The College-to-Career Transition in STEM: An Eleven-Year Longitudinal Study of
Perceived and Objective Vocational Interest Fit

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Preprint of the following article:
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Abstract

This 11-year longitudinal study investigates the effects of vocational interest fit measured in college on college-to-career trajectories. Vocational interest theories suggest that vocational interest fit will affect choices and attitudes about major and job. The expectancy value model is used in the study to describe how values assigned to an outcome (e.g., engaging in a major or a job) ultimately influence major and career choices. The current study tracks a cohort of students (N = 159) from 2007 to 2018 examining their vocational interest, matriculation major interest, degree, first job after graduation, and job seven years post-graduation. Results showed that vocational interest fit with major had a significant effect on major retention and first job choice, and the relationships were mediated by subjective task values (attainment value, intrinsic value, utility value, and relative cost). Vocational interest fit with job had a significant effect on career attitudes, and these relationships were mediated by perceived career fit. Additionally, job fit increased over time from first job after graduation to 2018 job. Results suggest that vocational interest measured in college is useful in predicting future career trajectories.

Keywords: vocational interest fit; career trajectory; major retention; career choice; career attitudes

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
**Introduction**

Career choice is one of the most critical decisions people make in their lives, largely because ending up in a job with a bad fit can be a miserable experience. College students strive to find a major that is a good match with their interests, hoping that their major choice will lead to a job with a good fit. Previous studies suggest that genuine interest in a major as well as interest in the work relevant to that major are the main factors that influence students’ decisions to choose and change their majors in post-secondary education (Adams et al., 1994; Beggs et al., 2008; Collins & Giordani, 2003; Stanislaw, 2014). Furthermore, theories of career choice support the idea that vocational interest is an important determinant of career choice (Lent & Lopez, 1996; Lent, Brown, & Hackett, 1994).

Holland’s theory of vocational interest suggests that people strive to find work environments that fulfill their values and interests, and that vocational interest, or vocational personality, consists of work related interest, values, and abilities (Holland, 1997). Hence, the fit, or the congruence, between one’s vocational interest and the environment (e.g., work or college) should predict attitudes about and behaviors in those environments (Holland, 1997). Many studies have shown the effect of vocational interest on major decisions (Allen & Robbins, 2008; Le et al., 2014; Wessel et al., 2008). Studies also have found that the fit between one’s vocational interest and corresponding work characteristics influence job-related outcomes such as satisfaction (Dik et al., 2010; Tsabari et al., 2005), performance, and turnover (Van Iddekinge, Putka, et al., 2011; Van Iddekinge, Roth, et al., 2011). Most research on vocational interest fit is cross sectional, meaning that interest scales and job outcome measures are collected at the same time from a group of students or employees (Dik et al., 2010; Van Iddekinge, Putka, et al., 2011). Although informative, cross-sectional research cannot provide insight into the stability of
vocational interests over time or whether interest measures taken in school predict longer-term career-related outcomes. Some longitudinal studies have investigated within-person change in interest profiles over time (Low et al., 2005; Tracey & Robbins, 2005), the effect of vocational interest fit on academic outcomes in academic settings (Allen & Robbins, 2008; Nye et al., 2012; Tracey et al., 2012), or the effect of interest fit on job outcomes in job settings (Feij et al., 1999). We know of no studies that have examined the effect of interest fit on both academic and job outcomes spanning academic and career trajectories, however.

In addition to vocational interest fit theory, we used Eccles and Wigfield’s (2002) expectancy value model to frame part of our investigation. The expectancy value model describes how one’s motivation will be influenced by the value one assigns to an outcome (i.e., obtaining a degree or career in a particular field) and expectations of achieving that outcome. The expectancy value model is based on social-cognitive theory and describes how the value that students assign to engaging in their major or major-related activities will ultimately influence retention in the major (Bandura, 1991). We assessed four subjective task values identified by Eccles and Wigfield (2002) (attainment value, intrinsic value, utility value, and relative cost) to explain how fit impacts major retention and career choice.

