.

Hypothesis #6: Sense of Identity

From a developmental perspective, one might expect that Sense of Identity would be differentially related to personality and academic major change across class standings, which was the result found in current study. Although the trait was insignificant in the aggregate sample, it was positively and significantly related to major change among seniors, and negatively

and significantly related to major change among sophomores. One way to interpret these findings can be found in the developmental literature.

According to Fouad (1994), most vocational theorists, scientists and practitioners subscribe to some variation of the developmental perspective. For example, Chickering and Reisser (1993), who formulated a theory of college student development, viewed identity stabilization as a primary goal of adolescence. The "end goal," realizing a mature identity, required that a person move through various stages, or "vectors" of this process, such as developing competence, managing emotions, moving through autonomy toward independence, and establishing an identity. Because college is populated with undergraduates who are at the age in which the process of identity formation is thought to occur (18-22; e.g., Marcia, 1980), one would expect that a study such as the current one (student participants primarily between the ages of 18-22, across different class ranks), would include evidence that students are moving through Chickering's stages and that identity development is taking place.

Further, Super (1953) claimed that career choice is an expression of the individual's self-concept in vocational terms. Because a strong sense of identity is conceptually linked to self-awareness and sense of purpose, one could propose that those students with higher scores on a measure of identity would also be more decided on a career and more committed to a specific major. Extending this idea, the higher one's class standing the higher their identity scores and the lower the occurrence of academic major change, and vice versa. The data on the sophomore sample support this assertion—the major changers reported a lower Sense of Identity than non-changers. This low Sense of Identity coupled with academic major change could indicate some degree of difficulty deciding on a major, in part because they are struggling to find an inner purpose and sense of self. Thusly, major changing behavior can be indicative of movement

through normal developmental stages, as previous researchers suggest (e.g., Barak and Rabbi, 1982; Titley, Titley & Wolff, 1976; Warren, 1961; Wessel, Ryan and Oswald, 2008). However, the directional hypothesis proposed that higher Sense of Identity scores would correspond to lower incidence of academic major change.

On the other hand, the group of seniors in the HPR sample produced the opposite relationship to the one discussed above, in that Sense of Identity was positively related to academic major change. Again, one could project that those students high in Sense of Identity have successfully managed their college career, of which major change was a part. Recalling the evidence that most students will change majors at least once before they graduate (e.g., Foote 1980; Gordon, 1984; Kramer et al.,1994), and only 30% of graduating seniors can be expected to stay in the same major upon graduation that they chose as freshmen (Willingham, 1985), a group of seniors could be expected to be major changers. The fact that they are in their last year of college, and at the age where they should have reached the "end goal" of a mature identity, they could also be expected to have higher levels of Sense of Identity.

Research Questions

The next section addresses the three sets of research questions set forth in this study.

RQ1: What is the relationship of the other five traits to academic major change?

This research question addressed the other Big Five (Agreeableness, Openness) and narrow traits (Work Drive and Self-Directed Learning) and their relationship to academic major change.

Starting first with Agreeableness, although the trait was not directionally hypothesized as being related to academic major change in the current investigation, it has been associated with constructs related to career decision. For instance, Lounsbury and colleagues (1999), found that

students who were (among other things) more agreeable were more likely to be decisive in their career choices. Decisiveness in this case could be interpreted as major commitment, or a lack of major changing behavior. Lounsbury et al. (ibid) suggested the Agreeableness functions in such a way as to allow students who are more willing to listen to advice from others will be more successful in the career decision-making process. Others have reported similar findings using measures of Agreeableness in contexts analogous to major changing behavior (see Feldt & Woelfel, 2009; Gray, Newman & Fuqua, 1999; Wille & DeFruyt, 2003).

Although Agreeableness was not significantly related to major change in the present investigation, the HPR sample showed that senior students with low scores on Agreeableness were more likely to change majors (r= -.404; p=.060), and that overall, major changers had lower mean scores of Agreeableness than non-changers in the student housing sample, as well. So while both of these groups show support for the existing literature, none of the mean differences were appreciably different than zero, leading to the conclusion that agreeable dispositions do not have much influence in decisions to change academic major.

Moving on to a trait that assumes qualities of curiosity, imagination and open-mindedness, Openness was found to be significantly related to academic major change in the student housing sample among groups of both sophomores and juniors. However, for the sophomore group, Openness correlated positively with academic major change, and for the juniors, the association was negative. One could propose that Openness acts as a catalyst for students with broad interests, who are curious about many majors and career choices; the direction of the correlation could indicate high or low levels of career exploration. Tellingly, when looking at Openness through this particular hypothetical lens, research findings also appear to be mixed. For example, Steel (1994) suggests that students who discover new options or

changes in vocational interests during their college experience are more likely to change majors. Others (Chartrand et al., 1993; Page et al., 2008) reported similar results when examining confidence in career decision making. Reed and colleagues (2008) however, found negative associations between career exploration and Openness, but positive associations with self-exploration, suggesting that those individuals who are high in Openness enjoy abstract and creative exploration (self-examination) more than the practical and mundane investigations that career-oriented research requires.

Interpreting the results of the present study in the context of Openness to Experience and academic major change, sophomores, who in general are more likely to be engaged in career exploration and major-changing behaviors than juniors, might find that the second year of school is providing a plethora of opportunities for them to learn about their vocational interests through varied coursework and college experiences, especially for those with high levels of Openness. Thusly, the discovery of novel ideas is changing their pre-conceived notions about careers and their specific field of study. Such exploration could serve to usher in alternative career paths through subsequent major change. Juniors, on the other hand, have been in school longer and are more likely to have settled on a major. Indeed, they might already have gone through the major change process and at this point are simply keeping their heads down and working on their chosen career path—their trait levels of Openness are incidental. Alternatively, due to low levels of Openness, they might not have fully explored their options early in their college career, only to find themselves in ill-fitting academic programs as upperclassmen; this lack of fit could prompt academic major change. Further research would need to be done in order to parse out reasons for differences in the occurrence of academic major change and trait levels of Openness across class standings.

Moving on to Work Drive, although not included in the directional hypotheses, certainly a logical case can be made for the importance of Work Drive in the major change decision-making process. For instance, one could argue that a student who works hard and is motivated to perform well in college would be more likely to successfully complete even the most challenging coursework required of their major. Therefore, students with high levels of Work Drive might be less likely to change out of their current major and instead, opt to persist. Previous research supports the assertion in other academic contexts and outcomes, such as intention to withdraw (i.e. Lounsbury et al., 2004). However, the present study found significant and negative correlation between Work Drive and change of academic major among both the aggregate group and among sophomores in the HPR sample, and in the group of juniors in the resident hall sample. These results imply that those students who were less likely to study hard, and less willing to make a serious effort inside and outside of the classroom, were more likely to change majors than their counterparts who scored higher on the trait of Work Drive. Because the correspondence between academic major change and Word Drive was relatively consistent across class rankings, one might expect that positive Work Drive has a strong influence on a student's commitment to their major of study. However, effect sizes are relatively small; thus it is more likely that major changing behavior is a complex process of which Work Drive is just a part.

Finally, regarding the trait of Self-Directed Learning (SDL); this narrow-scope trait, like several others in the study, infers a degree of persistent character. Defined as "an inclination to learn new material and find answers to questions on one's own…(and) taking personal responsibility for one's continued learning, academic progress and career development", high SDL individuals will take their learning into their own hands. In a practical sense, SDL would

seem to be a common characteristic for students who are investigating career options, exploring possibilities and trying to find the best career "fit". In this sense, one might expect a positive correlation between SDL and incidence of academic major change, but that was not the case in the present study for this particular research question. Although no significant associations were found, a negative relationship emerged in the residence hall juniors group (r= -.173; p =09) suggesting, albeit weakly, that those students with lower scores in SDL will be more likely to change majors. These results are similar to those found in Lounsbury et al. (2004) and their study of college attrition, where they found negative relationships between intent to withdraw from college and Self-Directed Learning. Because most universities do not have the funding to offer much more than basic career-oriented curricula, and informal, on-campus resources, the career decision-making process usually involves a lot of self-directed research outside of normal school activities. Students low in SDL might not have the intellectual resources, experience, or personal initiative to accomplish the necessary investigative tasks on their own, thus failing to successfully explore career options and alternative pathways.

Another way to explain the study results comes from developmental theory and Chickering's vectors of identity, which includes a stage called "moving through autonomy toward independence." This stage is analogous to the type of independent learning that SDL implies. Perhaps those with low levels of SDL are less vocationally mature and less able to commit to a career path.

RQ2: Do narrow traits add predictive variance beyond the Big Five traits?

The second research question addressed whether or not narrow traits added unique variance above and beyond the Big Five traits in the prediction of academic major change.

