A Longitudinal Examination of the Relationship Between Interest-Major Congruence and the Academic Persistence, Satisfaction, and Achievement of Undergraduate Students

by

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ABSTRACT

Using a sample of 931 undergraduate students, the current study examined the influential factors on undergraduate students' academic performance, satisfaction, and intentions to persist in their enrolled major. Specifically, the current study investigated the salience of interest-major match in predicting academic success. Interest-major match has been found to be one of the most influential determinants of academic and occupational success. However, support for this relationship has been equivocal and modest at best. The present study was designed to improve upon the current understanding of this relation by examining the moderating effect of gender and employing a longitudinal design to investigate the reciprocal relation between interest-major match and academic outcomes. Correlational results suggested that women reported greater interest-major match and results of the path analyses demonstrated a moderating effect of gender. Although a reciprocal relation was not supported, the findings indicated that a student's level of academic satisfaction may influence the degree of fit between his or her interest and academic major. The results also highlight the tendency for students further along in their academic tenure to persist to graduation despite poor fit. Implications for educators and administrators are discussed.

DEDICATION

To my grandma Deda for your unwavering support and belief in me. Thank you for modeling resilience, perseverance, and a resounding spirit. Your optimism, laughter, and wisdom shaped the beacon of light that guided my footsteps.

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I wholeheartedly believe in the saying that *it takes a village*. This dissertation is a culmination of my academic pursuits and tremendous personal and professional growth, none of which would have been possible without the love and support of my family, friends, and mentors.

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To my dear Canim and best friend, I feel truly blessed to walk hand in hand in life's journey with someone who is as warm, caring, and compassionate as you are. Thank you for lovingly supporting me and encouraging me every step of the way.

As I embark on the next chapter of life, I move with conviction, confidence, and determination knowing that I'm supported by the collective strength and guidance of all those who've been instrumental in shaping my life's path.

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CHAPTER I

Introduction

Despite the growing need for prospective employees to possess postsecondary education, college students across the United States still struggle to obtain their bachelor degrees in a timely fashion. Among first-time undergraduate students who began their pursuit of a bachelor's degree at a 4-year institution in the fall of 2005, 59% completed their degrees within 6 years (National Center for Education Statistics [NCES], 2013). This is a 1% increase from a decade earlier. These statistics highlight the fact that the majority of students who enter 4-year institutional settings do not obtain degrees within the customary 4-year time frame.

One factor shown to be instrumental in an individual's academic tenure is the match between his or her interest and their chosen academic major (i.e., interest-major match). A lack of fit between the two is likely to result in students frequently changing their academic majors, which in turn lengthens the time to degree completion. In fact, interest-major match, otherwise known as congruence, has been shown to influence the attitudes and behaviors of students such that they tend to be more satisfied, more successful, and more likely to persist in a timely manner. This relationship is often regarded as the congruence-outcome relation.

Interest-major match is a derivative of Person-Environment Fit (P-E fit). For over a century now, the P-E fit theory has served as the cornerstone of vocational psychology (Parsons, 1909) and is the foundation on which many career models and theories of occupational choice have been developed (e.g., Dawis & Lofquist, 1984; Holland, 1985, 1997). Interest-major match, is the dimension of P-E fit that has garnered the bulk of the

research focus. This is largely because of the commensurate model on which both the interests of individuals and the environment of occupations and majors can be classified (i.e., Holland's six RIASEC interest types).

Statement of the Problem

Although interest-major congruence has received extensive empirical support with academic outcomes, there remains a debate over the validity of the results. A number of researchers have found small to moderate effect sizes for the relationship between interest-major match and vocational outcomes, with results typically not exceeding .30. These researchers have interpreted the small to moderate effect sizes as inconsequential and have therefore questioned the centrality of the construct and gone so far as advocating its eschewal (Arnold, 2005; Spokane, Meir, & Catalano, 2000; Tinsley, 2000; Tsabari, Tziner, & Meir, 2005). Proponents of the congruence construct have cautioned against such dismissal based solely on effect sizes when correlations of comparable magnitudes have been deemed meaningful in other areas of psychology, such as personality, as well as in medicine (Tracey, 2003). Instead of continuing to debate whether or not to dismiss congruence as a central career construct, researchers have suggested looking to more complex models of the congruence-outcome relation to improve our understanding.

These researchers have put forth several explanations and recommendations as future avenues to explore. One such argument focuses on the wide variety of methods and measures used to operationalize interest-major congruence. Researchers have demonstrated that the vast discrepancies between these indices have led to differing congruence-outcome results (De Fruyt, 2002; Tinsley, 2000; Tsabari et al., 2005).

Furthermore, none of the indices represent the complexity of the entire RIASEC profile (De Fruyt, 2002). Tinsley (2000) and Prediger (1999) also noted the importance of assessing for possible moderators on the congruence-outcome relations. Tracey (2003) stated that the moderation effect is an often proposed, but seldom tested, possibility that could aid in understanding the factors that increase or decrease the correlations between congruence and outcome criteria. Lent, Brown, and Hackett (1994) regarded gender as a key person variable in examining interests. Given the literature support demonstrating the salience of gender in understanding academic and career success (Betz, Harmon, & Borgen, 1996; Betz & Fitzgerald, 1987; Hackett & Lent, 1992), further research that examines its impact on the congruence-outcome relation is warranted. Lastly, most investigations of the congruence-outcome relation have been carried out in a cross sectional design, assuming a static view of congruence and outcomes (Chartrand & Walsh, 1999). A more accurate representation of this interaction has congruence affecting the occupational outcomes and these outcomes in turn affecting congruence. Tracey (2002b, 2007) highlighted that this reciprocal relationship warrants a more dynamic representation that can only be assessed using a longitudinal design.

Purpose of Study and Research Questions

In keeping with these recommendations, I examined the congruence-outcome relation over the college years using both a cross-sectional and longitudinal research design, with a more precise indicator of interest-academic major match. Furthermore, I sought to expand our understanding of this relation by examining the moderating effect of gender. The following are the three research questions examined in the current study:

1. What is the relationship between interest-major congruence and academic satisfaction, academic performance, and intention to persist in one's academic major?
2. What is the moderating effect of gender on the relationship between congruence and academic satisfaction, academic performance, and intention to persist in one's academic major?
3. Employing a longitudinal design, what is the reciprocal relation between congruence and academic satisfaction, academic performance, and intention to persist in one's academic major?

Design of Dissertation

This research and its accompanying findings are described in five chapters. Chapter I presents background information and a statement of the problem, as well as the research questions. Chapter II outlines the theoretical frameworks underlying this study and provides a review of the literature that has focused on the congruence-outcome relation. Chapter III describes the methodology of the study. Chapter IV delineates the results of the analysis. Chapter V summarizes the findings and discusses the implications for both researchers and practitioners, as well as recommendations for further research.

CHAPTER II

Literature Review

Person-Environment (P-E) Fit Theory

Modern career development and P-E fit theory can be traced back most directly to Frank Parsons in 1909. He is credited for the first model of vocational choice and framework for career-decision making and behavior. Parson's tripartite model is most succinctly delineated in the opening to his classic volume, *Choosing a Vocation:*

> In the wise choice of a vocation there are three broad factors: (1) a clear understanding of yourself, your aptitudes, abilities, interests, ambitions, resources, limitations, and their causes; (2) a knowledge of the requirements, conditions of success, advantages and disadvantages, compensations, opportunities, and prospects in different lines of work; (3) true reasoning on the relations of these two groups of facts (1909, p.5).

This model highlights the importance of the compatibility between an individual's characteristics and the characteristics of his or her environment. Parson's (1909) further reasoned that active engagement in career decision making resulted in better vocational outcomes, such as increased performance and greater satisfaction with their careers.

Patterson and Darley (1936) were the first to implement the P-E model and found that matching workers to occupations based on their scores on both ability and aptitude tests resulted in employees who were more productive and stable in the workforce. More recent studies have found that individuals not only prefer environments that are well matched with their own personality traits but they also seek them out (Roberts, Caspi, & Moffitt, 2003; Roberts & Robins, 2004). Studies have examined the effects of

misperceived fit and found that employees who recognize that the fit between them and an organization is not what was expected, experience reduced productivity, and/or terminate prematurely from the organization altogether (Dickson, Resick, & Goldstein, 2008; Schneider, 1987).

P-E fit has had a significant impact on the areas of personality (e.g., Roberts & Robins, 2004), social psychology (Aronoff & Wilson, 1985), and industrial and organizational psychology (e.g., Kristof-Brown, Zimmerman, & Johnson, 2005; Schneider, 1987). Compatibility between the person and his or her environment has been defined by comparing personality, values, goals, and abilities (Kristof, 1996; Schneider, 2001). However, the most heavily researched dimension on which this matching has been done is using vocational interests.

Holland's Theory of Vocational Interests

Vocational interests reflect a person's preferences for behaviors, situations, context in which activities occur, and/or the outcomes associated with the preferred activities (Rounds, 1995; Su, Rounds, Armstrong, 2009). John Holland's (1959, 1997) theory of vocational interests is arguably the most ubiquitous model of vocational interests. Holland organized vocational interests into six types; a Realistic type, this individual is interested in working with gadgets, things, or in the outdoor environment; an Investigative type, this individual is interested in the sciences, including, biological and medical sciences, and the physical and social sciences; an Artistic type, this individual prefers the creative arts, including the visual and performing arts and writing; a Social type, this individual prefers helping others; an Enterprising type, this individual prefers working in leadership or persuasive roles intended toward achieving an economic gain;

and a Conventional type, this individual thrives in a well-structured environment, particularly those in business settings. Collectively these six types are referred to as the RIASEC model. Holland further (1997, p.2) proposed that:

> Each type is the product of a characteristic interaction among a variety of cultural and personal forces including peers, biological heredity, parents, social class, culture, and the physical environment. Out of this experience, a person learns first to prefer some activities as opposed to others. Later these preferred activities become strong interests; such interests lead to a special group of competencies. Finally, these interests and competencies create a particular personal disposition that leads the person to think, perceive and act in special ways.

As illustrated in Figure 1, the six RIASEC interest types form a hexagonal structure with their relative degree of similarity being indicated by their proximity. Adjacent Holland types (e.g. artistic and investigative) are most related, alternate types (e.g. realistic and enterprising) have an intermediate relationship, and the opposite types (e.g. realistic and social) are least related. The hexagonal ordering of the six RIASEC types have been supported by large representative samples of college students (Day & Rounds, 1998; Day, Rounds, & Swaney, 1998), as well as structural meta-analysis of RIASEC correlation indices (Rounds & Tracey, 1993). Holland's hexagonal model is also preferred by researchers and clinicians alike because of its parsimonious interpretation of the interest structure.

Holland (1997) further proposed six types of work environments that are equivalent to the six RIASEC interest types. He stated that individuals are drawn to work environments that match their interests. More importantly, Holland posited that an

individual's work attitudes and behaviors are influenced by the compatibility of their interests and the environment such that he or she tends to be more satisfied, more successful, and more likely to persist if there is a good fit. For example, a student interested in investigative tasks will be more likely to perform well and persist if they are in a science major. This has become known as the *congruence hypothesis*.