The current study contributes to the existing literature by investigating the long-term effect of interest measured during college on college-to-career trajectories. Specifically, we examine the effect of vocational interest fit on retention in a major, retention in a career related to the major, and career attitudes over the college-to-career trajectory. The sample comprises students who matriculated into college with an interest in STEM in 2007 and who participated in a larger study aimed at examining student attrition in STEM (Rittmayer & Beier, 2008). We followed up with participants in 2018 and assessed career choices and career attitudes. We
investigated the effect of vocational interest captured in 2007 on major choice and career trajectories. The study examined two different models of the relationship between 1) interest fit with intended college major at matriculation into college on major retention and career choice and 2) interest fit with current job (henceforth referred to as 2018 job) and career attitudes. The study also explored changes in job fit over a seven-year period after college (i.e., from first job after college, henceforth referred to as first job, to 2018 job).

**Vocational Interest Fit**

Fundamentally, P-E fit theory predicts that when there is a match between the characteristics of the person and the resources provided by the environment, positive outcomes such as psychological well-being will result. Equally important, when there is a mismatch between the characteristics of the person and the characteristics of the environment, mental and physical strain will result (Edwards et al., 1998). According to this theory, fit is important because people feel more comfortable and competent when they experience fit (Chatman, 1989) and P-E fit fulfills people’s fundamental need for belonging, identity, and self-actualization (Cable & Edwards, 2004). For instance, person-organization fit assesses a person’s perception of fit with organization, and person-job fit assesses a person’s perception of fit with job (Lauver & Kristof-Brown, 2001). Person-organization fit is positively related to job satisfaction, and negatively related to turnover intentions. Person-job fit is positively related to contextual performance (extra role behaviors) and job satisfaction, and is also negatively related to turnover intentions.

Vocational interest fit is a type of a Person-Environment (P-E) fit that refers to the congruence between the vocational interests of a person and the attributes of a work or college environment. People desire work environments that allow them to “exercise their skills and
abilities, express their attitudes and values, and take on agreeable problems and roles” (Holland, 1997, p. 4). Accordingly, vocational interest theory suggests that individuals are attracted to certain environmental properties that match their vocational interest type, and that differences in the degree of fit can result in different attitudinal and decisional outcomes in the job context. Hence, fit, which represents the degree of congruence between vocational interest type and environment type, can predict important job-related outcomes.

Holland's (1997) theory of vocational personalities and work environments suggests that most people resemble a combination of six vocational personality types, or interest types, that comprise the acronym RIASEC: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Realistic interest involves practical and hands-on activities; investigative interest involves working with ideas and critical thinking; artistic interest involves working with forms, designs, and patterns; social interest involves working with and providing services to other people; enterprising interest involves starting up and carrying out projects as leaders; and conventional interest involves following a set of rules and working with data (Holland, 1997).

**Fit with Major and Major Retention and Career Choice**

Holland's (1997) theory of vocational interest suggests that people desire work environments that are compatible with their interests, values, and abilities. Further, misfit between a person’s work-related interests and work environments can motivate people to change their environment, which can explain why people choose (i.e., choice behavior) and stay (i.e., persistence behavior) in an environment (Le et al., 2014). Indeed, research shows that vocational interest fit measured using RIASEC dimensions is predictive of academic outcomes (Allen & Robbins, 2008; Le et al., 2014). Allen and Robbins (2008) examined 48,232 students across 25 different four-year colleges and universities. The authors examined the relationship between fit
with major and retention in the major and found that interest fit with college major and first year GPA predicted retention in the major at the end of third year (estimated regression coefficients were .383 for fit with college major and .360 for first year GPA). Le et al. (2014) examined 207,093 students at 51 postsecondary institutions on the relationship between vocational interest fit and persistence in STEM and found that people with higher fit with STEM major were less likely to leave STEM at the end of third year (β = .126). In summary, these studies showed that interest fit with major predicts important retention outcomes in the major.