Although not at robust levels of significance, the present study did show evidence for incremental predictive validity of narrow traits over Big Five within the student housing resident sample. Thus, the findings support those scholars who advocate for the use of more narrow scope traits, either in lieu of, or in addition to, Big Five dimensions (e.g., Ashton, Jackson, Paunonen, Helmes, & Rothstein, 1995; Stewart, 1999; Tett, Steele & Beauregard, 2003; Timmerman, 2006). Given that there were no Big Five traits that accounted for unique variance in either sample, the narrow traits (Career Decidedness and Optimism) provided the only predictive variance out of the ten traits in the model. In fact, the majority of findings across both the residence hall and the HPR samples involved correlations between academic major change and narrow traits, suggesting that the study of major change can benefit from the inclusion of more specific, contextual and narrow scope measures as a way to better understand the kaleidoscope of major changing behaviors.

RQ3: What is the relationship between traits and multiple major changes?

The final research question addressed the relationship between Big Five and narrow personality traits and multiple academic major changes.

The investigation of multiple major change looked at the relationship between personality traits and those students who changed their major one or more times. In conducting such analyses, the potential relationship between personality traits and "normal" and developmental major change versus a more "chronic" indecisiveness might become apparent. For example, the number of times a student changes their major might suggest either the successful navigation through a plethora of career choices, on the way to choosing the major of "best fit," or conversely, a degree of indecisiveness that hampers development and collegiate success.

In the student housing sample, the only trait that was significant in aggregate (all groups) for those students changing majors one or more times was Emotional Stability. Emotional Stability, and related variables such as anxiety, has been repeatedly associated with career indecision, dropout rates and other negative academic outcomes (Chartrand et. al., 1993; Feldt and Woelfel, 2009; Lounsbury et al., 1999; Page et al., 2008; Saka, Gati & Kelly, 2008; Shafer, 2000). However, within the results of the current investigation, Emotional Stability was positively and significantly related to one or more academic major changes, a result which would appear to support the argument that career indecision (a proxy for major change in this case) is a natural part of the development and decision-making process (e.g., Gordon 1984; 1998; Grites, 1981; Lewallen, 1994; Titley & Titley, 1980), rather than a cause for concern (e.g., Hartman & Fuqua, 1983).

When exploring the differential effect of class standing on the relationship between personality traits and multiple major changes, several interesting and sometimes disparate findings were uncovered. For instance, among the group of freshmen, Conscientiousness was positively correlated with number of academic major changes. This finding is particularly interesting given that it was the only group in the entire study to show any association with Conscientiousness. As reported elsewhere in this paper, a good deal of research has shown the importance of Conscientiousness in achieving key academic outcomes, such as achievement (e.g., DeVries et al., 2011; Trapmann, Hell, Hirn & Shuler, 2007), career decidedness (Lounsbury et al., 1999; 2005; Feldt & Woelfel, 2009; Newman et al., 1999; Page et al., 2008), and withdrawal (Okun & Finch, 1998; Tross et al., 2000). So it is even more compelling to note that the correlations in the present study were positive, indicating that the higher one's level of Conscientiousness, the more likely they would be to change their major at least one time. Also,

because the associations occurred within the freshmen group, it is less useful to speculate that Conscientiousness was a trait that emerged over four years of college experience, in the process of learning how to be a successful student. An alternative explanation could be that a number of entering freshmen are focused and determined to find their career niche and quickly zero in on the academic majors that they believe are most appropriate, after only a brief period of trial and error. In this case, it could make sense that highly motivated and highly Conscientiousness (i.e. organized and dutiful) students commit to the major declaration process early on, in order to minimize the time they might otherwise spend floundering in the pursuit of a unsuitable career.

Extraversion also correlated significantly and positively with number of academic major changes. Again, the positive direction of the correlation is the opposite that one might expect from the bulk of the literature that associates high levels of Extraversion with decidedness (see, e.g., Lounsbury et al., 2004; Kelly & Pulver, 2003; Page et al., 2008). In the present case, however, high levels of Extraversion suggest incidence of academic major change, either one or more times, in a group of freshmen. Although these results would seem contrary to prediction, perhaps the relationship is due to the facets of Extraversion that pertain to an outgoing, sociable and assertive nature--the kind which instigate information-seeking behaviors. Thus, in the exploratory stage of career decidedness, where major change (or changes) is a pathway leading to a final career decision, perhaps Extraversion plays a key role. Several recent findings support the function of Extraversion in career exploration (e.g., Rogers, Creed and Glendon, 2008; Reed, Bruch & Haase, 2004; Savickas, Briddick & Watkins, 2002). Alternatively, the same qualities of gregariousness and talkativeness could also work in a less desirable way. For instance, people who are extraverted are focused "outward," on relationships with other people rather than "inward," on themselves. It may be that the high Extraversion students are concentrating more

on social activities than schoolwork and as a result, are faltering in their studies, triggering an involuntary major change (i.e. grades that don't meet minimum requirements for entry into a field of study).

Agreeableness was significantly and positively related to multiple major changes in the seniors group; as levels of this trait went up, so did the likelihood that a student would change their major at least once (and maybe more) times. Agreeableness has been associated with constructs related to career decision, but usually in the opposite direction (see Feldt and Woelfel, 2009; Lounsbury et al., 2004). However, the fact that Agreeableness is positively related to academic major change among seniors in the present investigation might be evidence that these students, at some point during their university tenure, have used their time to explore career options by reaching out to others, listening to advice from peers, teachers and counselors, and utilizing campus resources. As a result, they have changed majors at least once in the search to find their best-fitting career. On the other hand, more agreeable students might be more easily swayed and influenced by recruiting efforts and the advice of parents, friends and teachers.

When looking at the combination of traits in the group of major changers described above, there is some evidence in the literature regarding the role of the Big Five in career exploration. For example, in a study by Reed et al. (2004), students with higher levels of Conscientiousness and Extraversion were more likely to engage in career exploration behaviors. Also, Lounsbury et al. (2004) proposed that the three traits of Emotional Stability, Conscientiousness and Agreeableness might work together in such a way as to allow students who are less anxious and worried, more self-disciplined and more willing to listen to advice from others to be more successful in the career decision-making process. Looking at the freshmen group in the current study who changed their major at least one time and had higher levels of

Conscientiousness, Emotional Stability and Extraversion, or the group of seniors who had higher levels of Agreeableness and Emotional Stability--perhaps these traits, when combined, provide a sort of synergy that facilitates career exploration

Focusing now on narrow traits, it is somewhat surprising (given the results of the other analyses), that none of the narrow-facet traits reached significance at the $p < .05$ level. However, Career Decidedness was negatively related to academic major changes among juniors in the resident hall data sample (r= -.398; p=.067), a result that fits in well with findings in the extant literature, That is, students who are less certain about their career will be more likely to change their major (Bergeron & Romano; 1994; Gordon, 1998; 2007). However, from a developmental perspective, the results are less expected for third year students, a group one would assume would increase in their levels of career certainty over time. One explanation is that they might be a sub-type of student whose decision-making abilities decrease as they advance through their undergraduate years (Titley et al., 1976). This type of indecisive student, rather than experiencing normal levels of indecision that would resolve given more time and information, instead might experience chronic indecision arising from anxiety or lack of confidence. If this was the case, one would also expect that these students would have lower scores on Emotional Stability. Of course there is no way of knowing without the inclusion of other experimental variables and additional analyses, but the possibility is compelling.

Regarding Work Drive, this trait was inversely related to one or more academic major changes among a group of juniors, and neared significance at the .05 level (r=-.420; $p = .51$). This outcome is consistent with other findings in the current study, and to previous literature connecting high Work Drive with commitment, as discussed earlier (i.e. Lounsbury and colleagues, 2004). But why would this result only be significant in a group of juniors? Perhaps

the explanation is simply that the juniors group has been in school longer and has had more opportunity to change majors (a common occurrence in 50% of students between their freshmen and senior years). The fact that these students have low levels of Work Drive is incidental. Nevertheless, the findings are similar to those found previously and, overall, point to a link between Work Drive and one's commitment to their field of study.

The final analysis in the sample of major changers involved the group that had changed majors *more than* one time. In this case, both SDL and Work Drive were positively and significantly correlated with the criterion variable. From a career exploration perspective, high levels of SDL and Work Drive and multiple major changes might signify a concerted and deliberate move from career indecision to decidedness. In fact, these two traits could provide functional value by combining independent thinking and self-direction with the willingness to spend time and energy in order to discover the best-fitting vocational choice—an outcomes oftentimes only made possible through career exploration and hard work.

A word of caution must again be noted in that some of these correlations are found within small groups of data. The seniors group, for example, contains only 14 cases. So although Conscientiousness is significantly related to academic major changes in this group, the finding needs to be interpreted with skepticism.

Summary of results

The best predictors of academic major change for all students were Career Decidedness and Optimism, indicating that students who were more certain about a future career choice, and more able to persevere in the face of obstacles, were also more likely to have changed their academic major. Work Drive was inversely related to academic major change, implying that those students who were less willing to put in long hours of study were also more likely to switch

majors. Extraversion and Sense of Identity were both positively and negatively related to academic major change, depending on the sample and class standing. Thus, for some sophomores and seniors, being more outgoing or more certain about their own identity meant that they were likely to change their majors. However, for some sophomores, juniors, and seniors who were less self-aware or more introverted, were also more likely to change majors at some point.