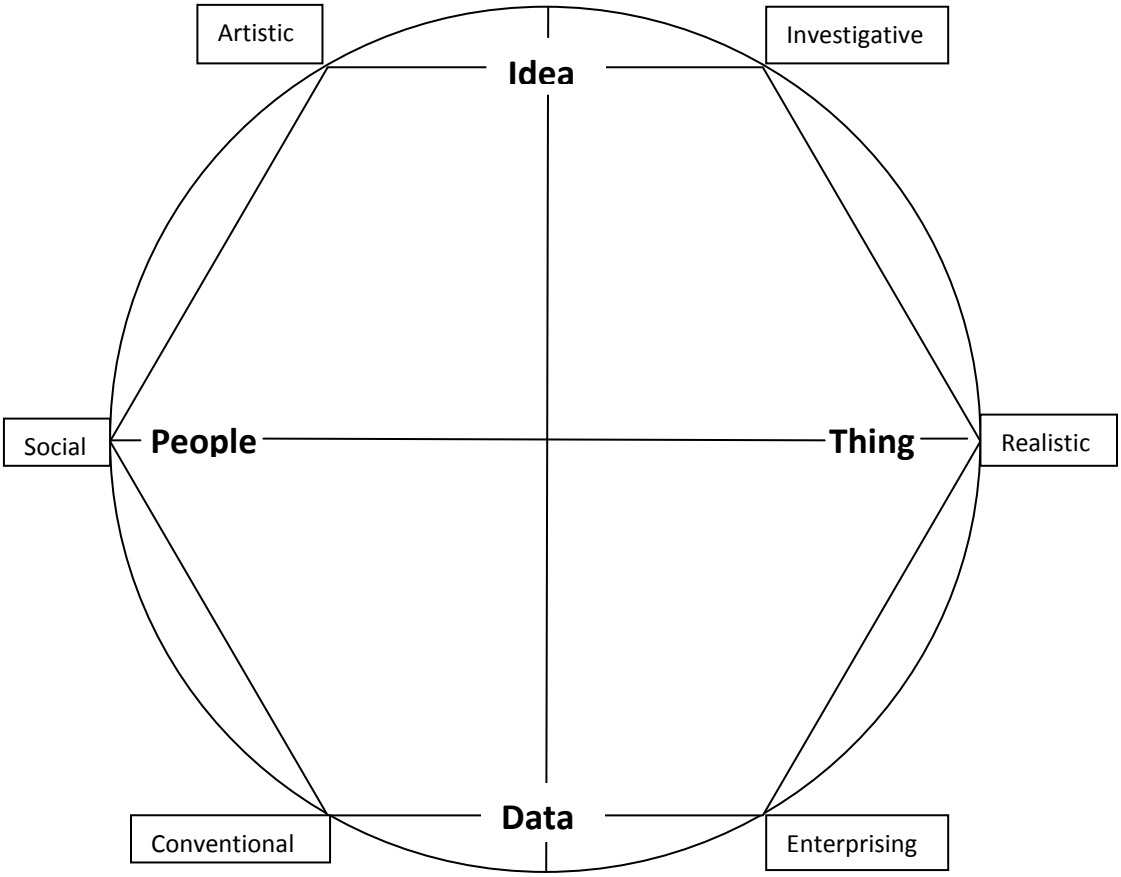


Figure 1. Spatial representation of Holland's RIASEC types and Prediger's underlying dimension

Holland (1997) also recognized that environments are rarely homogeneous. He found that many sub-environments exist within an organization or academic discipline. For example, students within different majors at the same university have different experiences because of varying programmatic nuances. Consequently, he suggested that it would be more accurate to assess the sub-environment, when examining an individual's match between their interests and the environment (Holland, 1997). Following this suggestion, we refer to the level of fit between a student's interest and his or her academic major environment as *interest-major congruence.* In the case of employees, we refer to this congruence as *interest-occupation congruence.* The focus of the current study is specifically on interest-major congruence and its relation to academic outcomes.

Operationalizing Congruence

A benefit of using the RIASEC model is that it allows commensurate examination of interests and the environment. However, there is a myriad of formulae for aggregating RIASEC interest scores with RIASEC occupations (Young, Tokar, & Subich, 1998). Since Spokane's (1985) review where he listed eight distinct indices for calculating congruence, the number of congruence indices more than doubled within the two years following. Assouline and Meir (1987) identified 16 different indices for measuring congruence. Examples of the array of congruence indices developed include the dichotomous first-letter agreement index (Holland, 1963), where congruence scores are computed by comparing first letter person and environment codes; the two-letter agreement index (Healy & Mourton, 1983), where participants are assigned a congruence score of 1 (lowest level of congruence), 2 (intermediate level), or 3 (highest level), based on the level of agreement between their first- and second-letter person and job codes; and

the Iachan (1984) M Index, where scores are computed by summing numerical weights that correspond to positions where interest–job matches occur. Holland (1987) endorsed the M index as the best available measure of congruence.

The plethora of congruence indices developed poses a number of issues in the determination of congruence. First, researchers have demonstrated that the congruence–outcome relation varies as a function of the congruence index used, such that results of studies will vary substantially (De Fruyt, 2002; Tinsley, 2000; Tsabari et al., 2005). Second, none of the indices represent the complexity of the entire RIASEC profile (De Fruyt, 2002). Instead they are generally gross simplifications of both the interest profile and occupation, thus omitting key information (Tracey, 2002). Typically, congruence is computed using only the first three interest types, usually referred to as high point codes. However, the Dik, Strife, and Hansen (2010) study offers support for the inclusion of the entire RIASEC profile and not just a subset. This would result in a more accurate representation and reduce the loss of useful information (Dik, Strife, & Hansen, 2010). The third reason that multiple congruence indices pose concerns is that the relative magnitudes of scores are not taken into account (Tracey & Robbins, 2006). For example, an individual with a very high Social score and moderately low Enterprising and Conventional scores would be classified as exactly the same as someone with a moderate Social score and slightly less Enterprising and Conventional scores. Fourth, is the problem of ties; these indicate an equal resemblance of two or more RIASEC types. Ties are often ignored or a random ordering is proposed because there is usually no external criterion available to decide on the ranking of tied letters. The prevalence of ties was highlighted in De Fruyt (2002) study. He found that 45% of all person profiles in a

sample of 934 participants had ties in their six-letter code. The aforementioned issues with the extant congruence indices highlight the importance of using an improved index.

Tracey and Rounds (1995) were the first to demonstrate that the organization of the six RIASEC types are arbitrary conveniences. Their results showed that the distribution of interest items around the circle was uniform; there were no clusters of interests. Consequently, interests could be represented using a circular structure, instead of just the six types. Given this and the difficulty involved in generating congruence indices using RIASEC scales, Tracey and Robbins (2006) proposed using Prediger's (1982) two dimensions of People/Things and Data/Ideas as an alternative representation of interests and occupations. This representation improves on the previous indices by providing a simpler means of portraying the occupation and interest profiles. Instead of six different scores, there are only two. More importantly, the two scores take account of the entire profile, not just the 1, 2 or 3 highest scores. To calculate the congruence index using Prediger's (1982) dimensions, Tracey and Hopkins (2001) suggested using Euclidean distance. Given that an individual's interests can be represented as a point on Prediger's People/Things and Data/Ideas dimensions, as can his or her occupation, the Euclidean distance between these two points provides an indication of the congruence. Closer points indicate greater congruence while more distal points indicate less congruence. This approach has received empirical support for its improvement over previous indices (Tracey & Hopkins, 2001; Tracey, Robbins, & Hofsess, 2005; Tracey & Robbins, 2006; Tracey, 2010).

Congruence Outcome Relations

Holland's (1997) congruence hypothesis has received substantial literature support with regard to its relation with three of Gottfredson's (1996) global career outcomes. These include performance, satisfaction, and persistence. The following paragraphs offer a review of the studies that have examined these congruence-outcome relations.

Performance. Academic performance, sometimes referred to as academic achievement, remains a salient outcome variable for college persistence (Brown et al., 2008; Kahn, Nauta, Gailbreath, Tipps, & Chartrand, 2002). Campbell, Gasser, and Oswald (1996) broadly defined performance as a behavior that is goal relevant and that can be evaluated in terms of its degree of contribution to relevant goals. Following from this definition, doing well in classes and completing a degree are behaviors focused on academic goal attainment. Poor academic performance is among the leading causes of students' early departure (i.e., leaving college prior to the sophomore year). This departure can significantly disrupt an individual's vocational progress, and therefore warrants further examination.

Past research has supported the theoretical link between congruence and academic performance. One such study was conducted by Nye and his colleagues in 2012. Using a comprehensive review of the interest literature that spanned 60 years of research, they examined the relation of both interest and congruence on performance using a meta-analysis of 60 studies and over 500 correlations. Specifically, the 60 studies were published between 1942 and 2011 and comprised 42 employed and 18 academic samples, with sample sizes ranging from 25 to1,390 and a total sample size of 15,301 (N = 9,472

in employed samples and 5,829 in academic samples). The researchers found that interest was moderately correlated with performance in both the academic and work domains. More specific to the current study, these researchers also found that congruence indices were stronger predictors of performance, in both samples, than interest scores alone.

Tracey and Robbins (2006) examined the relation between congruence and academic performance using a longitudinal design with a sample of 80,574 individuals enrolled in 87 colleges and universities across four states. Performance was measured using grade point average (GPA) assessed after the first and second years, as well as at graduation. Their use of GPA is consistent with prior research examining academic success (Bauer & Liang, 2003; Duff, Boyle, Dunleavy, & Ferguson, 2004; Farsides & Woodfield, 2003; Furnham, Chamorro-Premuzic, & McDougall, 2002; Gray & Watson, 2002; Lievens, Coetsier, De Fruyt, & De Maeseneer, 2002). Tracey and Robbins (2006) used Euclidean distance and angular agreement, two different but complete indicators of interest-major congruence, to examine the congruence-performance relation. They found that congruence predicted performance at all three time points in spite of institutional differences. These findings support the congruence hypothesis. Students enrolled in majors consistent with their interest tended to have higher GPA's than those individuals whose interest-major match was lower.

Academic Satisfaction. Lent and colleagues (2007) defined academic major satisfaction as the "enjoyment of one's roles or experiences as a student" (p. 87). Despite its assigned definition, academic satisfaction has been referred to as a potential proxy for measuring the outcomes of college students' decision making in lieu of job satisfaction. Nauta (2007) regarded academic major satisfaction and job satisfaction as similar seeing

that different academic settings, like jobs, lead to different opportunities to utilize skills and interests. Administrators and advisors regard academic major satisfaction as of utmost concern given its influence on student retention. Bailey, Bauman, and Lata (1998) found that academic satisfaction was significantly lower among students who failed to persist. While, the results of the study by Elliott and Shin (2002) found that student satisfaction positively impacted factors such as motivation, retention, and recruitment.

Of all the vocational outcomes examined, satisfaction has received the most empirical support with regards to congruence. Spokane (1985) was one of the first to conduct an investigation of this relation. He examined 63 studies, published between 1959 and 1983, that directly tested Holland's (1973) theory or made reference to the theory as an indirect test. He reported that 42% of the studies found mostly positive results between congruence and job satisfaction. Spokane and colleagues conducted a second investigation of 66 published congruence studies from 1985 to 1999 and found support for the relation between congruence and job satisfaction (Spokane, Meir, & Catalano, 2000). Assouline and Meir (1987) also carried out a meta-analytic examination of the relation between congruence and job satisfaction. The authors' analysis used 41 studies that yielded over 77 useful correlations. A significant relationship between congruence and job satisfaction was found. More importantly, the mean congruence-job satisfaction correlation was .35. This is contrary to Spokane's (1985) claim that congruence-outcome correlations do not exceed .30, otherwise known as the "magic .30 correlational plateau" (p. 335).