*H1. Objective major fit is positively correlated with a) obtaining a STEM degree at graduation and b) the likelihood of having a STEM first job, and c) the likelihood of having a STEM 2018 job.*

Although previous research suggests that there is a relationship between objective vocational interest fit and college major retention (Allen & Robbins, 2008; Tracey et al., 2012; Wessel et al., 2008), much of this research examines major choice during the second or third year of college (Allen & Robbins, 2008; Tracey, Allen, & Robbins, 2012) and commitment to one’s major (Wessel et al., 2008) as outcome variables, rather than retention in the major through graduation. There are studies that examine the congruence between the vocational interest profile of the person measured in college and interest profile of future career aspirations (Borgen, 1972) or career choice (Bartling & Hood, 1981). However, we know of no research that has examined how vocational interest fit with college major predict major retention or career choice after college. The current study fills these research gaps by examining the relationship between objective vocational interest measured at college matriculation to predict both major retention at graduation and career trajectories after graduation.
Assessment of the value of STEM activities for participants while enrolled in college was based on Eccles and Wigfield's (2002) expectancy value model. We assessed four facets of subjective task value as identified by Eccles and Wigfield (2002): attainment value (self-concept), intrinsic value, utility value, and relative cost. Attainment value assesses the extent to which the activities align with one’s self concept. Intrinsic value assesses the extent to which personal pleasure is derived from engaging in the activities. Utility value assesses the extent to which the activity is perceived to be useful for attaining a specific outcome (e.g., career goal). And relative cost assesses the extent to which the activities detract from other areas of life or development.

We posited that the four subjective task value facets would mediate the relationship between objective fit and major retention and STEM job choice (Figure 1). The expectancy value model suggests that the value that students assign to academic activities can influence motivation to engage in a major and persist in the major or in a job relevant to the major. For instance, if a student’s intrinsic value for STEM activities is high, he or she will derive personal satisfaction from engaging in STEM activities and he or she will be more likely to persist in the major and to choose a job related to STEM. There has also been support for the idea that subjective task value mediates the relationship between educational interventions (active learning) and career aspirations in STEM (Beier et al., 2019).

The current study examined the mediating role of subjective task value facets on the relationship between objective fit with major and STEM major retention and first-job and 2018 job choice. We expected that the relationship between objective major fit and STEM major retention and job choice would be explained by subjective task value variables (i.e., attainment, intrinsic, utility, and cost; Figure 1).
H2. Subjective task value facets will mediate the relationship between objective major fit and STEM major retention (measured by obtaining a STEM degree) and STEM first job and STEM 2018 job. Specifically, (a) mediation for attainment, utility, and intrinsic values will be positive (i.e., these mediators will be positively related to objective major fit and STEM major retention and job choices), and (b) mediation for relative cost will be negative (i.e., relative cost will have a negative relationship with objective major fit, STEM major retention, and job choice).

Fit and career attitudes

Many studies have examined the relationship between objective interest fit and job attitudes, particularly, turnover intentions and job satisfaction. Indeed, researchers have found that vocational interest fit is related to turnover intentions (Van Iddekinge, Putka, et al., 2011; Van Iddekinge, Roth, et al., 2011). In a study of soldiers in the U.S. Army, Van Iddekinge, Putka, et al. (2011) found that vocational interests showed significant incremental validity for predicting intentions to continue in the Army ($R^2 = .08$) above cognitive ability. Van Iddekinge, Roth, et al. (2011) conducted a meta-analysis comprised of 74 studies with 141 independent samples and found estimated validities for single interest scales were -.19 for turnover intention and -.15 for actual turnover. In summary, these studies support vocational interest theory, which posits that interest fit with one's job will have a significant impact on job attitudes and behaviors.

The magnitude of the relationship between job satisfaction and interest fit is often moderate to small. Assouline and Meir (1987) conducted a meta-analysis and found a significant mean correlation of .21 between fit and satisfaction using 53 correlations. In addition, Tranberg, Slane, and Ekeberg (1993) and Tsabari et al. (2005) found a mean correlation of .17 (not significantly different from zero) using 22 and 53 effect sizes respectively. Gottfredson and
Holland (1990) showed a significant correlation between objective interest fit and job satisfaction \((r = .36)\) using unified sample of bank tellers. The current study examines the relationship between interest fit and work satisfaction. Unlike job satisfaction, which is influenced by external factors (i.e., salary, organizational climate) unrelated to interest (Spector, 1997), work satisfaction is an intrinsic form of satisfaction that measures one’s satisfaction with the work itself and is thus more directly related to interest (Prediger, 2000).