Further, Openness predicted academic major change in sophomore and junior groups, but in different directions. For sophomore groups the relationship was positive, suggesting that the qualities of being Open to Experience might also encourage career and self-exploration, leading to major changing behaviors. In contrast, the group of juniors had lower levels of Openness, signifying perhaps either an aversion to information-seeking and career exploration which put them in ill-fitting majors that they were forced to change out of (e.g., a pre-med student who discovers s/he can't pass their classes so they must find an alternative major or drop out of school), or a student who has made a satisfactory major change into their chosen field but simply does not have an open disposition. Again, without implementing a longitudinal study design to measure a student's academic major change history throughout their college years there is no way of knowing if the trait caused the major change or the major change was due to other, extrinsic factors such as poor academic performance, financial pressures, discovery of new interests, and the like.

Conscientiousness freshmen and Agreeable seniors were also more likely to change their academic major one or more times, as were Emotionally Stable students across all class ranks. These findings, especially in combination, can be viewed in conjunction with previous studies

linking career exploration and career decidedness to Big Five personality traits (e.g., Lounsbury et al., 2004; Reed et al., 2004).

Finally, Work Drive and Self- Directed Learning (SDL) were found to be related to multiple major changes (i.e. more than one academic major change; n =33; r=363, p <.05; r=.433, p <.05, respectively), regardless of class standing. Consequently, students who are independent learners and are willing to put forth a lot of effort and energy into their coursework, or career exploration and career planning activities, might also find themselves changing majors more often as they hone their interests and evaluate their abilities.

A summary of all results can be found in Table 24.

Implications

Overall, the current study's findings support the assertion that academic major change is a multi-dimensional and complex construct. While personality traits don't appear to be able to explain considerable variance in academic major change activity, especially with regard to the directional hypotheses predictions the study of student characteristics in relation to academic major change behavior provides additional understanding of a common and important variable of interest. Based on the present study's findings, the choice a student makes to change majors is most likely a complex process, influenced by factors that both include and go beyond the influence of personality traits. Nevertheless, the present findings can inform counselors, administrators and students.

For instance, one noteworthy finding regarding the relationship between traits and major changing behavior involved the differential effects of personality traits depending upon class standing. Because it is thought that career maturity increases with age (Luzzo, 1993), when extrapolated to a college context this could mean that students in higher class rankings, such as

juniors and seniors, also have higher levels of career maturity than students in lower grades, such as sophomores and freshmen (e.g., McCaffrey, Miller & Winston, 1984; Post-Kammer, 1987). Some trends can be seen in the results of the current investigation. For the trait of Career Decidedness, all groups showed positive and significant relationships with academic major change that increased with class rank. The implications here are that as a student progresses through their undergraduate experience, their levels of career certainty should increase, as well. Accordingly, they can expect major change to occur as part of the career development process.

A similar relationship can be seen with Sense of Identity. For sophomores, lower levels of identity appeared to be triggering academic major change, whereas for seniors, higher levels of self-identity were associated with academic major change. Although the cause of the relationship could not be determined, and the study did not specify the semesters in which major change (or changes) took place, it is suffice to say that correlations were moving in the direction one might expect when looking at sophomores and seniors through a developmental lens. Being aware of these types of developmental differences as they relate to academic major change might help career advisors better understand the way in which to approach each type of student. For the sophomore who might still be developing their self-concept as it relates to the world of work, a counselor might have them focus on issues of self-exploration and self-assessment. Conversely, seniors who have developed stronger identities might be better served by gathering together specific vocational information, such as that which might be find through O*NET and the Dictionary of Occupational Titles.

Furthermore, some traits were positively related to academic major change in all student groups. Higher levels of Career Decidedness, Optimism and Emotional Stability were all related to incidence of academic major change across class standings. Many scholars might consider

these traits to be positive, functional traits because they have repeatedly been associated with key outcomes of academic success (e.g., Lounsbury, Saudargas et al., 2004; Ruthig, Perry, Hall & Hladky, 2004; Solberg, Evans & Segerstrom, 2009). Thusly, the positive relationships between these traits and academic major change might provide further, albeit indirect, evidence that major change is indeed a normal part of the college experience. The fact that up to 75% of students change their major more than once (e.g., Kramer et al., 1994) could be interpreted as meaning that students are seeking a career more in line with their interests and skills. Also, it might be useful for vocational counselors to remember that, as Steele suggested (1994), major changers are not necessarily undecided students; they have made a choice and for some reason, their circumstances have changed.

The narrow trait of Work Drive showed consistently negative relationships with major changing behaviors in all groups of students. This finding could indicate that those students who are less committed to their studies might experience less success in their coursework and consequently, cause them to have problems doing the work required to remain in their major of choice. Although it is difficult to determine if low Work Drive is problematic from an academic major change point-of-view, students and advisors might want to be aware of the role Work Drive can play, especially if a student is particularly committed to a specific career path. Looking at Work Drive from another point of view, guidance counselors could consider the role that focused and concerted effort might play in the self and career exploration process, particularly for students who struggle with career-related decisions. Students who are undecided might be undecided because they haven't done the work they need to do in order to find a suitable career path.

There also appear to be some personality traits that might function to encourage change of major, such as Extraversion and Openness, particularly among sophomores in this sample. Students with high levels of gregariousness and varied interests, who enjoy engaging in interpersonal communication and novelty, might find themselves more likely to change their majors. Although these traits might function to help students seek out and obtain information about their selves and their career options, potentially resulting in a successful academic major change, the tendency towards sociability and curiosity might also keep them from finding the focus they need to make an informed and successful major choice. Therefore, counselors who are tasked with helping these students find career-oriented information and make informed decisions might find it useful to know more about their personalities, to see if traits such as Openness and Extraversion might be influencing their major changing behaviors, either in a negative or positive way.

Among the small group of students in the study who had changed their majors more than once, both Work Drive and Self-Directed Learning correlated positively, suggesting that students who work hard and learn on their own, independently of others, will have more academic major changes and perhaps, face more challenges in graduating on time. However, these types of students might not seek out career counselors on campus, instead preferring to work through their options on their own, using the libraries, internet and social networks to aid in their search. In this way, although they might benefit from the advice of campus advisors, their independence keeps them "off the radar." In order to reach out to these students, it might help to take a more non-traditional approach and offer self-managed tutorials, online resources and virtual environments that students could utilize while still maintaining contact with a campus advisor. In

this way, that can maintain their autonomy while still being able to contact an expert should the need arise.

Lastly, although it is pointed out in the first paragraph of this section that personality traits did not appear to explain much variance in academic major change activity, it is worth noting that reported correlations within the range of .2-.4 do not necessarily indicate an insubstantial relationship between variables. For example, a correlation of .30 represents shared variance of only 9%, but it also denotes an increase of 30% over odds based on chance occurrence alone. Another way to look at the relative benefit of a .30 correlation is from the perspective of an expectancy table. Expectancy tables are made by grouping scores on a predictor variable, such as a personality trait, on the levels of some criterion variable, such as the probability of changing one's academic major. The example illustrated in Table 27 shows the level of Optimism scores for a group of sophomores, classified in levels of either "low," "medium" and "high" Optimism. The correlation between the trait of Optimism and academic major change is. 290. Because the correlation is positive, one would expect that as levels of Optimism rise, so would the incidence of major change. Now, even though a correlation of .290 might on the surface seem low, one can clearly see how the odds of changing one's major increase as levels of Optimism rise. Among the lowest scorers on the Optimism scale, only 2% changed majors; of the top third of scorers, 37% of the students changed majors, which is a substantial increase. Thusly, even modest correlations can provide predictive power, as well as meaningful and practical significance in the relationship between predictor and criterion variables.

Directions for Future Studies

In light of the results of the current research project, several suggestions for future

research can be made.

Firstly, a research design that incorporates a multi-year, longitudinal study that could track the academic major change histories of incoming freshmen through to graduation would allow inferences of causality. For example, does Optimism, which is related to academic major change in this study, actually influence major change, or does major change cause a student to adopt a more optimistic view of their future? Although personality characteristics precede behaviors such as entry into college, personality traits have been shown to be somewhat malleable until the age of 30 (McCrae & Costa, 1999). Furthermore, a trait such as Optimism has been theorized to be a learnable disposition (Seligman, 1991).

A longitudinal design would also allow for the concurrent measurement of variables that might influence academic major change over time, above and beyond personality traits, such as GPA, non-traditional student status, and time to graduation. It would also allow a more thorough exploration of the timing of academic major change (e.g., freshmen year, junior year, etc.), as well as the field of study being changed. For example, are students more likely to change from a traditionally "tough" major such as biochemistry into an "easier" major like biology, geology or psychology? Answering these questions could provide insight into student characteristics that could be helpful to the specific university as they try to meet their student's needs, and also to a larger population of colleges looking for information about why, when and how academic major change occurs and evolves over a student's college tenure.