Job satisfaction was also found to be influenced by person-job fit in a meta-analysis of over 170 articles conducted by Krystof-Brown et al., (2005). A study

conducted by Morris (2003) showed similar results; there was a moderate relationship between interest congruence and job satisfaction. Oleski and Subich (1996) examined the present and intended occupation of 42 nontraditional students who returned to college after deciding upon a job change and found correlations between congruence and satisfaction averaging around .33. The authors noted that congruence ratios were substantially higher for respondents' intended occupation (the one they wanted to change to) than they were for their present occupation.

Despite the above empirical support, the meta-analytic study conducted by Tranberg, Slane, and Ekberg (1993) found that the overall relationship between person-environment congruence and satisfaction was non-significant. A breakdown of the results indicated mean correlations of .20 and .095 for congruence and job satisfaction (employees) and for congruence and academic satisfaction (students), respectively (Tranberg, Slane, & Ekberg, 1993). Surprisingly, Tranberg and colleagues (1993) is one among few studies that have examined the relationship between interest-major congruence and academic major satisfaction (Allen, 1996; Camp & Chartrand, 1992; Chartrand, Camp, & McFadden, 1992). Moreover, the assessments of this relationship have been shown to be consistently inclusive (Tranberg et al., 1993).

Intention to Persist. In addition to satisfaction and performance, persistence has also been shown to have a significant relation with congruence. Compatibility between an individual's interest and his or her environment leads to longer tenure in their job and persistence in academic majors. Allen and Robbins (2010) used a longitudinal design to assess the relation between interest-major congruence and timely degree attainment among four year (N=3,072) and two year (N=788) postsecondary institutions. The results

of their study demonstrated that students whose interests matched their majors tended to graduate on time or even early. The authors explained that their findings could be attributed to the decreased likelihood of students switching majors when there was high interest-major congruence. Frequent switching of majors could result in needing to complete extra course work that would in turn prolong students' graduation. These findings were consistent with the results of their previous study (Allen & Robbins, 2008); interest-major fit positively predicted whether a student would stay in their entering major.

Tracey, Allen, and Robbins (2012) also examined the relation of interest-major congruence on outcomes of academic success including persistence. They employed a sample of 88,813 undergraduates (38,787 men and 50, 026 women) from 42 colleges and universities across 16 states. These researchers examined three forms of persistence: enrollment status after one year, after two years, and major persistence in year 3. Tracey and his colleagues (2012) found mixed results. There was no significant relation between interest-congruence and the retention outcomes (either returning for the second or third years). However, interest-major congruence was significantly related to academic major persistence in year three. The researchers concluded that greater congruence in year one increased the likelihood of students' persisting in their academic major in year three. These finding highlight the importance of early and effective career and educational planning for students and institutions to support their initiatives toward timely degree attainment.

Summary and Recommendations of Congruence - Outcome Relation

The aforementioned results demonstrate that the fit between congruence and vocational outcome matters. Students with greater interest-major congruence are: (a) more likely to perform well academically; (b) more satisfied with their academic program; (c) and more likely to persist in their major. In short, the results support Holland's (1997) congruence hypothesis.

Despite the support for the congruence-outcome relations, the magnitude of this relation tends to be mixed and modest at best. This has resulted in a number of researchers calling for the abandonment of the centrality of the congruence-outcome relation in our theories (e.g. Arnold, 2005; Tinsely, 2000). Spokane (1985) was the first to highlight that the typical correlation between congruence and its most studied outcome, satisfaction, does not exceed .30. Assouline and Meir (1987) reported mean correlations of r = .06 between congruence and job performance; r = .21 between congruence and satisfaction. Tranberg, et al. (1993) reported similar results for their meta-analysis of 27 congruence-satisfaction studies (21 of which were included in Assouline and Meir's study). They found mean correlations of r = .20 between congruence and job satisfaction. These meta-analytic reviews demonstrate that the magnitude of this relation has yielded modest results.

Proponents of the congruence-outcome relation have put forth various explanations for these modest findings and have offered several recommendations. First, it has been noted that the magnitude of the congruence-outcome relation is what it should be (Rounds & Tracey, 1990; Tracey, Darcy, & Kovalski, 2000). Other areas of psychology, such as personality, have similar correlation magnitudes. Given the

predictability afforded in these areas, it is unreasonable to expect greater magnitude in the congruence-outcome relation (Tracey, 2007). Additionally, researchers have noted that the congruence-outcome correlations are comparable to those found in medicine (Meyer, et al., 2001). Overall, vocational outcomes are very integral to counseling psychology. So a contribution of 5% to 10% in explained variance, though small, is still very meaningful.

Second, some researchers (Tracey, 2007; Wilkins & Tracey, 2014) have posited that if congruence is occurring at all, then individuals would chose majors that are in line with their interests and change majors if needed. Thus the individuals enrolled in academic majors at the time of empirical assessment are likely to be those whose interest and major align the most. This results in relatively little variance to be detected by the congruence indices. Contrary to some claims (e.g., Tinsley, 2000), the lack of variance does not translate into poor validity of the congruence-outcome relation. It is unreasonable to expect a large congruence-outcome relation given the presence of self selection. It should be modest at best (Tracey, 2007). Third, and similarly, it has been noted that the modest findings are likely the result of a restricted range in both congruence and outcomes variables. This is largely due to ceiling effects being placed on the magnitude of the results (Dik & Hansen, 2010; Gore & Brown, 2006).

In addition to the aforementioned explanations of the modest congruence-outcome results, researchers have put forth a number of recommendations to further our understanding of this salient relationship. Among them are the inclusion of moderators and employing a longitudinal versus a cross-sectional design. The following sections provides a rationale for including these suggestions in future designs.

Gender Moderation

Researchers have posited that the congruence-outcome relation is accurately being depicted but have stated that a more nuanced understanding of this relation can be gained through the examination of moderators (Tracey, 2007; Tracey & Robbins 2006; Tracey, Allen, & Robbins, 2012; Willie, Tracey, Freys, & De Fruyt, 2014). According to Tracey (2007), the concept of moderation refers to the "magnitude of a relation between two variables being dependent upon a third variable" (p. 39). A common illustration of a moderation is finding that social support moderates the relation between stress and poor outcomes such that the wellbeing of individuals with high social support tends to be less impacted by the amount of perceived stress compared to those with low social support (e.g., Holahan & Moos, 1985). Spokane (1985) and Spokane et al. (2000) have put forth the notion that the modest results of the interest congruence-outcome relation could be partly due to the unexplained variance in this relation across differing individuals and environments. Consequently, researchers have recommended theoretically informed investigations of moderators on the congruence-outcome relation.

To date, several moderators have been put forth and examined. Tracey and Robbins (2006), for instance, found that an individual's interest level moderated the relationship between congruence and college persistence. Additionally, Tracey, Allen, and Robbins (2012) found evidence supporting the salient role of environmental constraint on the congruence-success relation among undergraduates. Tracey (2003, 2008), also demonstrated support for traitedness (i.e., adherence of RIASEC scores to a circumplex). Despite support for moderating variables, contextual variables (i.e., gender) are rarely examined. However, in order to investigate mean scale score differences of

contextual variables such as gender, it must first be determined that a similar scale structure exist for both genders (Hansen, Collins, Swanson, & Fouad, 1993). Tracey (1997) conducted an examination of the scales used in the PGI (i.e., occupational preference, activity preferences, and self-efficacy estimates) to assess whether gender differences existed in the scale structures. Results indicated that the PGI's spherical structure fit both men and women equally well. Consequently, the invariance of gender across the structure of interests and self efficacy was supported. These findings demonstrate that men and women use similar conceptual structures to organize their interest and self-efficacy, thus indicating that direct comparisons between men and women on similar scales can be explored.

Gender is regarded as a key person variable in understanding individuals' academic and career success (Lent, et al., 1994). Furthermore, the literature on college student retention has consistently noted the importance of gender in understanding retention (Peltier, Laden, & Matranga, 1999; Reason, 2003; Tinto, 1993). Due to the consistent results highlighting the gender differences across interests and self efficacy (Betz, et al., 1996; Betz & Fitzgerald, 1987; Hackett & Lent, 1992), gender has been cited as a potential moderating variable in need of further examination across congruence-outcome relations. Adams (2009) employed a sample of 144 undergraduate students to investigate the degree to which gender moderated the relation of interest-major congruence and self-efficacy major congruence. He found that these relations did not differ between men and women on either of the two academic outcomes (i.e., GPA and academic satisfaction). Adams (2009) cited the lack of variability in his sample as an explanation for the non-significant results. Of the 144 total participants, 117 were women

and the remainder men. Adams (2009) noted that the overrepresentation of one gender may have contributed to a lack of power in finding a significant moderating effect. He recommended further examination of gender as a moderator on the congruence outcome relation with a more evenly distributed sample.

Dynamic Reciprocity of the Congruence-Outcome Relation

The current literature on the congruence-outcome relation constitutes of studies that assess person-environment congruence at one time point and relate it to outcomes assessed at the same or a later time point (Ishitani, 2010). The prevalence of such static analyses leads one to believe that an assumption of linearity underscores this relationship. However, if congruence is operating any at all, then individuals should become more congruent as they develop (Tracey, 2007). Most researchers agree that P-E fit is the dynamic representation of continuous attempts of adjustment between the characteristics of the person and environment (Caplan, 1987; French, Rodgers, & Cobb, 1974). Rounds and Tracey (1990) refers to this process as dynamic reciprocity. According to Chartrand (1991), "the P-E fit perspective explicitly assumes that people and environments change continually in ongoing adjustment" (p.521). Similarly, Holland (1997) describes congruence as both a long-term and an interactive process whereby interests and environments mutually affect the other. Despite the consensus of the dynamic nature of congruence, empirical examinations of the adjustment over time has been largely ignored.

To date, only a handful of researchers have assessed the dynamic nature of congruence. These include both Tracey and Robbins (2006) and Tracey, Robbins, and Hofsess (2005) who investigated changes in congruence during adolescence and the

college years as well as Donohue (2006) who examined the change in congruence following a single career change. However, no study to date has empirically examined the dynamic reciprocity between congruence and outcomes. If the person and the environment are thought to influence the other over time, then a similar argument could be made for the influence of congruence and outcomes such that an individual with greater P-E fit would endorse more positive career or academic outcomes and then these outcomes would in turn impact the degree of congruence at a later time. In order to investigate this mutual effect, a longitudinal versus cross-sectional design is needed. Researchers have highlighted that non-linear examinations of the congruence-outcome relation might contribute to an improvement of the modest relations found thus far (e.g. Meir, Esformes, & Friedland, 1994; Spokane et al., 2000).

Purpose of Study and Research Questions

In keeping with these recommendations, I examined the congruence-outcome relation over the college years using both a cross-sectional and longitudinal research design, with a more precise indicator of interest-major match. Furthermore, I sought to expand our understanding of this relation by examining the moderating effect of gender. The following are the three research questions examined in the current study:

1. What is the relationship between interest-major congruence and academic satisfaction, academic performance, and intention to persist in ones academic major?
2. What is the moderating effect of gender on the relationship between congruence and academic satisfaction, academic performance, and intention to persist in ones academic major?

3. Employing a longitudinal design, what is the reciprocal relation between congruence and academic satisfaction, academic performance, and intention to persist in ones academic major?