Career commitment concerns the extent to which people identify with and value their profession, and their willingness to exert time and effort to pursue their career goals (Blau, 1985; Goulet & Singh, 2002). Career commitment has been shown to be positively related to job involvement (i.e., psychological involvement with one’s work) and negatively related to career withdrawal (i.e., intention to leave one’s career). Although we know of no research that directly examines the relationship between vocational interest fit and career commitment, Holland’s (1997) theory would predict that having a good interest fit with one’s job would positively influence a person’s identification with work and job commitment.

The current study examines work satisfaction, career commitment, and career withdrawal. Notably, career attitude assessments used in the current study are relative to a profession – not organization. This is important because a person might be committed and satisfied with his or her profession and the work relevant to the profession, but be disenchanted with, and intending to leave, his or her organization. The current study is focused on attitudes about professions, not organizations.

**H3. Objective 2018 job fit will be positively correlated with work satisfaction, and career commitment, and negatively correlated with career withdrawal.**
Perceived fit measures individuals’ perceptions of their compatibility with their environments (Kristof-Brown et al., 2005). Because perceived fit directly measures people’s perception of fit, it is more proximal to people’s attitudes than objective fit. We hypothesized that perceived fit would mediate the relationship between objective fit and career attitudes. That is, perceived fit would explain the relationship between objective fit and career attitudes (Figure 2).

**H4. Perceived career fit will mediate the relationship between objective 2018 job fit and career attitudes.**

**Fit over time**

P-E fit theory suggests that stress and strain will result from the discrepancy between environmental supplies and personal characteristics (Cummings & Cooper, 1979). One interesting argument raised by some researchers is that when people face stressors, they increase their effort at first, and thus their overall performance will not be damaged over the short-term (Robert & Hockey, 1997; Tafalla & Evans, 1997). The negative impact of misfit appears when people are unable to sustain effort to compensate for misfit over time. In this scenario, people will likely quit jobs with bad fit and find jobs with better fit.

Research on personality and aging also supports the idea that P-E fit increases over time. Research shows that people become more psychologically mature with age (i.e., more self-aware of their interests, values, and identity), and thus work to create environments that fit for them (Caspi et al., 2005; Kooij et al., 2017). Kooij et al. (2017) suggests that people learn more about their weaknesses and strengths with age (Bosma & Kunnen, 2001) and select experiences that help them to develop strong professional identities over time. Caspi, Roberts, and Shiner (2005) proposed the Maturity Principle, which suggests that people become more dominant, agreeable,
conscientious, and emotionally stable with age (Roberts et al., 2006), and these changes lead to self-actualization and personal growth, as well as being more effective in love, work, and health. These studies suggest that as people become more mature and knowledgeable about themselves with age, they will find jobs that would be a better fit for them.

Additionally, researchers have suggested that aging is associated with achieving greater psychological well-being through adopting intrinsic values over extrinsic ones, and greater self determination to achieve these goals (Sheldon & Kasser, 2001). This implies that people will strive to find jobs that match better with their interests and intrinsic values in contrast to jobs that match with extrinsic values such as salary expectations. The current study will examine changes in fit over time from first job after college to 2018 job.

**H5a. Job fit will increase from objective first job fit (first job obtained after graduation) to objective 2018 job fit.**

Further, based on the idea that people will select experiences that help them to develop professional identities (Kooij et al., 2017), we predict that people who have a greater number of career changes will have made the changes to achieve a better fit with their job. In other words, people with more career changes will have a greater increasing fit trend compared to people with a lower number of job and career changes.

**H5b. Number of career changes will moderate the relationship between job fit and time. The increase in fit over time will be greater for people who have greater number of career changes.**

**Measuring Vocational Fit**

P-E fit can be categorized into objective and perceived fit. Objective fit measures examine fit by independently measuring the characteristics of the person and the environment,
and modeling the difference as an indicator of fit. For example, a self-report measure of vocational personality might be matched with the vocational interest profile of a job. The Occupational Information Network (O*NET; Peterson, Mumford, Borman, Jeanneret, & Fleishman, 1999) is an occupational information database that provides comprehensive job information for more than 900 jobs. Job information includes general job descriptions, an index of job requirements, job complexity ratings, job preparation ratings, and the job’s correspondence with each of the six RIASEC codes for each job in the O*Net.