Another promising line of inquiry involves exploring one's intention to change majors. Intention to change majors, compared to actual major change, can offer students, advisors and university administrators the opportunity to benefit from interventions that can take place before

a change of academic major occurs for the purpose of increasing student retention and satisfaction.

Intention to change majors was investigated by the current author in a pilot study using a newly developed, five-item questionnaire where respondents indicated their level of agreement with a five point Likert-type scale ranging from "Strongly Disagree" to "Strongly Agree." Examples of items include: "I intend to change my major within the next year," and "If money or time were not a factor, I would probably change my major." For a sample size of n =142, seven out of ten traits significantly related to change of academic major (see Table 25). These results indicate a potential to discover meaningful and robust relationships between personality and intention to change one's program of study, and they illustrate a promising direction with regard to the understanding and management of academic major change.

Another potential line of inquiry could include an investigation of the influences of personality on academic major change by looking at traits and specific fields of study. For example, two groups of engineers could be compared based on their levels of Conscientiousness and whether or not they changed majors. Because the trait of Conscientiousness is thought to be key trait for successful engineers, one might expect mean differences across groups of changers and non-changers based on this specific trait. This type of information could be useful for counselors when discussing optimal career paths with their students.

In light of current results, it would make sense to expand future studies to include additional narrow-spectrum traits, especially those that are facets of the Big Five. For example, within the findings of the current study, Work Drive was significantly related to incidence of academic major change but Conscientiousness was not. Given that Work Drive is conceptually associated with Need for Achievement, a facet of Conscientiousness, perhaps the actual

relationship between Conscientiousness and academic major change is obscured by other facets of Conscientiousness such as dutifulness or rule-conforming characteristics. Inclusion of such traits might make future studies more comprehensive and informative.

Similarly, future research ideas could also include the addition of narrow personality traits that could explain variance in academic major change beyond those addressed in the current study, such as Assertiveness, Self-Efficacy or attribution style. Also, exploring other dependent variables in tandem with academic major change, such as major and life satisfaction, perceived sense of community, and university engagement could all provide a clearer picture of the undergraduate population in terms of other factors that might influence decisions to change major.

Finally, it seems apparent from the present study that while academic major change is similar to career indecision and major persistence, it cannot really be considered analogous to either construct. As Gordon proposed (1997), more needs to be done to understand major changer characteristics. Although personality research appears to be a good place to start, continued efforts should be made to further define academic major change. Like career indecision, perhaps there are different types of major changers, some that align well with normal developmental trajectories, and some that forecast a more troubled future. Also, conducting discriminant and convergent analyses to see which constructs academic major change most and least represents (e.g., career indecision and decision making self-efficacy) will help in understanding the specific place academic major change holds within the decision-making models in the vocational domain.

Limitations

Although the current research uncovered linkages between personality traits and academic major change behavior among college undergraduates, several limitations should be noted. Firstly, although sample sizes overall appeared to be of sufficient size to represent the university's undergraduate populations, the frequency distributions were skewed toward freshmen students, and consequently, toward those respondents who had never changed majors. Even though some research has indicated high percentages of academic major change among first year students (e.g., Kramer, 1994), no effort was made to distinguish between first semester and second semester freshmen. Perhaps the data contained higher numbers of first-semester freshmen who had not yet had the opportunity to change majors. Regardless, low case numbers of major changers may well have suppressed the ability to find significant effects. Relatively small sample sizes across class standings, especially in the HPR study, was also a limitation, with sizes of less than n=20 for two out of three groups.

Both samples were also from a single university, and also included a disproportionate number of females and a lack of diverse ethnic groups. These limitations make it difficult to generalize findings to males, other student populations, and other major fields of study. Future studies should make every effort to both increase and normalize the frequency distributions across all class standings, gender and ethnicities.

Secondly, the current study employed a cross-sectional design, and measurements were taken at only "one moment in time" in a field study survey design. This methodology necessarily limited the ability to know whether or not a finding (in this case, a correlation between a trait and a major change) was a result of a student's developmental progress, over time, or a truly stable trait that would be in evidence throughout their freshmen, sophomore, junior or senior years.

A final limitation was the use of self-report personality measures, especially with regard to image management bias (Campbell & Fiske, 1959; Paulhus, 1991; Schmitt, 1994). However, it is difficult, if not impossible, to assess variables that cannot be directly observed, such as personality traits, with anything but a self-report measure. Fortunately, many studies have found no negative effect on outcome-related validity of self-report measures (Barrick & Mount, 1996).

Conclusion

Most students will change their majors at some point in their academic career (e.g., Foote 1980; Gordon, 1984; 2007; Kramer, Higley & Olsen, 1994), and only 30% of graduating seniors will major in the same field they selected as freshmen (Willingham, 1985). As a result, academic major changers represent the majority of undergraduates on the average college campus today and they compel the attention of researchers across vocational and behavioral domains.

The present study represents the first such attempt to examine the relationship between Big Five and narrow personality traits in conjunction with change of academic major. The Big Five traits of Extraversion and Openness, Emotional Stability, Conscientiousness; and the narrow traits Optimism, Sense of Identity, Work Drive and Career Decidedness were all significantly related to change of major. However, many of the relationships that were found were not predicted and are not supported by existing literature on constructs conceptually related to academic major change. Nonetheless these traits offer additional information about the characteristics of major changers that can be built upon in future investigations.

Admittedly, there appears to be more to the picture given the relatively low correlations between personality traits and change of major obtained in this investigation, and it still remains to be seen whether or not academic major change is harmful or helpful to student success.

Future research will undoubtedly serve to elaborate on the personological variables which influence the change of academic major.

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APPENDICES

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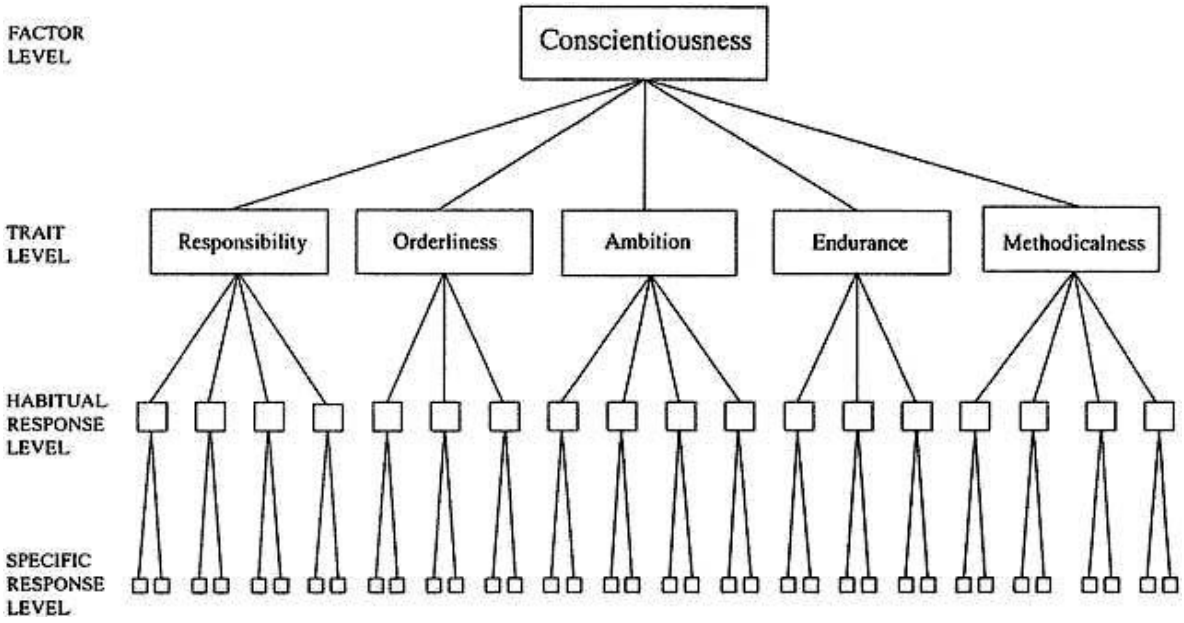

Figure 1. Personality Hierarchy (Paunenon, 1998).