CHAPTER III

Method

Participants and Recruitment

Upon receiving approval from the university's Institutional Review Board (see Appendix A), students were recruited from a wide cross-section of classes at a large university in the southwest. These classes included accounting, engineering, general education, career exploration and a number of other representative undergraduate courses. The resulting sample comprised of 931 students who ranged in age from 17 to 38 (M = 21.62, SD = 3.67). Thirty three percent of the sample identified as male (N = 304), 67% identified as female (N = 621), and 6 participants declined to provide their gender. Twelve percent of the sample were freshmen, 19% sophomores, 29% juniors, and 39% seniors. Participants' self-identified as Caucasian (56%), Latino/a (16%), Asian American (5%), African American (3.4%), Native American (1.2%), Bi-racial (3%), Multi-racial (10%), and International Students (5.4%).

The longitudinal sample was comprised of individuals who completed all three survey administrations. This included 173 students who ranged in age from 17 to 38 (M = 21.62, SD = 3.67). Twenty nine percent of the sample identified as male (N = 50) and 71% identified as female (N = 123). Fourteen percent of the sample were freshmen, 17% sophomores, 29% Juniors, and 39% seniors. Participants' self-identified as Caucasian (54%), Latino/a (17%), Asian American (5%), African American (4%), Native American (1.7%), Bi-racial (2%), Multi-racial (12%), and International Students (5%). See Table 1.

Table 1

Demographic Characteristics for Both Samples

	Cross-Sectional Sample (N = 931)		Longitudinal Sample (N = 173)	
	N	Percent	N	Percent
Gender				
Male	304	33	50	29
Female	621	67	123	71
Ethnicity				
Caucasian	521	56	93	54
Latino/a	149	16	29	17
Asian American	43	5	8	5
African American/Black	32	3.4	7	4
Native American	11	1.2	3	1.7
Bi-racial	23	3	4	2
Multi-racial	92	10	21	12
International Students	50	5.4	8	5
Class Standing				
Freshman	112	12	25	15
Sophomore	176	18.9	30	17
Junior	273	29.3	50	29
Senior	366	39.3	68	39

Measures

Demographic Form. A short demographic questionnaire was administered to collect data on participants' age, gender, race/ethnicity, major, and GPA. Participants were also presented with a list of seven barrier statements and were asked to indicate the barriers that would deter them from persisting to graduation in their current major.

Academic satisfaction. The seven-item scale developed by Lent, Singley, Sheu, Schmidtt, and Schmidtt (2007) was used to measure participants' academic satisfaction. Participants were asked to indicate the degree to which they agreed with each response using a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Example

items include “I feel satisfied with my decision to major in my intended field” and “I enjoy the level of intellectual stimulation in my courses.” Scores range from 7 - 35, with higher scores indicating greater academic satisfaction. Alpha coefficient for the total score was .89. Similarly, studies using this measure have reported coefficient alphas of .90-.93 (Duffy, Allen, & Dik, 2011; Ojeda, Flores, & Navarro, 2011). The results of Lent, Singley, Sheu, Schmidtt, and Schmidtt (2007) demonstrate that academic satisfaction correlated with both self efficacy and intended academic persistence in the expected direction. A copy of the instrument can be found in Appendix C.

Performance. Performance was assessed using participants current cumulative self reported Grade Point Average (GPA) assessed at the beginning of the fall semester (Time 1), and at the beginning of the spring semester (Time 2). GPA was not assessed at Time 3 because administration took place prior to students receiving their Spring semester GPA. A number of issues has been raised regarding the validity of using self-reported GPA instead of official school records. This concern is largely due to social desirability and the belief that respondents would inflate their GPAs. Contrary to this belief, Cassidy (2001) demonstrated that there was an overall correlation of .97 between student's self-reported GPA and school records. It should be noted that he found that the least accurate self report scores were of the students with the lowest official GPA. Bacon and Bean (2006) also found high correlations (i.e., .94) between self reported cumulative GPA and official school records. These results provide support for the use of self reported GPA in the current study.

Intention to Persist in One's Academic Major. An abbreviated version of Lent et al., (2003) Major Choice Goals was used to assess participants' intentions to persist in

their academic major. The original measure is comprised of four items but only two items were used in the current study. Participants were asked to indicate the degree to which they agreed with each response using a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The two items used in this study include, "I intend to remain enrolled in my current major over the next semester" and "I intend to remain enrolled in my current major over the next year." Alpha coefficient for the total score was .87. These two items were used in the current study because they more directly assessed intentions to persist compared to the other two items which included "I intend to excel in my current major" and "I intend to complete the upper level required courses in my major with an overall GPA of B or better". Furthermore, these two items evidenced greater internal consistency compared to the four item measure ($\alpha = .83$). Lent et al. (2003) reported an internal consistency for the four item measure of .95. Lent et al., (2007) also reported a similar coefficient alpha ($\alpha = .95$). Additionally, Lent et al., (2003) found that this measure strongly predicted actual persistence. A copy of the instrument can be found in Appendix G.

Personal Globe Inventory. Participants' interest scores were assessed using the Personal Globe Inventory –short form (PGI, Tracey, 2010). The PGI-S is an abbreviated version of the PGI (Tracey, 2002). The measure is comprised of two forms, based on item types; they include activity liking and activity competence beliefs. Each item type consists of 10 scales; the 8 basic interest scales (Social facilitating, Managing, Business Detail, Data Processing, Mechanical, Nature/Outdoors, Artistic, and Helping) and prestige (high prestige and low prestige scales). Each scale is comprised of four items, totaling 80 items across 20 scales for both item types. Participants were asked to rate the

extent to which they like an activity using a 7-point scale ranging from 1 (*very strongly dislike*) to 7 (*very strongly like*). Example activities include "Oversee building construction" and "Write a scientific article."

Three dimensions underlie the factor structure of the PGI-S, People/Things, Data/Ideas, and Prestige. This structure received strong empirical support across high school and college students, males and females, and different ethnic groups (Tracey, 1997, Tracey, 2002b; Tracey & Rounds, 1996). Similar results for the PGI-S were found in a study conducted by Zhang, Kube, Wang, and Tracey (2013). These authors also demonstrated that the PGI-S had good concurrent validity and test-retest reliability. A copy of the instrument can be found in Appendix E.

Derived Measures

Dimensional interest score. The interest estimates of each individual at each administration were expressed in T score units (mean 50, *SD* = 10) to allow both individuals and majors to be placed on the same scale.

Dimensional major scores. Participants were asked to provide the name of the academic major in which they were currently enrolled. The dimensional major scores were calculated by coding student major choices based on the National Center for Educational Statistics Classification of Instructional Program (CIP) taxonomy. The CIP contains over 1650 different majors and is the standard reporting system used by postsecondary institutions when categorizing majors and fields of study. The CIP listing was then converted into World-of-Work groups (Prediger & Vansickle, 1992; Swaney, 1995) using ACT's standard classification algorithm. The revised World-of-Work Map consists of six career clusters (i.e., Administration and Sales, Business Operations,

Technical, Science & Technology, Arts, and Social Service) and 26 career areas (ACT, 2001). These areas are: (A) Employment-Related Services, (B) Marketing & Sales, (C) Management, (D) Regulation & Protection, (E) Communications & Records, (F) Financial Transactions, (G). Distribution & Dispatching, (H) Transport Operation & Related, (I) Agriculture, Forestry, & Related, (J) Computer & Information Specialties, (K) Construction & Maintenance, (L) Crafts & Related, (M) Manufacturing & Processing, (N) Mechanical & Electrical Specialties, (O) Engineering & Technologies, (P) Natural Science & Technologies, (Q) Medical Technologies, (R) Medical Diagnosis & Treatment, Social Science, (T) Applied Arts (Visual), (U) Creative & Performing Arts, (V) Applied Arts (Written & Spoken), (W) Health Care, (X) Education, (Y) Community Services, and (Z) Personal Services.

Prediger and Swaney (2004) have provided support for this two dimensional representation of occupations. For the purposes of the current study, the two-dimensional coordinates of each group were put on a scale commensurate with the standardized scores (Mean = 50, *SD* = 10) used in the interest Things/People and Data/Ideas scores. Thus, all majors were translated using explicit algorithms into positions on a circular Things/People and Data/Ideas map with scores commensurate with those of standardized interest scores. This procedure was also used by Tracey et al. (2005). Participants who did not indicate an academic major were not assigned a code and were not included in subsequent analyses.

Calculation of Congruence Index. Two dimensional interest-major congruence was determined using Euclidean distance. This method takes the Euclidean distance of an individual's interest score on Prediger's two dimensions (i.e., People/Things and

Data/Ideas) from his or her major score on these same two dimensions. The formula for Euclidean distance equals SQRT((interest *T/P* – WWM *T/P*)^2 + (interest *D/I* –WWM *D/I*)^2), where WWM refers to the World of Work Map (http://www.act.org/wwm/). The Euclidean index ranges from 0, or no distance between person (interest, or self-efficacy) and environment (major) to infinity, where larger scores indicate greater distance between person and environment.

Procedures

The current longitudinal study was completed over the course of an academic year and in three administrations. At the start of the academic year, participants were informed of the study through in-class presentations conducted by this researcher as well as via electronic advertising disseminated by professors. In both cases, professors included the advertisement of the study on Blackboard, which provided interested participants with a link to access the electronic version of the survey via QuestionPro. Upon accessing the link, participants were presented with an electronic version of the cover letter which briefly described the current study, alerted them to the longitudinal design, requested their involvement in all three administrations, and asserted their rights to confidentiality. Participation was voluntary and students received extra credit for their participation in the survey administration at Time 1.

Upon agreeing to participate in the study, students were asked to complete an identification form to facilitate the matching of their surveys across all three administrations. A copy of this form is included in Appendix I. The ID code was comprised of the two digit month of their birthday, first initial, last initial, and the last two digits of their student ID (e.g., 11KW15). Participants were also asked to provide at

least one email address, but preferably two, to ensure that they could be contacted for the follow up administrations. Participants were also asked an additional identification question in the demographic questionnaire (i.e., "What is the name of your last high school?") to assist in separating participants' ID codes in the event that two or more participants had the same ID code.

The survey packet at Time 1 was administered within the first month of the Fall semester and took an average of 15 minutes to be completed. Participants received extra credit for their participation in Time 1. Students interested in receiving extra credit were asked to complete a separate survey with their full name, the course name and number for which they were getting extra credit, and the professors full name and email address. Students were asked to complete a separate form to ensure that their responses were not directly tied to their identifying information. The survey packet at Time 2 was administered within the first month of the Spring semester. Only the students who completed the first administration were emailed at Time 2 and invited to participate in the next phase of the study. Seeing that participants were not enrolled in the same classes from which they were recruited, they were instead given a monetary incentive for their participation. Students were entered into a raffle for a chance to win one of 200 electronic gift cards from a prominent online retailer valuing $10. For the third and final survey administration, students who participated in both Time 1 and Time 2 were emailed and invited to participate in the online survey packet. The survey was administered in the last month of the Spring semester. Similar to Time 2, participants were entered into a raffle to win one of 100 electronic gift cards in the amount of $5. Recipients of the electronic gift cards were randomly selected using a Random Number Generator and the gift cards were

emailed to the addresses on file. Once data collection closed, the data was downloaded and prepped for data analysis.

Analyses

A series of path analyses were used to assess the research questions. The predictor variables include interest–major congruence and the outcome variables include academic satisfaction, academic performance, and intentions to persist. Path analysis was employed using the M*plus* 6.12 (Muthen & Muthen, 1998-2010) with maximum-likelihood robust (MLR) estimation. Path analytic approach was deemed most appropriate given its capability to simultaneously examine multiple observed variables in the hypothesized models. Congruence-outcome relations are typically assessed using regression analysis**.** However, standard regression approaches only allow the prediction of one outcome variable at a time, which hinders the examination of the interrelationships that could possibly exist between the multiple variables of interest. The following is a detailed description of the analyses used to test each research question.