By contrast, measures of perceived fit tend to be self-report assessments aimed at understanding a person’s perception of fit with their environment. For example, a person might be asked to indicate their perception of how well they fit with their job. As such, one distinction between objective and perceived assessments of fit is that assessments of perceived fit consider both the person and environmental characteristics simultaneously and include any idiosyncratic weighting of person and environmental characteristics that might be important to any one individual. Objective assessments of fit consider person and environment separately and thus are not subject to the idiosyncratic judgments or biases that might influence perceptions of fit (Kristof-Brown et al., 2005). Research supports that objective and perceived fit are distinct constructs in that correlations between objective and perceived fit tend to be significant but small in magnitude (e.g., around $r = .22$; Dineen, Ash, & Noe, 2002, and $r = .33$; Cable & Judge, 1996).

Because participants in the current study matriculated with an interest in STEM, we operationalized objective fit relative to STEM majors. Objective fit with a STEM major was derived by matching the vocational interest profile assessed upon student matriculation in 2007 (ACT, Lamb & Prediger, 1981) with an interest profile of thousands of STEM students (Le et al.,
This approach is based on the idea that interest fit can be determined by comparing a person’s vocational interest profile and the profile of the people who stay in an environment (Allen & Robbins, 2008). That is, the interest profile of an environment should be represented by people who are attracted to, select themselves into, and are selected by the environments that are more compatible to their characteristics. The objective major fit index was then used to predict STEM retention (i.e., did the student graduate with a STEM degree or not) and as a predictor of STEM career choice for the first job and for 2018 job. We hypothesized that the relationship between objective major fit and retention in a STEM major and career choice would be mediated by the value assigned to STEM activities (Figure 1). To predict career attitudes, we operationalized objective job fit by matching the same vocational interest profile assessed upon college matriculation with current job profile derived from the O*NET (Peterson et al., 1999). For career attitudes, we examined whether the effect of objective fit on career attitudes was mediated by perceptions of fit (Figure 2).

Method

Participants and Procedures

Matriculating first-year students who indicated an interest in STEM majors were recruited for a larger study (Rittmayer & Beier, 2008) in August, 2007 through emails sent to 460 first year students at a university in the southern U.S.. A total of 159 students (64% men) completed all of the measures relevant to the current study (35% response rate). The demographic makeup of the sample was: 41% Caucasian, 40% Asian, 14% Hispanic, 4% African-American, and 1% other. The mean and the standard deviation of participants’ age at the first data collection was $M_{age} = 17.70$ and $SD_{age} = 1.08$. The purpose of the original study (Rittmayer & Beier, 2008) was to track participant STEM attitudes through the first four
semesters in college. To this end, participants completed a battery of personality and attitude measures upon matriculation in Fall, 2007 (including an assessment of vocational interest fit) and four additional surveys at the end of each semesters until they selected their major field of study at the end of their second year of college, in Spring, 2009. Students who completed all five assessments as part of the original study were given $50 in Spring, 2009 for their participation.

The current study uses only a subset of measures from the original study (Rittmayer & Beier, 2008). Namely, the vocational interest fit assessment given in Fall, 2007 (Wave 1, N = 159), and the subjective task value assessment given in Spring, 2008 (Wave 2, N = 127).

Data waves for the current study are shown on Table 1. The current study expands the original study in three ways. First, we collected information on student majors at the time of graduation in Spring, 2011 (N = 153). Second, participants from the original study were invited to complete an electronic survey in Spring, 2018. The electronic survey measured the participants’ job history and career attitudes. Participants were recruited using alumni emails, a professional network (LinkedIn), and a social network (Facebook). Of the original 159 participants, 72 responded to the survey and were given a $20 gift card and a chance to win an additional $100 gift card.