Table 1

Sample I (*Residence Hall): Descriptive Statistics*

	Min	Max	Median	Mean		STD	Skewness		Kurtosis	
					SEM			SES		SEK
Have you changed your major?	_	_	_	1.730	.0212	.4444	-1.040	.117	-.924	.233
How many times have you changed your major?	.00	4.00	_	.3867	.0365	.7627	2.490	.117	7.038	.233
What is your class year?	1.00	4.00	2.000	1.871	.0486	1.0169	.877	.117	-.449	.233
Openness	2.00	5.00	4.0000	4.0154	.02702	.56486	-.402	.117	-.059	.233
Agreeableness	1.57	5.00	3.8751	3.7738	.03323	.69469	-.558	.117	.152	.233
Conscientiousness	1.86	5.00	4.0000	3.9389	.02926	.61166	-.371	.117	-.213	.233
Emotional Stability	1.00	5.00	3.1667	3.1156	.03647	.76246	-.058	.117	-.081	.233
Extraversion	1.00	5.00	3.5000	3.3940	.04293	.89736	-.236	.117	-.518	.233
Optimism	1.40	5.00	4.0000	3.9314	.03217	.67243	-.560	.117	-.083	.233
Work Drive	1.00	5.00	3.2000	3.3103	.04119	.86098	.128	.117	-.442	.233
Career Decidedness	2.00	5.00	3.0000	3.0546	.01864	.389600	.282	.117	-.503	.233
Sense of Identity	1.50	5.00	4.0000	4.0309	.03200	.66886	-.673	.117	.519	.233
Self-Directed Learning	1.40	5.00	3.6000	3.7578	.03184	.66563	-.345	.117	.195	.233

N =437

Table 2

Sample II (HPR) Descriptive Statistics

	Min	Max	Median	Mean	SEM	STD	Skewness	SES	Kurtosis	SEK
Have you changed your major?	--	--	0	.12	.016	.326	2.335	.119	3.467	.237
How many times have you changed your major?	--	4.00	0	.19	.029	.588	3.599	.119	14.199	.237
What is your class year?	1.00	4.00	1	1.36	.038	.779	2.134	.119	3.544	.237
Openness	1.88	5.00	3.8750	3.8066	.02645	.54341	-.264	.119	.095	.237
Agreeableness	1.43	5.00	3.8751	3.8460	.03142	.64538	-.451	.119	.012	.237
Conscientiousness	2.14	5.00	4.0000	3.9617	.02956	.60716	-.396	.119	-.181	.237
Emotional Stability	1.17	5.00	3.3333	3.2848	.03559	.73111	-.108	.119	-.331	.237
Extraversion	1.33	5.00	3.6667	3.5754	.03841	.78907	-.324	.119	-.613	.237
Optimism	1.80	5.00	4.0000	3.9834	.02896	.59500	-.542	.119	.363	.237
Work Drive	1.25	5.00	3.0000	2.9419	.03751	.77053	.273	.119	-.311	.237
Career Decidedness	1.00	5.00	3.1429	3.0948	.05814	1.19430	-.111	.119	-1.192	.237
Sense of Identity	1.50	5.00	4.0833	4.0332	.03325	.68296	-.686	.119	.129	.237
Self-Directed Learning	1.40	5.00	3.6000	3.6754	.03034	.62331	-.136	.119	-.025	.237

N =422

Table 3

Sample I: Intercorrelations of Big Five and Narrow Traits

Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Openness	1									
(2) Agreeableness	.247**	1								
(3) Conscientiousness	.149**	.323**	1							
(4) Emotional Stability	.078	.271**	.215**	1						
(5) Extraversion	.203**	.039	.104*	.278**	1					
(6) Optimism	.355**	.246**	.264**	.513**	.455**	1				
(7) Work Drive	.332**	.282**	.489**	.192**	.087	.231**	1			
(8) Career Decidedness	.139**	-.042	-.020	-.182**	.065	.057	.049	1		
(9) Sense of Identity	.175**	.207**	.352**	.479**	.334**	.609**	.259**	-.224**	1	
(10) Self-Directed Learning	.466**	.167**	.345**	.297**	.123*	.376**	.587**	.050	.342	1

N=437
***p* <.01 **p* <.05

Table 4

Sample II: Intercorrelations between Big Five and Narrow Traits

Correlations										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Openness	1									
(2) Agreeableness	.253**	1								
(3) Conscientiousness	.223**	.367**	1							
(4) Emotional Stability	.072	.197**	.261**	1						
(5) Extraversion	.173**	-.089	.132**	.236**	1					
(6) Optimism	.277**	.232**	.350**	.524**	.344**	1				
(7) Work Drive	.247**	.213**	.463**	.183**	-.023	.226**	1			
(8) Career Decidedness	-.132**	.025	.149**	.199**	.050	.165**	.207**	1		
(9) Sense of Identity	.183**	.223**	.420**	.469**	.226**	.604**	.279**	.495**	1	
(10) Self-Directed Learning	.426**	.162**	.428**	.258**	.045	.454**	.537**	.142**	.415**	1

N=422
***p* <.01 **p* <.05

Table 5

Sample I Descriptive Statistics: Comparing Groups of Major Changers and non-Major Changers

		N	Mean	STD	SE	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
O	No	319	4.0106	.57917	.03243	3.9468	4.0744	2.00	5.00
	Yes	118	4.0286	.52639	.04846	3.9326	4.1246	2.88	5.00
A	No	319	3.7707	.72615	.04066	3.6907	3.8507	1.86	5.00
	Yes	118	3.7821	.60428	.05563	3.6719	3.8923	1.57	5.00
C	No	319	3.9458	.59136	.03311	3.8807	4.0110	2.29	5.00
	Yes	118	3.9201	.66576	.06129	3.7987	4.0415	1.86	5.00
ES	No	319	3.0925	.77662	.04348	3.0069	3.1780	1.00	5.00
	Yes	118	3.1780	.72230	.06649	3.0463	3.3097	1.17	4.83
EX	No	319	3.3631	.91854	.05143	3.2619	3.4643	1.00	5.00
	Yes	118	3.4774	.83544	.07691	3.3251	3.6297	1.00	5.00
OPT	No	319	3.8853	.68258	.03822	3.8101	3.9605	1.40	5.00
	Yes	118	4.0559	.63023	.05802	3.9410	4.1708	2.20	5.00
	Total	437	3.9314	.67243	.03217	3.8681	3.9946	1.40	5.00
WD	No	319	3.3411	.87180	.04881	3.2450	3.4371	1.00	5.00
	Yes	118	3.2271	.82893	.07631	3.0760	3.3782	1.40	5.00
CD	No	319	3.0125	.38116	.02134	2.9706	3.0545	2.00	4.13
	Yes	118	3.1684	.39100	.03599	3.0971	3.2397	2.50	4.00
SI	No	319	4.0355	.67276	.03767	3.9614	4.1096	1.50	5.00
	Yes	118	4.0184	.66087	.06084	3.8979	4.1388	2.33	5.00
SDL	No	319	3.7680	.68170	.03817	3.6929	3.8431	1.67	5.00
	Yes	118	3.7302	.62205	.05726	3.6168	3.8436	2.00	5.00

N =437 No=Did not change majors Yes=Did change majors
O=Openness A=Agreeableness C=Conscientiousness ES=Emotional Stability EX=Extraversion OPT=Optimism WD=Work Drive CD=Career Decidedness SI=Sense of Identity SDL=Self-Directed Learning

Table 6

Sample II Descriptive Statistics: Comparing Groups of Major-Changers and non-Major Changers

		N	Mean	STD	SE	95% Confidence Interval for Mean		Min	Max
						Lower	Upper		
O	No	371	3.8049	.54243	.02816	3.7495	3.8603	1.88	5.00
	Yes	51	3.8186	.55583	.07783	3.6623	3.9750	2.50	4.88
A	No	371	3.8568	.64562	.03352	3.7908	3.9227	1.43	5.00
	Yes	51	3.7675	.64458	.09026	3.5862	3.9488	2.29	5.00
C	No	371	3.9742	.61490	.03192	3.9114	4.0370	2.14	5.00
	Yes	51	3.8711	.54455	.07625	3.7180	4.0243	2.57	4.86
ES	No	371	3.2978	.73736	.03828	3.2226	3.3731	1.17	5.00
	Yes	51	3.1895	.68315	.09566	2.9974	3.3817	1.17	4.83
EX	No	371	3.5759	.78995	.04101	3.4953	3.6566	1.33	5.00
	Yes	51	3.5719	.79040	.11068	3.3496	3.7942	1.83	4.83
OPT	No	371	3.9865	.60603	.03146	3.9247	4.0484	1.80	5.00
	Yes	51	3.9608	.51228	.07173	3.8167	4.1049	2.60	5.00
WD	No	371	2.9690	.77245	.04010	2.8901	3.0479	1.25	5.00
	Yes	51	2.7451	.73398	.10278	2.5387	2.9515	1.25	4.75
CD	No	371	3.1213	1.20894	.06276	2.9979	3.2447	1.00	5.00
	Yes	51	2.9020	1.07304	.15026	2.6002	3.2038	1.00	5.00
SI	No	371	4.0485	.69070	.03586	3.9780	4.1190	1.50	5.00
	Yes	51	3.9216	.61856	.08662	3.7476	4.0955	2.50	5.00
SDL	No	371	3.6733	.63007	.03271	3.6090	3.7376	1.40	5.00
	Yes	51	3.6902	.57732	.08084	3.5278	3.8526	2.00	4.80

N =437 No=Did not change majors Yes=Did change majors
O=Openness A=Agreeableness C=Conscientiousness ES=Emotional Stability EX=Extraversion OPT=Optimism WD=Work Drive CD=Career Decidedness SI=Sense of Identity SDL=Self-Directed Learning

Table 7

Sample I Scale Reliabilities

Trait	Cronbach's Alpha	N of Items
Openness	.769	8
Agreeableness	.824	7
Conscientiousness	.774	7
Emotional Stability	.826	6
Extraversion	.876	6
Optimism	.824	5
Work Drive	.847	5
Career Decidedness	.824	8
Sense of Identity	.830	6
Self-Directed Learning	.831	6