1. **What is the relationship between interest-major congruence and academic satisfaction, academic performance, and intention to persist in ones academic major?**

In order to examine the first research question, a standard path analysis was conducted to test the hypothesized model (Fig. 2). Given that the survey administration at Time 1 yielded the largest response, research question 1 was assessed using data collected at Time 1. Specifically, the model comprised of Interest-Major congruence, as measured by Euclidean Distance at Time 1, predicting academic performance, academic satisfaction, and intentions to persist all assessed at Time 1. Multi-item measures (i.e., Academic

Satisfaction and Intentions to Persist) were averaged into subscale scores and these scores were used in the subsequent analyses.

Several different indicators of fit are typically used to assess the fit of path models, the most common being the chi-square goodness-of-fit index. Non-significant chi-square values indicate that the model fits the data, whereas significant chi-square values indicate poor model–data fit. Hu and Bentler (1998) recommended the use of two other indices of model fit, the root-mean-square error of approximation (RMSEA; Steiger, 1989; Steiger & Lind, 1980) and the standardized root-mean square residual (SRMR). These two indicators were found to most likely result in valid conclusions under a variety of conditions (e.g., small sample size).

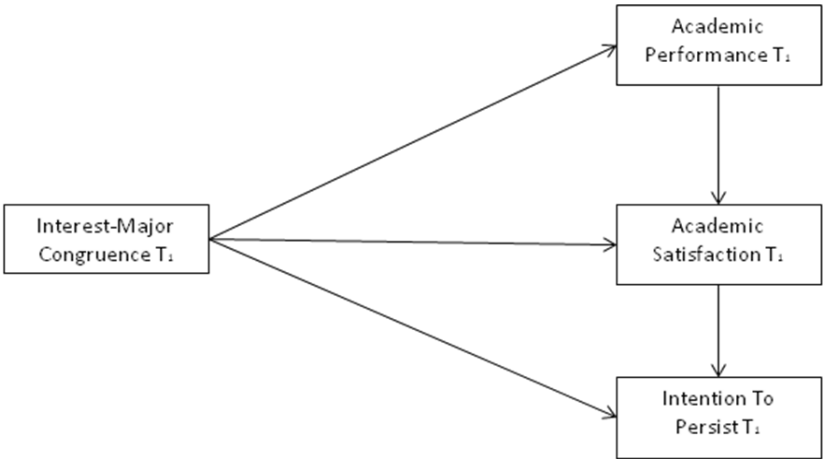


Figure 2. Hypothesized cross-sectional congruence-outcome relationship

Therefore, these were the indicators given the most weight in the determination of model–data fit in this study. Browne and Cudeck (1993) proposed that RMSEA values of less than .05 indicate very close fit and that values between .06 and .08 indicate fair fit.

RMSEA values over .10 are viewed as indicative of poor fit. MacCallum, Browne, and Sugawara (1996) viewed RMSEA values between .08 and .10 as indicative of mediocre fit. Quintana and Maxwell (1999) recommended that SMSR values below .10 be viewed as indicative of good fit. The comparative fit index (CFI) was also included as it has been commonly used in the past and can serve as a reference to past research.

2. **What is the moderating effect of gender on the relationship between congruence and academic satisfaction, academic performance, and intention to persist in ones academic major?**

In order to examine the moderating effect of gender, a multi-group path analysis was employed. Multiple-group path analysis is used to study group differences (i.e., invariance) on structural parameters by simultaneous analysis of several groups of individuals (Muthén & Muthén, 1998-2006). In order to test for invariance across multiple groups (i.e., male and females), an examination of hierarchical ordering of nested models needs to be conducted (Bentler, 1990). First, a baseline model, wherein no constraints were specified, was established. Specifically, all the paths from interest-major congruence to the three academic outcomes were allowed to freely estimate for both men and women. For the second model, all paths were constrained to be invariant between the groups. Given that the constrained model was nested within the baseline model, the Satorra-Bentler chi square difference test was used to examine the difference between the two models. This method takes the difference between the two chi square values and tests this value against the critical value associated with the difference in degrees of freedom (Jöreskog, 1978; Long, 1983). If the chi-square difference test exhibits a significant

difference between the two models, then gender is said to moderate the congruence-outcome relationship (Muller et al., 2005; Preacher et al., 2007). A a non significant chi-square difference test denotes the lack of a gender moderation. In the case where the two models differ based on gender, a series of follow-up analyses were conducted to determine the specific parameter estimates that differ significantly between males and females. These analyses were conducted using M*plus* (Muthén & Muthén, 1998-2006).

3. **Employing a longitudinal design, what is the reciprocal relation between congruence and satisfaction with ones major, academic performance, and intention to persist in ones academic major?**

A similar path analytic procedure was utilized to assess research question three. However, analysis included data collected at all three time points. The use of scale scores as manifest variables, greatly reduced the number of parameters required. As such, it results in a more appropriate examination in the event of a small sample size which was the case for the longitudinal sample. Similar goodness-of-fit indices were also employed in assessing research question three (i.e., chi-square, CFI, SRMR, RMSEA).

CHAPTER IV

Results

Data Cleaning and Missing Values

The data were downloaded into SPSS from QuestionPro. Of the original 1,091 cases, 160 contained no data or a significant amount of incomplete data (e.g., did not complete an entire measure) were deleted (N = 931).

Descriptive Statistics

The means and standard deviations of the cross-sectional and longitudinal measures are presented in Table 2-3, respectively. Overall, the fit between participants' interest and major was moderately congruent. Euclidean distance ranged from 1.18 to 143.35 (M = 60.77) in the cross-sectional sample and .53 to 134.00 (M = 58.10) in the longitudinal sample. Lower congruence indices indicate greater compatibility between an individual's academic major and interest. Scores on measures of academic satisfaction were relatively high in both the cross-sectional sample (M = 4.06) and the longitudinal sample (M = 4.12) indicating that participants were highly satisfied with their academic environment and major. Similarly, participants strongly endorsed intentions to persist in their academic majors, both in the cross-sectional model (M = 4.58) and the longitudinal model (M = 4.54).

Table 4 outlines the academic related characteristics of both the cross-sectional and longitudinal samples. Participants in both samples were primarily enrolled in the following four academic majors: psychology, accounting, and human development and family studies. Fifty-two percent of the cross-sectional sample and 45% of the

longitudinal sample indicated that they have previously changed their major, with majority changing their majors at least once. Only 7-8% of the samples endorsed intention to change their major again. The majority of participants cited disinterest in major as the barrier most likely to hinder their persistence. Nonetheless, the overwhelming majority of participants in the cross-sectional (73%) and longitudinal sample (79%), indicated that they intended to persist to graduation in their current major.

Table 2

Means, Standard Deviations, and Correlations of Variables in the Cross-Sectional Model

Variables	1	2	3	4	5	*M*	*SD*
1. Interest-Major Congruence$_{T1}$	-					60.77	26.27
2. Academic Satisfaction$_{T1}$	-.01	-				4.06	0.7
3. Intentions to Persist$_{T1}$	-.01	.44**	-			4.58	0.81
4. Academic Performance$_{T1}$	.03	.18**	.16**	-		3.3	0.55
5. Gender$_{T1}$ (M = 1, F = 0)	.38**	-.10**	-.05	-.05	-	-	-

Note. ***p* <.01

Bivariate Relationships among Variables

The correlations for the variables in the cross-sectional model are reported in Table 2 Interest-major congruence was not significantly correlated with academic satisfaction, (r = -.01, p > .05), intentions to persist (r = -.01, p > .05), or academic performance (r = .03, p > .05). However, interest-major congruence was significantly correlated with gender (r = .38, p < .01) such that women reported greater compatibility. Similarly, women demonstrated greater academic satisfaction as evidenced by the significant relationship between gender and academic satisfaction (r = -.10, p < .01). An intercorrelation matrix (Table 3) shows similar results among the variables in the longitudinal model. There was a significant relationship between gender and congruence at Time 1 (r = .38, p < .01), Time 2 (r = .35, p < .01) and Time 3 (r = .36, p < .01) such

that women demonstrated greater interest-major match. However, congruence evidenced a non significant relationship with academic satisfaction, intentions to persist, and academic performance across all three time points (see Table 3 for details).

Path Analysis of Cross-Sectional Congruence-Outcome Relation

A path analyses was performed to determine the relationships between interest-major congruence and the three academic outcomes. Figure 2 illustrates the hypothesized relationship among the variables. Results demonstrated that the model exhibited good fit, χ^2 (1) = 7.98, p <.05, with CFI = .96, RMSEA = .09 (.04-.15), and SRMR = .02. However, the path estimates for all three congruence-outcome relations were found to be non-significant. See Figure 3 for the final model.

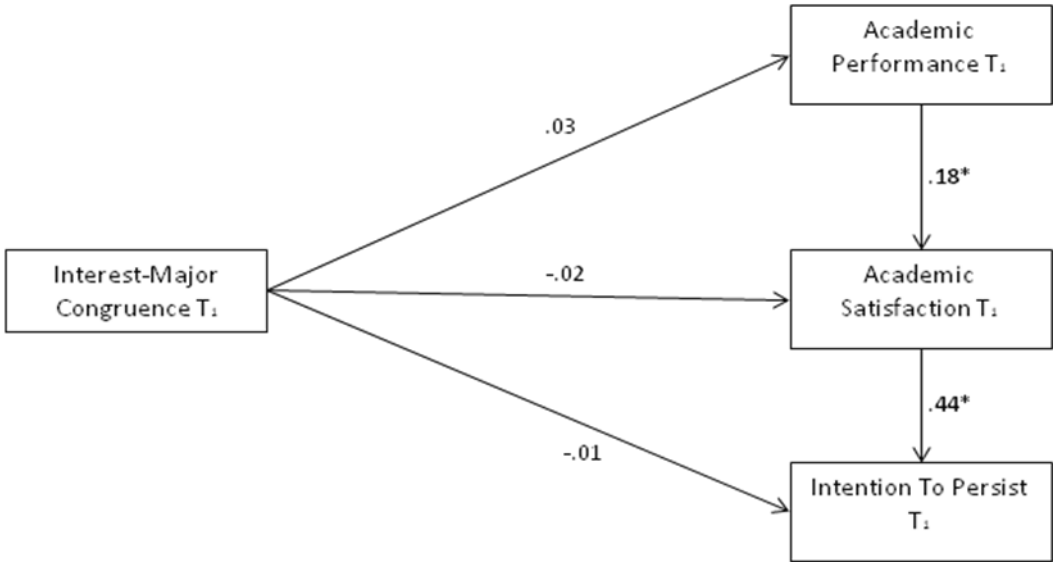


Figure 3. Results of the cross-sectional congruence-outcome relationship path analysis. Path coefficients represented are the standardized estimates. *p <.001

Table 3

Means, Standard Deviations, and Correlations of Variables in the Longitudinal Model

	1	2	3	4	5	6	7	8	9	10	11	12	*M*	*SD*
1. Interest-Major Congruence$_{T1}$	-												58.99	26.26
2. Interest-Major Congruence$_{T2}$	.89**	-											58.89	28.78
3. Interest-Major Congruence$_{T3}$	.89**	.91**	-										56.43	28.17
4. Academic Satisfaction $_{T1}$	-.02	.01	-.05	-									4.19	.64
5. Academic Satisfaction $_{T2}$	.01	.08	.01	.49**	-								4.13	.68
6. Academic Satisfaction $_{T3}$	-.04	.02	-.04	.47**	.56**	-							4.04	.78
7. Intentions to Persist $_{T1}$	.07	.08	.08	.36**	.38**	.15	-						4.72	.70
8. Intentions to Persist $_{T2}$	.00	-.02	.01	.08	.32**	.10	.22**	-					4.44	.96
9. Intentions to Persist $_{T3}$	.07	.05	.12	.07	.11	.05	.05	.38**	-				4.46	.96
10. Academic Performance $_{T1}$	-.06	.04	-.02	.03	.16	.10	.13	.11	.003	-			3.48	.54
11. Academic Performance $_{T2}$	-.01	.07	.02	-.00	.11	.12	.04	.22**	.05	.85**	-		3.50	.51
12. Gender $_{T1}$ (M = 1, F = 0)	.38**	.35**	.36**	-.13	-.03	-.04	.07	.06	.04	-.10	-.13	-	-	-

Note. **p <.01

Table 3

Academic Related Characteristics for Both Samples

Variables	Cross-Sectional Sample (N = 931)		Longitudinal Sample (N = 173)	
	N	Percent	N	Percent
Top 5 Majors				
Psychology	106	11	29	17
Accounting	101	11	21	12
Family Studies	88	9.5	24	14
CIS	47	5	5	3
Journalism	45	5	9	5
Changed major previously	488	52	78	45
Number of major changes				
Once	309	33	53	31
Twice	92	10	12	7
Three times	59	6	8	5
Four times	15	2	3	1.7
More than 5 times	10	1	2	1.2
Intend to Change Current Major Again	71	8	12	7
Barriers to Persisting in Current Major				
Financial pressures	236	25	43	25
Disinterest in major	239	25	52	30
Few job opportunities in this field	210	23	37	21
Limited support from current advisor	50	5	10	6
Parental pressure	60	6	11	6
Feeling overwhelmed by academic demands	229	25	45	26
Competing demands for your time	134	14	18	10
Intend to Graduate with Current Major	677	73	137	79

Multi-group Path Analysis

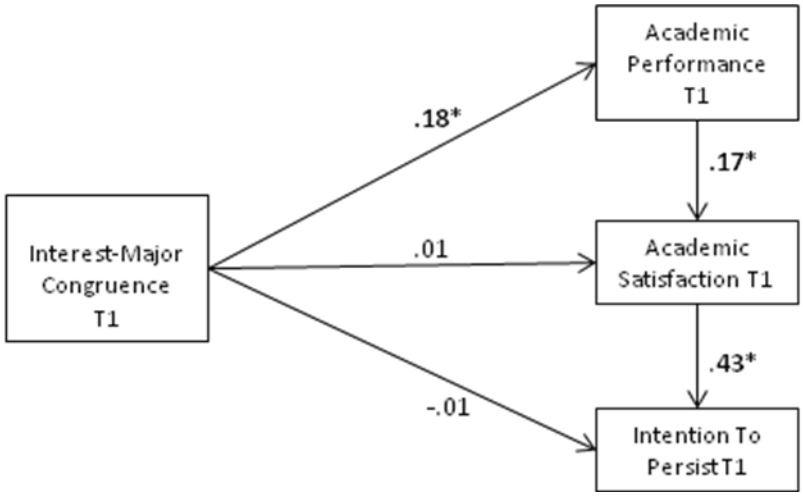
To examine the moderating effect of gender on the relations of congruence on students academic satisfaction, intentions to persist, and academic performance a multi-group path analysis was conducted. The first step involved testing the unconstrained path model where all paths were allowed to freely estimate between genders. The results indicated a relatively good fit to the data [χ^2 (6) = 10.63, *p* =.10, with CFI = .98, RMSEA = .04 (.00 - .08), and SRMR = .04]. An inspection of the modification indices and residuals did not demonstrate that any paths needed to be added. The second step involved constraining all the path estimates to be equal. These constraints did not provide as good a fit [χ^2 (8) = 37.42, p <.05, with CFI = .86, RMSEA = .09, and SRMR = .07] when compared to the fit statistics of the unconstrained model, especially when considering the drop in chi-square test statistics.

The results of the Satorra-Bentler chi-square difference test for the multiple group gender comparison suggest that making the structural parameters equal for both men and women resulted in a statistically significant worsening of model fit ($SB\chi^2_{diff}(6)$ =29.60, *p* < .05). Consequently, the null hypothesis that the paths are the same for these groups is rejected. Next, I examined the specific parameter estimates to determine if they differed across gender. Results indicated that the interest-major congruence -> academic performance path was significantly different for men and women ($SB\chi^2_{diff}(1)$ = 6.82, p =.009). The congruence-outcome relations differed significantly for men and women such that men evidenced a positive relationship between interest-major congruence and academic performance. This relationship was non-significant for women (See Figure 4).

Path Analysis of the Reciprocal Congruence-Outcome Relation

In order to examine the reciprocal relations of the congruence-outcome relation, a path analysis was conducted using the longitudinal data with a combined sample of 173 participants. A graphical representation of the hypothesized model between congruence and the three academic outcomes (i.e. academic satisfaction, intention to persist, and academic performance) is depicted in Figure 5. The results demonstrated that the final model exhibited moderate fit to the data [χ^2 (29) = 63.48*, p <.05, with CFI = .95, RMSEA = .08 (.06-.11), and SRMR = .05]. Figure 6 illustrates the results of the final model. A significant relationship was found between interest-major congruence and academic performance. However, this relationship was positive indicating that students were performing despite poor interest-major match. Two findings were particularly unique to this study, both academic satisfaction and intentions to persist significantly predicted interest-major congruence. The results of the former relationship, that is the intentions to persist on congruence relation, was a positive relation indicating that students will continue to persist despite poor interest-major match. The latter results are more intuitive seeing that students who felt more satisfied tended to report greater interest-major congruence over time. Additionally, each variable (i.e., interest-major congruence, academic satisfaction, academic performance, and intention to persist) significantly predicted themselves at subsequent time points. That is, congruence predicted subsequent congruence scores and likewise for academic satisfaction and intention to persist. Similar to the other variables, academic performance at time 1 significantly predicted performance at time 2. It should be noted that academic performance was assessed at two time points, instead of three.

Males



Females

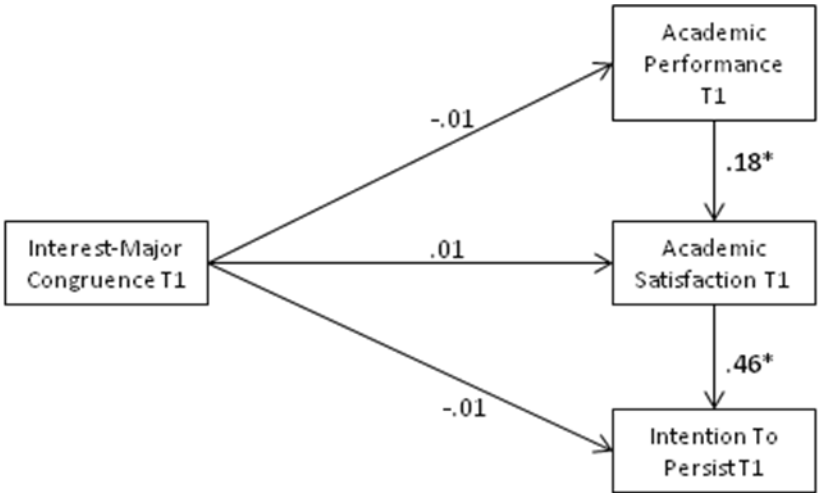


Figure 4. Results of the multi-group path analysis of gender invariance across the cross-sectional congruence-outcome relationship. Path coefficients represented are the standardized estimates. *p <.001

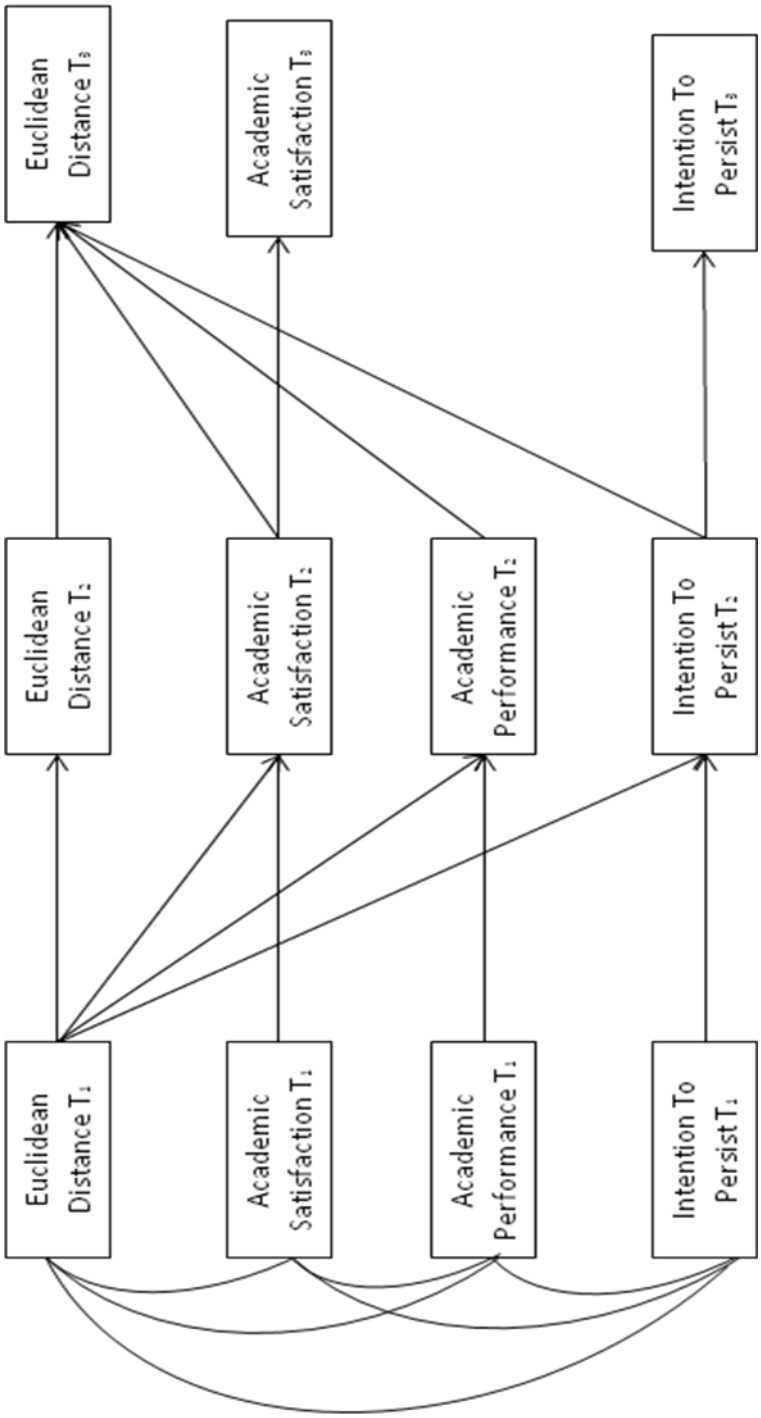


Figure 5. Hypothesized longitudinal model illustrating the reciprocal relation between congruence and academic outcomes.