Table 8

Sample II Scale Reliabilities

Trait	Cronbach's Alpha	N of Items
Openness	.735	8
Agreeableness	.788	7
Conscientiousness	.809	7
Emotional Stability	.792	6
Extraversion	.858	6
Optimism	.799	5
Work Drive	.764	5
Career Decidedness	.964	8
Sense of Identity	.846	6
Self-Directed Learning	.804	6

Table 9

Sample I--Residence Hall: All Groups Hypotheses 1-6a and b

Correlations: Academic Major change and personality traits for all groups

Traits	All Groups	Freshmen	Sophomores	Juniors	Seniors
	H1a-6a and RQ1	H1b-6b and RQ1			
	N =437	*N =210*	*N =120*	*N =60*	*N =47*
Openness	.014	-.012	.224**	-.246*	-.013
Agreeableness	.007	.065	-.006	-.021	.001
Conscientiousness	-.019	-.001	-.036	-.102	.120
Emotional Stability	.050	.040	.111	-.002	-.001
Extraversion	.057	.028	.172**	038	.106
Optimism	.113**	.046	.153*	.290*	.119
Work Drive	-.059	-.021	-.054	-.227*	.036
Career Decidedness	.178**	-.092	-.198*	.233*	.321*
Sense of Identity	-.011	-.035	-.037	-.062	.274*
Self-Directed Learning	.025	-.040	.043	-.173	.035

**p <.01 *p <.05
Point-biserial correlations
1-tailed test for Directional Hypotheses (Conscientiousness, Emotional Stability, Extraversion, Optimism, Career Decidedness and Sense of Identity)
2-tailed tests for RQ 1 traits (Openness, Agreeableness, Work Drive and Self-Directed Learning)

Table 10

Sample II--HPR: All Groups Hypotheses 1-6a and b

Correlations: Academic Major change and personality traits for all groups

Traits	All Groups	Freshmen	Sophomores	Juniors	Seniors
	H1a-6a and RQ1	H1b-6b and RQ1			
	N =422	*N =331*	*N =44*	*N =31*	*N =16*
Openness	.008	-.030	.100	-.145	.246
Agreeableness	-.045	.010	-.166	-.061	-.404
Conscientiousness	-.055	-.017	.022	-146	-.261
Emotional Stability	-.048	.006	.221	-.155	-.223
Extraversion	-.002	.014	.108	-.146	-.430*
Optimism	-.014	.039	.207	.017	.072
Work Drive	-.095*	.004	-.316*	.259	.383
Career Decidedness	-.060	-.054	-.186	.103	-.014
Sense of Identity	-.061	-.024	-.273*	.227	-.292
Self-Directed Learning	.009	.051	-.026	-088	.055

**p <.01 *p <.05
Point-biserial correlations
1-tailed test for Directional Hypotheses (Conscientiousness, Emotional Stability, Extraversion, Optimism, Career Decidedness and Sense of Identity)
2-tailed tests for RQ 1 traits (Openness, Agreeableness, Work Drive and Self-Directed Learning)

Table 11

Resident Hall Sample Frequency Distribution of Class Standing

Class Standing				
	Frequency	Percent	Valid Percent	Cumulative Percent
Freshman	210	48.1	48.1	48.1
Sophomore	120	27.5	27.5	75.5
Junior	60	13.7	13.7	89.2
Senior	47	10.8	10.8	100.0
Total	437	100.0	100.0	

Table 12

Incidence of Major Change by Class Standing

		Class Standing				
		Freshman	Sophomore	Junior	Senior	Total
Major change?	Yes	41	41	22	14	118
	No	169	79	38	33	319
Total		210	120	60	47	437

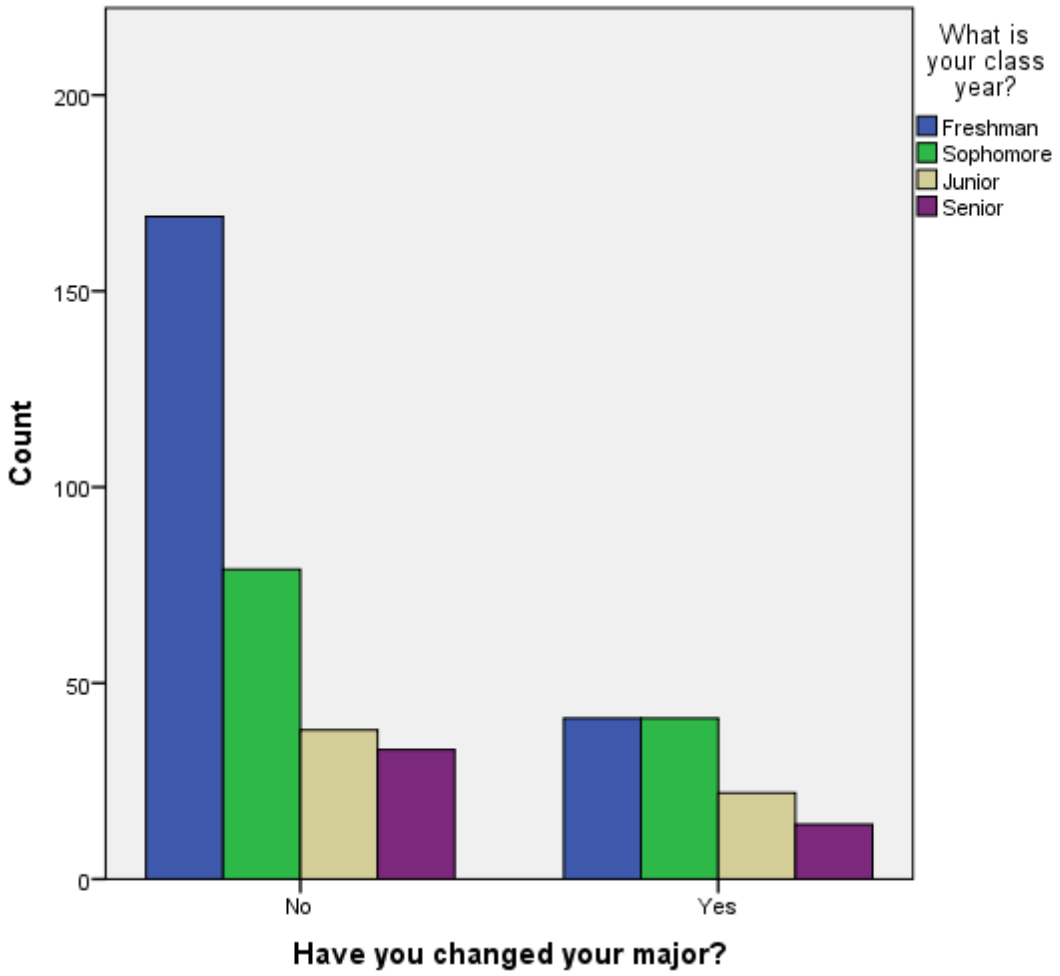

Figure 2. Residence Hall Sample: Incidence of Major Change by Class Standing

Table 13

HPR Sample: Frequency Distribution by Class Standing

Class standing?

	Frequency	Percent	Valid Percent	Cumulative Percent
Freshman	331	78.4	78.4	78.4
Sophomore	44	10.4	10.4	88.9
Junior	31	7.3	7.3	96.2
Senior	16	3.8	3.8	100.0
Total	422	100.0	100.0	

Table 14

Incidence of Major Change by Class Standing

		Class standing?				Total
		Freshman	Sophomore	Junior	Senior	
Major Change?	Yes	17	16	12	6	51
	No	314	28	19	10	371
Total		331	44	31	16	422