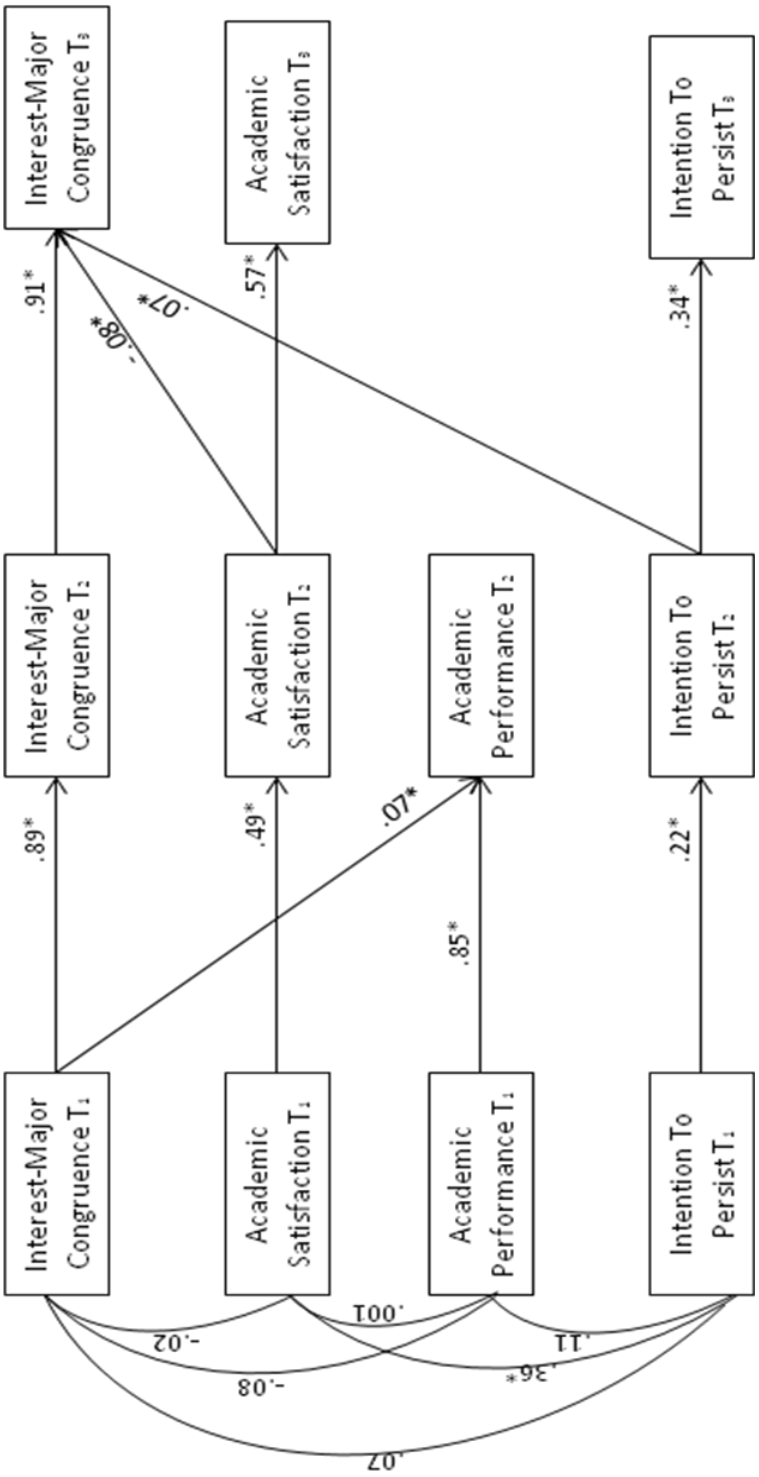


Figure 6. Results of the path analysis examining the reciprocal relation between congruence and academic outcomes

CHAPTER V

Discussion

One of the foundational premises of vocational psychology is that people will amass greater success and satisfaction when there is strong compatibility between the characteristics of the person and the corresponding occupational or academic environment. This concept dates back to Frank Parsons in 1909 and was regarded by John Holland as the congruence theory. Holland's research has focused on interest as the salient characteristic of the person. Furthermore, he posited the notion that greater interest-environment match leads to more positive occupational and academic outcomes. Given its prominence in the vocational psychology literature, the congruence-outcome relation has received significant empirical attention. Despite this attention however, Holland's theory has not received unanimous support. It has been suggested that the inconsistent findings are the result of inadequacies in the congruence indices, the need for more complex examinations of the congruence-outcome relation such as the use of moderations, and more dynamic investigations of this relation.

Consequently, the current study sought to examine the relationship between interest-major congruence and three academic outcomes (i.e. academic satisfaction, academic performance, and intentions to persist) using a more precise congruence index, employing both a static and dynamic research design, and incorporating an investigation of the moderating effect of gender. A greater understanding of the congruence-outcome relation would further our understanding of the influential factors on college students' persistence, satisfaction, and performance, which in turn can impact their degree

attainment. Such an understanding is especially crucial given the salience of a post-secondary education in acquiring an entry level position and advancing one's career.

The results of the current study however, highlight nuanced complexities that arose in the examination of the congruence-outcome relation. The subsequent section not only offers an interpretation of the study's results but also augments this discussion with the unique particulars that possibly influenced these results.

Overview of Findings

Academic Related Characteristics of the Current Sample. Based on the demographic results, nearly 70% of the study's sample was comprised of students in their junior and senior years of college. Given that these students are likely toward the end of their collegiate career, it is fitting that they would have completed many of the steps needed to improve their interest-major match. Over 50% of the sample reported changing their major previously and of these major-changers, 9% had already changed their major more than three times. Furthermore, only 8% intended to change their major again. In the event that these students were still dissatisfied with their majors, it is likely that they would consider it too late to change and instead choose to graduate in their current major. A total of 25% of the total sample cited disinterest in their academic major as a possible barrier to them persisting in their current major. Despite this however, 73% of the sample indicated that they intended to graduate in their current major. The means for all three academic outcomes indicated that students strongly agreed with questions regarding their academic satisfaction and intentions to persist, as well as evidenced an above average GPA. Overall, the unique characteristics of this sample, including the overrepresentation of juniors and seniors, could significantly impact the results of the study.

Static Examination of the Congruence-Outcome Relation. A main aim of the current study was to examine the congruence-outcome relation using an improved fit index given the documented inadequacies of the previous indices. To investigate this aim, a static (i.e., cross-sectional) research design was utilized. Despite the application of an improved fit index, that is the Euclidean Distance, the results of the study did not support the congruence-outcome relation for all three criteria (i.e., academic satisfaction, academic performance, and intentions to persist). These findings are consistent with the equivocal results found in the literature with academic performance (Allen & Robbins, 2010), satisfaction (Tranberg, Slane, and Ekeberg, 1993; Young, Tokar, & Subich 1998), and persistence (Tracey, Allen, and Robbins, 2012). An often-cited problem in the congruence-outcome literature is the tendency for measures to have a restricted range. Given the high means reported for all three outcome measures a similar problem is evidently occurring in the current sample. With the majority of the sample endorsing academic satisfaction, intentions to persist and performance, the data would have limited variability thus hindering the likelihood to detect significant differences.

Moderating Effect of Gender. Some researchers have recommended the examination of moderators in order to get a more nuanced understanding of the congruence-outcome relation (Tracey, 2007; Tracey & Robbins 2006; Tracey, Allen, & Robbins, 2012; Willie, Tracey, Freys, & De Fruyt, 2014). Gender is considered as one of the most salient person variables in understanding college retention (Reason, 2003) as well as, academic and career success (Lent, et al., 1994). A second purpose of the current study was to investigate the moderating effect of gender on the congruence-outcome relation.

The results of the current study demonstrated that the congruence-performance relation differed for men and women. Specifically, the results indicated that men performed well academically despite having poor interest-major match. This finding is somewhat counter intuitive as it implies that congruence might be an irrelevant construct for men. However, further examination of the sample characteristics helps to understand this result. The results of the bivariate correlation demonstrates that men have poorer interest-major match and are less satisfied with their academics compared to their female counterparts. Furthermore, male students made up only 33% of the sample, and of this group of men, approximately 75% were juniors and seniors. With the overwhelming majority of the male sample being upperclassmen, it is likely that the gender moderating effect is an artifact of the unique makeup of the sample versus a phenomenon generalizable to the larger population. One hypothesis is that these men could be performing well academically despite poor fit because of their desire to graduate which would require passing grades. This need to graduate is being experienced by a large proportion of the sample, which could result in the appearance of men performing despite poor fit.

Reciprocal Congruence-Outcome Relation. An underlying premise of congruence is that interest and the environment are continuously engaging in an interactive process and mutually affecting each other. Rounds and Tracey (1990) refers to this process as dynamic reciprocity. Despite the recognition of the dynamic nature of congruence, empirical examinations tend to be carried out using a static research design. The third aim of the current study was to extend the concept of dynamic reciprocity and apply it to the congruence-outcome relation. Specifically, this study examined the

reciprocal relation between interest-major congruence and the three academic outcomes (i.e. academic satisfaction, academic performance, and intention to persist) using a longitudinal design. The results of the current study were consistent with the aforementioned findings. First, a significant positive relationship was found between interest-major congruence and academic performance. Second, both academic satisfaction and intentions to persist significantly predicted interest-major congruence.

The first set of results implies that students are performing well academically despite poor fit. These findings once again appear counterintuitive. However, the longitudinal sample is a subset of the larger cross-sectional sample. As such, the uniqueness of this study's sample characteristics is likely to be influencing the results of the longitudinal data. Similar to the above-mentioned rationale, nearly 70% of the longitudinal sample is comprised of juniors and seniors. Academic performance directly influences this groups' ability to graduate. As such, they are more likely to continue performing even despite poor interest-major match.

Although the results of the current study do not support the reciprocal relation between congruence and outcomes, the second set of findings demonstrate that academic outcomes, namely intention to persist and academic satisfaction, predict interest-major congruence. No other study has demonstrated these significant relations. Satisfaction is the most researched criterion in the congruence-outcome literature. The results of this study build upon the existing congruence-satisfaction findings by demonstrating that satisfaction can in turn predict congruence. Students who feel more academic satisfaction experience greater interest-major match over time.

While some aspects of this study further the equivocal standing of the congruence-outcome relation, it also offers a number of useful results that improve our understanding of this relation. This study demonstrated a non-significant relation between congruence and the three academic outcomes (i.e. academic satisfaction, academic performance, and intention to persist). However, it illustrated factors that might impact the examination of the congruence-outcome relation such as sensitivity to sample characteristics. The results of the study also demonstrate the predictive capability of academic satisfaction on congruence. In line with Osipow and Fitzgerald (1996) the question of the relation between fit and outcome remains "unsettled".

Limitations

Despite the unique contributions of the present study, there are a number of limitations that need to be discussed. First, there were limitations regarding the sample characteristics. As previously mentioned, the majority of the study's sample was comprised of students in their junior and senior years. Consequently, the sample was largely homogenous and unrepresentative of the larger college population. The sample characteristics were likely a result of the student's available to participate in the study; the professors who were most willing to provide extra credit for students' participation instructed upper division courses designed for juniors and seniors. Although attempts were made to recruit from 100 and 200 level classes, professors often reported that they had a number of alternate research opportunities for which they were already giving extra-credit.