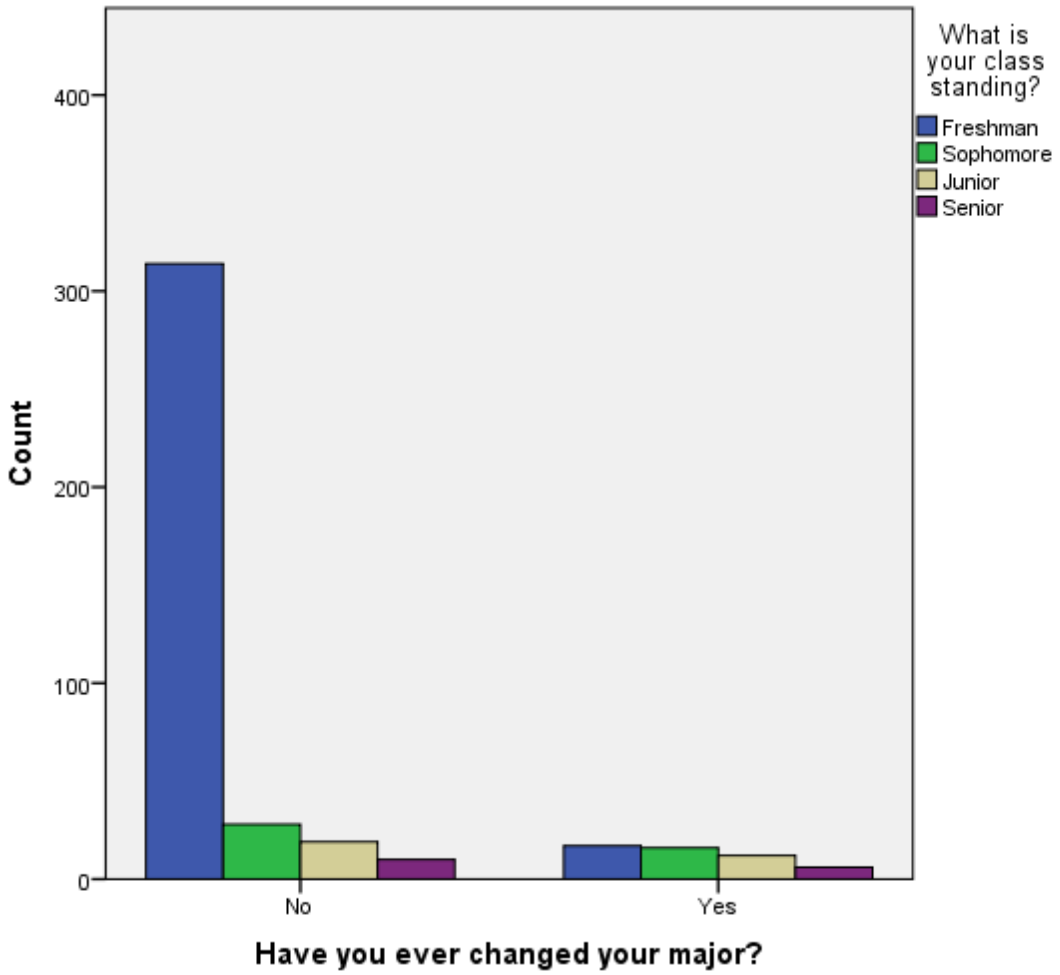

Figure 3. HPR Sample: Incidence of Major Change by Class Standing.

Table 15

Residence Hall: Correlations between Class Standing and Incidence of Major Change

		Have you changed your major?	How many times have you changed your major?
Class Standing	Correlation	-.122	.144
	Sig. (2-tailed)	.010	.003

N =437

Table 16

HPR: Correlations between Class Standing and Incidence of Major Change

		Have you ever changed your major?	How many times have you changed your major?
Class Standing	Correlation	-.368	.344
	Sig. (2-tailed)	.000	.000

N =422

Table 17

Residence Hall Sample: Logistic Regression Coefficients

Variable	Step 1		Step 2	
	B	S.E.	B	S.E.
Openness	.022	.204	-.054	.243
Agreeableness	.015	.174	.006	.181
Conscientiousness	-.129	.189	.023	.222
Emotional Stability	.127	.155	.212	.186
Extraversion	.120	.130	-.018	.145
Optimism			.516*	.255
Work Drive			-.204	.178
Career Decidedness			1.078**	..313
Sense of Identity			-.190	.232
Self-Directed Learning			-.172	.237
Constant	-1.44	1.05	-4.793**	1.478
X2/df	2.443/5		25.266/10**	
-2 log-likelihood	507.35		484.52	

*p < .05, **p < .01 (two-tailed).

Table 18

HPR Sample: Logistic Regression Coefficients

Variable	Step1		Step 2	
	B	S.E.	B	S.E.
Openness	.151	.204	.037	.329
Agreeableness	-.138	.174	.-.095	.258
Conscientiousness	-.210	.189	-.053	.309
Emotional Stability	-.145	.155	-.114	.251
Extraversion	.016	.130	-.015	.214
Optimism			.128	.369
Work Drive			-.510	.258
Career Decidedness			-.052	..154
Sense of Identity			-.226	.329
Self-Directed Learning			.504	.343
Constant	-.801	1.460	-.979	1.584
X2/df	2.319/5		8.288/10	
-2 log-likelihood	308.80		302.83	

All findings n.s.

Table 19

Residence Hall Sample: Descriptive Statistics Comparing Groups of Major Changers

Big Five Traits		N	Mean	SD	Narrow Traits		N	Mean	SD
Openness	1 time	85	3.9912	.52106	Optimism	1 time	85	4.0000	.67188
	2 times	21	4.1131	.60455		2 times	21	4.2476	.47288
	3 times	6	4.1667	.43060		3 times	6	4.1333	.64083
	4 times	6	4.1250	.43301		4 times	6	4.1000	.43359
Agreeableness	1 time	85	3.7731	.57070	Work Drive	1 time	85	3.2376	.79731
	2 times	21	3.8844	.62371		2 times	21	2.9810	.96105
	3 times	6	3.5000	1.08703		3 times	6	3.3333	.65320
	4 times	6	3.8333	.43721		4 times	6	3.8333	.75277
Conscientiousness	1 time	85	3.9345	.65486	Career Decidedness	1 time	85	3.1735	.36753
	2 times	21	3.7755	.79996		2 times	21	3.1071	.43172
	3 times	6	4.0952	.53959		3 times	6	3.1875	.52885
	4 times	6	4.0476	.41074		4 times	6	3.2917	.49791
Emotional Stability	1 time	85	3.0863	.73625	Sense of Identity	1 time	85	4.0059	.67966
	2 times	21	3.4206	.72384		2 times	21	4.0397	.63005
	3 times	6	3.3611	.63611		3 times	6	4.0278	.87189
	4 times	6	3.4444	.29187		4 times	6	4.1111	.31032
Extraversion	1 time	85	3.4412	.84660	Self-Directed Learning	1 time	85	3.7314	.57969
	2 times	21	3.5317	.86381		2 times	21	3.4841	.71084
	3 times	6	3.6944	.98554		3 times	6	4.1111	.60246
	4 times	6	3.5833	.48016		4 times	6	4.1944	.58135

Table 20

Descriptive Statistics Comparing Groups of Major Changers

Big Five Traits		N	Mean	SD	Narrow Traits		N	Mean	SD
Openness	1 time	29	3.6810	.53929	Optimism	1 time	29	3.9931	.51681
	2 times	16	4.0156	.59665		2 times	16	3.8250	.56510
	3 times	4	3.8750	.39528		3 times	4	4.1500	.25166
	4 times	2	4.1250	.35355		4 times	2	4.2000	.28284
Agreeableness	1 time	29	3.7685	.61849	Work Drive	1 time	29	2.6638	.64875
	2 times	16	3.7232	.71232		2 times	16	2.9219	.85009
	3 times	4	4.0000	.55940		3 times	4	2.3125	.82601
	4 times	2	3.6429	1.11117		4 times	2	3.3750	.17678
Conscientiousness	1 time	29	3.8719	.54311	Career Decidedness	1 time	29	2.9557	1.06228
	2 times	16	3.7589	.59868		2 times	16	2.8125	1.07756
	3 times	4	4.1071	.29451		3 times	4	3.1429	1.55620
	4 times	2	4.2857	.40406		4 times	2	2.3571	.50508
Emotional Stability	1 time	29	3.3218	.71953	Sense of Identity	1 time	29	3.9253	.58178
	2 times	16	2.8958	.62915		2 times	16	3.7708	.70678
	3 times	4	3.5417	.34359		3 times	4	4.5000	.19245
	4 times	2	2.9167	.11785		4 times	2	3.9167	.58926
Extraversion	1 time	29	3.4943	.77470	Self-Directed Learning	1 time	29	3.6483	.60629
	2 times	16	3.7083	.75890		2 times	16	3.6750	.56036
	3 times	4	3.9167	1.10135		3 times	4	3.8000	.56569
	4 times	2	2.9167	.58926		4 times	2	4.2000	.28284

Table 21

Residence Hall Sample: Number of Major Changes by Class Standing

		Class Standing				Total
		Freshman	Sophomore	Junior	Senior	
# of Major Changes?	Never	169	79	38	33	319
	1 time	37	24	16	8	85
	2 times	2	9	6	4	21
	3 times	2	3	0	1	6
	4 or more times	0	5	0	1	6
Total		210	120	60	47	437