Additionally, a sample with such an overwhelming majority of students towards the end of their studies could result in little variability in scores on the academic

outcomes (i.e., academic satisfaction, intention to persist, and academic performance). This can result in ceiling effects and can significantly hinder the capability to detect significant differences. Another explanation for the ceiling effects noted in the study is the limited scale range of the measures used to assess the academic outcomes. Two of the three measures used scales that ranged from 1-5. If interest-major congruence is working, then participants would more than likely score towards the high end of the measures. Consequently, a measure with a broader scale range could more accurately capture the nuanced differences at the higher end of the scale thus increasing the likelihood of increased variability.

Another limitation stems from the overly restrictive view of using only interests as an indication of the environment in P-E fit (Hogan & Roberts, 2000; Schneider, Smith, & Goldstein, 2000; Walsh, 2001). As previously mentioned, Holland's (1997) interest model affords the commensurate assessment of both the individual and the environment which makes assessment easier. However, interests are argued as too narrow to account for all the important variance in the person-occupation congruence. As a result, it has been recommended that other factors be examined to define P-E fit (e.g., self efficacy).

Implications

The results of this study offer new and unique perspectives for the relationship between interest-major congruence and academic outcomes. Gender was found to significantly moderate the relationship between congruence and academic performance. Additionally, women tended to report greater interest-major congruence. Unique to this study is the finding that student's level of academic satisfaction can influence the degree of fit between their interest and academic major. The results also highlight the tendency

for students further along in their academic tenure to persist to graduation despite poor fit. This has significant implications for educators and administrators who tend to guide and advise students' academic major decision making. These results highlight the salience of engaging in career and major exploration in the earlier years given that congruence is likely to play a less significant role in the later years when students are nearing graduation. Further examination of the congruence-outcome relation with a sample that is more representative of students across all four years of college is warranted.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD EXEMPTION NOTIFICATION

ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

To:	Terence Tracey EDB
From:	Mark Roosa, Chair Soc Beh IRB
Date:	07/29/2013
Committee Action:	**Exemption Granted**
IRB Action Date:	07/29/2013
IRB Protocol #:	1307009443
Study Title:	An Expanded View of Congruence

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

APPENDIX B

PARTICIPANT RECRUITMENT SCRIPT

Hello!

My name is Kerrie, and I am a doctoral student under the direction of Professor Tracey in the School of Letters and Sciences. I hope that the beginning of the semester is going well for each of you.

I am conducting a research study to examine the influential factors on undergraduate students' academic success and I am inviting your participation. This will involve filling out an anonymous online survey three times over the course of the 2013-2014 academic year. Your first participation will occur at the beginning of the fall 2013 semester for which you will receive extra credit from your professor for your participation. The second participation will take place at the beginning of the spring 2014 semester and you will receive a $5 electronic gift card to a prominent online retailer for your participation. Lastly, the third participation will occur at the end of the spring 2014 semester and you will receive a similar electronic gift card but in the amount of $10. The online survey will take about 10-15 minutes to complete at each administration. There are no right or wrong answers to any questions on the survey. Your participation in this study is voluntary, and you can withdraw from the study at any time with no penalty. You must be at least 18 or older to be part of the study.

If you are interested, please click on the following link to access the survey. The deadline to participate is September 27th, 2013 at midnight. You can access the survey anytime between now and then. Upon participating, you will be directed to a separate link where you will be asked to enter your full name, email address and to select the instructor and course name and number for which you are receiving extra credit. This information will be kept separately from your survey responses. Your name will be sent to your professor within two weeks of your participation.

Survey Link:

If you have any questions, please feel free to email me at kgwilkin@asu.edu.

Thank you,
Kerrie Wilkins, M.A.

APPENDIX C

INFORMED CONSENT LETTER

Hello,

Thank you for your interest in participating in this study! I am a graduate student under the direction of Dr. Terence J.G. Tracey in Counseling and Counseling Psychology in the School of Letters and Sciences at Arizona State University.

I am conducting a research study to examine the influential factors on undergraduate students' academic success. I am inviting your participation, which will involve filling out an anonymous online survey three times over the course of the 2013-2014 academic year. Your first participation will occur at the beginning of the fall 2013 semester; the second participation at the beginning of the spring 2014 semester; and your third participation will occur at the end of the spring 2014 semester. The online survey will take about 10-15 minutes to complete at each administration. There are no right or wrong answers to any questions on the survey. Your participation in this study is voluntary, and you can withdraw from the study at any time with no penalty. You must be 18 or older to be part of the study.

Even though there are no direct benefits for participating in the study, your participation will provide valuable information that may help university administrators, academic advisors, and career counselors improve students' academic experiences and satisfaction and ultimately their persistence to graduation. There are no foreseeable risks or discomforts to your participation.

Upon participating at the beginning of the fall 2013 semester, you will either receive extra credit or be entered into a raffle to win one of TEN $25 gift cards to a prominent online retailer. After participating at the beginning of the spring 2014 semester, you will receive a $5 electronic gift card to a prominent online retailer. Upon participating at the end of the spring 2014 semester, you will receive a similar gift card but in the amount of $10. You may decline the invitation to receive any incentive for your participation at any time.

In order to contact you at the beginning and at the end of the spring 2014 semester, you will be asked to provide one or two email addresses. Your email will NOT be linked to your responses in the surveys. Additionally, you will be asked to complete an identification form consisting of items that will ask you for your birthday, first and last initial, and the last two digits of your student ID. This information will be used to match your surveys together across your three participations. Your responses will be kept confidential. All collected data will be stored on a secure computer hard drive in the principal investigator's (Dr. Terence J.G. Tracey) office at 446 Payne Hall at Arizona State University. The principal investigator and I (Kerrie G. Wilkins) will be the only people who have access to the data. The results of this study may be used in reports, presentations, or publications only in the aggregate form. Your participation in the survey will be considered as your consent to participate in the study.

If you have any questions concerning the research study, please contact Kerrie Wilkins at kgwilkin@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Thank you for your cooperation.

Please click the Continue button below if you agree to participate in the current study.

Sincerely,

Kerrie G. Wilkins, M.A.
Doctoral Student
Counseling and Counseling Psychology
School of Letters and Sciences
Arizona State University
kgwilkin@asu.edu

Terence J.G. Tracey, PhD
Professor and Faculty Head
Counseling and Counseling Psychology
School of Letters and Sciences
Arizona State University

APPENDIX D

IDENTIFICATION FORM

Identification Form

Your answers to the following questions will be used to create your unique identification code. This code is developed to protect your privacy and will be used in all subsequent survey administrations. Please answer all the questions below.

1. What is the two digit day of your birthday? (e.g. if you were born on the 9th, please select 09 from the drop down menu).

-- Select --

2. What is the first letter of your FIRST name? *

3. What is the first letter of your LAST name? *

4. What are the last 2 digits of your student ID number? (In order to answer this question accurately, please check your Student ID). *

APPENDIX E

PERSONAL GLOBE INVENTORY (PGI)

INSTRUCTIONS: Please look at the following list of activities and respond to each TWICE. Once regarding how much you LIKE the activity and once regarding your ABILITY to do the activity. Use the scales listed below to rate your Liking and Ability.

	Liking							Competence						
	Strongly dislike						Strongly like	Unable to do						Very competent
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Manage an electrical power station	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Oversee building construction	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Give lecture to large groups	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Drive a bus	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Interview people for a survey	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Teach people to dance	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Manage an office	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Help children with learning problems	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Maintain office financial records	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Prepare financial reports	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Install electrical wiring	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Write a scientific article	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Oversee a hotel	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Sculpt a statue	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Categorize different types of wildlife	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Carry and load containers	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Oversee a data analysis group	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Study the effects of elections	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Seat patrons at a restaurant	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Paint a portrait	O	O	O	O	O	O	O	O	O	O	O	O	O	O

INSTRUCTIONS: Please look at the following list of activities and respond to each TWICE. Once regarding how much you LIKE the activity and once regarding your ABILITY to do the activity. Use the scales listed below to rate your Liking and Ability.

	Liking							Competence						
	Strongly dislike						Strongly like	Unable to do						Very competent
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Defend people in court	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Sell clothes to others	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Oversee sales	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Keep records of stock sales	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Set up social programs	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Organize office records	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Supervise children in a nursery	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Write a play	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Teach others cooking	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Draw cartoons	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Write computer programs for business	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Study wildlife	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Escort people through a television studio	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Analyze survey maps	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Establish a business accounting procedure	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Drive a taxi	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Assemble precision optical instruments	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Inspect construction sites for safety	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Teach science	O	O	O	O	O	O	O	O	O	O	O	O	O	O

APPENDIX F

ACADEMIC SATISFACTION

INSTRUCTIONS: Using the scale below, indicate your level of agreement with each of the following statements. Please click on the number that best reflects your response to each statement.

Since I enrolled in my current academic major .....

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am enjoying my coursework.	○	○	○	○	○
I enjoy the level of intellectual stimulation in my courses.	○	○	○	○	○
I like how much I have been learning in my classes.	○	○	○	○	○
I am generally satisfied with my academic life.	○	○	○	○	○
I feel satisfied with my decision to major in my intended field.	○	○	○	○	○
I feel enthusiastic about the subject matter in my classes.	○	○	○	○	○
I feel satisfied with my current course of study.	○	○	○	○	○

APPENDIX G

INTENTION TO PERSIST

INSTRUCTIONS: Using the scale below, indicate your level of agreement with each of the following statements. Please click on the number that best reflects your response to each statement.

At the present time, I intend to ....

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Remain enrolled in my current major over the next academic year.	○	○	○	○	○
Remain enrolled in my current major over the next semester.	○	○	○	○	○

APPENDIX G

DEMOGRAPHICS

Demographics

INSTRUCTION: Please complete the following with the answer that best reflects your response to each statement.

What is your gender?

- ○ Male
- ○ Female

What is your age?

What is your ethnicity?

- ☐ Caucasian
- ☐ Pacific Islander
- ☐ Native American
- ☐ Multi-Racial
- ☐ Hispanic/Latino
- ☐ African American
- ☐ International Student
- ☐ Bi-Racial
- ☐ Asian American
- ☐ Other

What is your class standing?

- ○ Freshman
- ○ Junior
- ○ Sophomore
- ○ Senior
- ○ Other

What is the name of the high school from which you graduated? *

What is your current GPA? _____/4

In the spaces below, please write the name of each of the courses that you were enrolled in LAST semester as well as the course number, the number of credit hours for each class, and the grade you received at the end of the semester.

	Course number	Course Name	Number of credits	Grade received
Course # 1				
Course # 2				
Course # 3				
Course # 4				
Course # 5				
Course # 6				

What is your current declared program?

-- Select --

What is your declared major?

Have you ever changed your major?

○ Yes ○ No

If yes, how many times have you changed your major?

-- Select --

What was your declared major last semester?

Do you plan on changing your current major?

○ Yes ○ No

On average, 45% of students do not persist to graduation in their current major. There are a number of reasons for this, which of the following reasons would cause you to NOT persist to graduation in your current major? (Please check all that apply)

- ☐ Financial pressures
- ☐ Disinterest in major
- ☐ Few job opportunities in this field
- ☐ Limited support from current advisor
- ☐ Parental pressure
- ☐ Feeling overwhelmed by academic demands
- ☐ Competing demands for your time
- ☐ I intend to graduate with my current major
- ☐ Other

APPENDIX I

INCENTIVE INFORMATION

Incentive Information

Are you receiving extra credit for your participation in this study?

- ○ Yes
- ○ No

If you would like to be entered in to the raffle to win one of TEN $25 electronic gift cards please check 'yes' below. You will be informed of your status via the email that you provided previously.

- ○ Yes, please include me in the raffle
- ○ No, I would rather not participate in the raffle