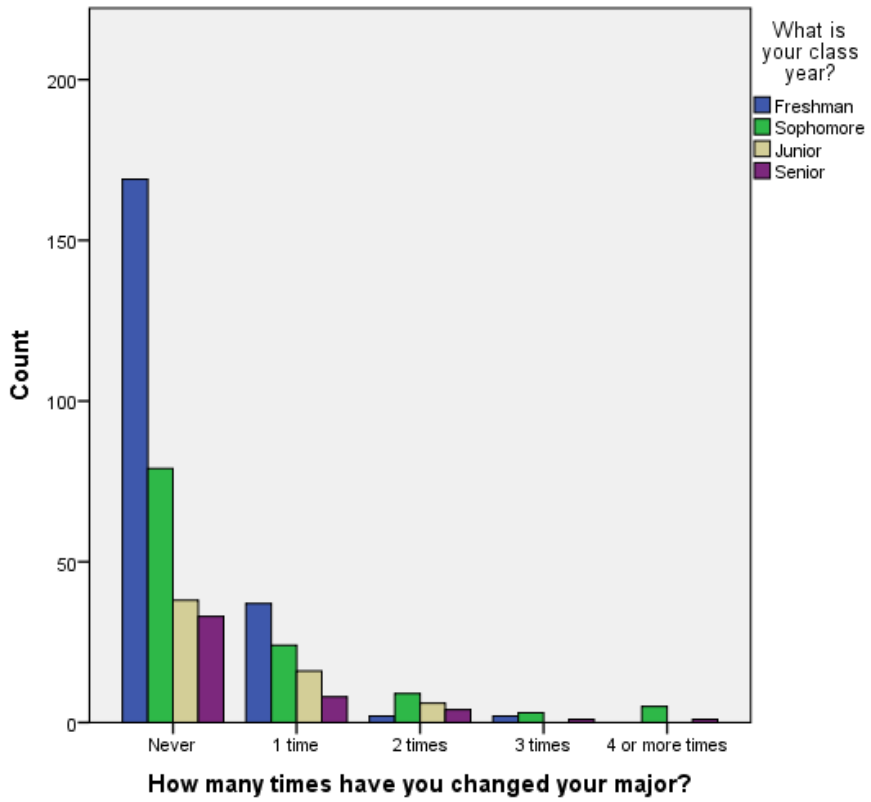

Figure 4. Residence Hall Sample: Number of Major Changes by Class Standing.

Table 22

HPR Sample: Number of Major Changes by Class Standing

		Class Standing				Total
		Freshman	Sophomore	Junior	Senior	
# of Major Changes	Never	314	28	19	10	371
	1 time	12	8	6	3	29
	2 times	3	7	3	3	16
	3 times	1	1	2	0	4
	4 or more times	1	0	1	0	2
Total		331	44	31	16	422

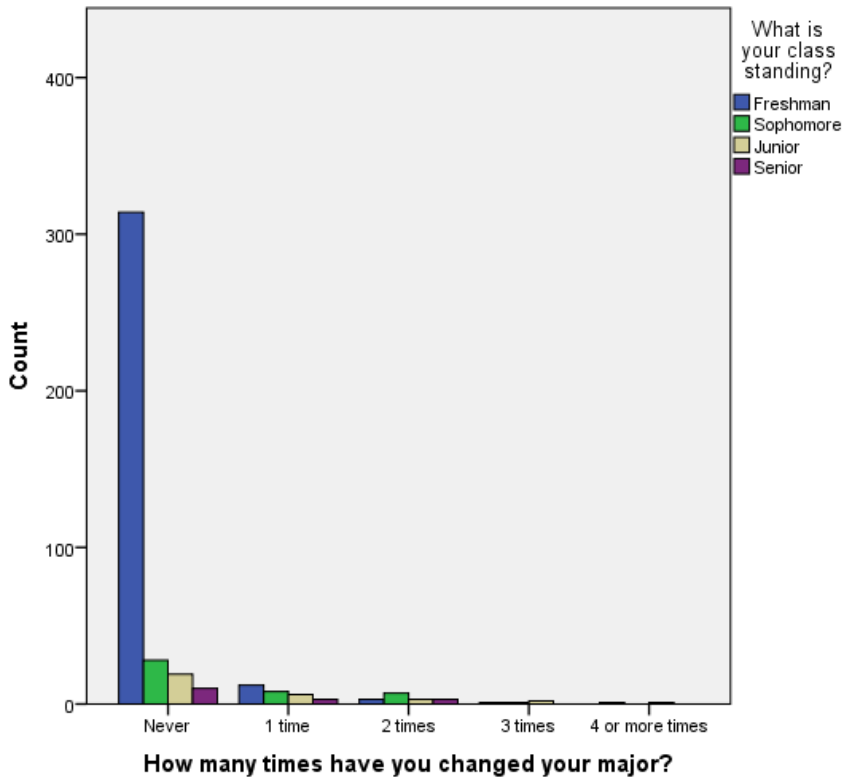

Figure 5. HPR Sample: Number of Major Changes by Class Standing.

Table 23

Sample I Correlations: Number of Major Changes and Personality Traits (RQ3)

Traits	All Groups	Freshmen	Sophomores	Juniors	Seniors
	N =118	*N* =41	*N* =41	*N* =22	*N* =14
Openness	.136	.188	.180	.032	-.406
Agreeableness	.049	.265	-.023	.129	.597*
Conscientiousness	-.013	.333*	-.166	.008	-.197
Emotional Stability	.230*	.154	.273	.259	.458
Extraversion	.081	.308*	-.102	.226	.252
Optimism	.102	.175	.119	.284	-.243
Work Drive	.005	.105	.135	-.420	-.133
Career Decidedness	-.021	.055	.023	-.398	-.104
Sense of Identity	.029	.251	-.137	.081	.023
Self-Directed Learning	.061	.180	.126	-.347	.047

*p <.05
Spearman's Rho correlations, 2 tailed test

Table 24

Sample II Correlations: Number of Major Changes and Personality Traits (RQ3)

Traits	All Groups	Freshmen	Sophomores	Juniors	Seniors
	N =51	*N* =17	*N* =16	*N* =12	*N* =6
Openness	.266	.-.195	.333	.682	.396
Agreeableness	.020	.014	.029	-.030	.198
Conscientiousness	.051	.083	.113	.085	-.198
Emotional Stability	-.141	-.156	-.011	-.034	-.603
Extraversion	.097	-.249	.369	.309	-.098
Optimism	.013	-.196	-.033	.442	.396
Work Drive	.117	.022	-.080	.444	.683
Career Decidedness	-.047	-.271	-.230	.238	.396
Sense of Identity	.075	-.142	.099	-.051	.198
Self-Directed Learning	.119	-.195	.179	.349	.198

Spearman's Rho correlations; 2 tailed test

Table 25

Residence Hall Sample: Multiple Major Changers (2-4 or more times)

	How many times have you changed your major?
Openness	-.037
Agreeableness	-.095
Conscientiousness	.150
Emotional Stability	-.007
Extraversion	.021
Optimism	-.137
Work Drive	.363*
Career Decidedness	.167
Sense of Identity	.027
Self-Directed Learning	.433*

N =33; **p* <.05

Table 26

Summary of Results by Class Rank for Samples I and II

Present Study	Class rank	Personality Traits	Correlation
Hypotheses 1-6a	*All Groups*	Career Decidedness	.178**
		Optimism	.113**
Hypotheses 1-6b	*Sophomores*	Extraversion	.172*
		Career Decidedness	.198*
		Optimism	.153*
		Sense of Identity	**-.273***
	Juniors	Career Decidedness	.233*
		Optimism	.290*
	Seniors	**Extraversion**	**-.430***
		Career Decidedness	.321*
		Sense of Identity	.274*
Research Question I	*All Groups*	**Work Drive**	**-.095***
	Sophomores	**Openness**	**.224****
		Work Drive	-.316*
	Juniors	**Openness**	**-.246***
		Work Drive	-.227*
Research Question II		Career Decidedness	
		Optimism	
Research Question III	*All Groups*	Emotional Stability	.230*
(1 or more changes)	*Freshmen*	Conscientiousness	.333*
		Extraversion	.308*
	Seniors	Agreeableness	.597*
Major changers >1	*All Groups*	Self-Directed Learning	.433*
		Work Drive	**.363***

Sample II results in bold type
***p* <.01 **p* <.05

Table 27

Incidence of Major Change as a Function of Optimism in a Group of Sophomores

		Percent of Students Who Changed their Major
Optimism Level	Low	2%
	Medium	13%
	High	37%

n=60; *r*=.290

"Low level" is a score below 2.9; "Medium level" is between 3.0 and 3.9 and "High" is above 4.0.

Table 28

Intent to Change Majors Scale: Reliabilities and Correlations

Cronbach's Alpha	N of Items
.895	5

Personality Trait	**ITCM**
Openness	.054
Agreeableness	-.204*
Conscientiousness	-.334**
Emotional Stability	-.254**
Extraversion	-.119
Optimism	-.043
Work Drive	-.216*
Career Decidedness	-.693**
Sense of Identity	-.395**
Self-Directed Learning	-.220**

N =142 ITCM= Intent to Change Majors

VITA

Nancy Foster earned an A.S. degree in Biology, and an A.A. degree in Communications from the College of DuPage in Glen Ellyn, Illinois. She went on to receive her Bachelors of Arts degree in Communications from North Central College in Naperville, Illinois. Most recently she finished a Master's program in experimental psychology at the University of Tennessee, Knoxville, where she is completing requirements for her Ph.D. degrees in experimental psychology. Her primary research interests include the study of personality traits and attitudes as they relate to vocational outcomes, particularly career decision-making, among adolescents and young adults. She hopes to develop assessments for high school and college students that will help them discover career paths which will lead, ultimately, to work that fits their personal style, abilities and interests.