Third, job history data were obtained from 69 participants from the electronic survey and 95 participants’ LinkedIn profiles. LinkedIn profiles were searched using participants’ name, major, name of graduating college, and college graduation year. There were 44 participants for whom we had both survey and LinkedIn data. Thus, job information was provided by: 44 participants from the survey and LinkedIn, 25 participants from the survey only, and 51 participants from LinkedIn only for a total of 120 participants with job information.
Job titles, work years, and job descriptions were carefully examined between the survey and LinkedIn data to match the overlapping data and obtain the most detailed and accurate job coding. There were 5 out of 44 data that had discrepancies. For instance, if the participant provided 3 previous jobs on the survey, but had 4 previous jobs listed on LinkedIn, we examined both sources for information on years worked, job titles, and job descriptions carefully to identify any overlap and included all jobs with detailed job information from both sources for the participant. Job histories for 120 participants were obtained using this strategy.

We used the O*NET to obtain vocational interest ratings on each job. Job information was converted to job titles and corresponding unique Standard Occupational Classification (SOC) codes and interest profiles linked to these jobs in the O*NET. The job title matching was conducted by two coders who were research assistant who were trained by the lead author. The coders were instructed to use job title and job description provided by the participants through survey and obtained from the search on LinkedIn. The coders used the job titles provided to search for the best match on O*NET. O*NET provides job descriptions, a sample of reported job titles, and a summary of tasks included in each job. After searching on the participant’s job title, raters reviewed the information provided on O*NET to see if it fit the information provided by the participant. If the job title did not match job titles provided on O*NET, raters were instructed to examine similar job titles (e.g., computational microbiologist can be matched with microbiologist and software engineer can be matched with software developers, systems software on O*NET) and to find the best match with participants’ job history data given the job duties provided in O*NET. The average percentage agreement between the two coders was .53. The moderate level of agreement was due to the fact that each job title reported by participants corresponded to multiple job titles and corresponding SOC codes on O*NET. All discrepancies
were resolved by discussion between the two coders and the lead author by reviewing the information provided by the participant about their job, the job information selected by each coder, and the information provided by O*NET to see if there was a closer match. One military job was not coded because military jobs are not included in the O*NET database. Thus, we obtained job profiles for 119 participants.

**Measures**

**Objective Fit**

Objective fit between the participants’ interest profile and interest profiles of the (a) major, (b) first job, (c) and 2018 job were calculated As recommended by Arnold, (2004) and Dik et al. (2010), fit was operationalized using the full RIASEC profile. Specifically, we used profile correlation that considers all six codes. The profile correlation has been shown to be a valid predictor of major persistence during the 3rd year in college (Allen & Robbins, 2010; Tracey et al., 2012). The profile correlation uses a simple Pearson correlation between the six RIASEC interest scores of the person and the RIASEC profile of the environment (academic or occupational; Watson, 2016). Once the RIASEC scores of the person and environment are obtained, the profile correlation is used to assess the linear association between the person’s profile and the job profile using all six RIASEC scores.

**Person Profile.** The ACT Interest Inventory (UNIACT, Lamb & Prediger, 1981) consists of 90 items and yields scores on the six Holland scales including Realistic ($\alpha = .89$), Investigative ($\alpha = .86$), Artistic ($\alpha = .89$), Social ($\alpha = .85$), Enterprising ($\alpha = .89$), and Conventional ($\alpha = .93$). Participants were asked to rate their level of interest to take part in activities described on a 6-point Likert scale, ranging from 1 (not at all interested) to 6 (extremely interested). Each of the six interest dimensions was measured with 15 items.
UNIACT RIASEC scale reported no difference in interest structure across U.S. racial or ethnic groups or between genders (Day & Rounds, 1998). Studies using UNIACT RIASEC scale show high reliability of the measure (.84 to .92; Darcy & Tracey, 2007) and it’s a valid predictor of major persistence at third year in college (Tracey et al., 2012; Tracey & Robbins, 2006).

**STEM Major Profile.** Major vocational interest was measured using the STEM Interest Profile created by Le et al. (2014), which used interest profiles of 121,906 third year college students from 83 institutions who majored in STEM with cumulative GPA of 2.0 or above. The STEM interest profile has been shown to be a valid predictor of STEM degree attainment in college using interest fit measured in middle school and high school (Le & Robbins, 2016).

**Job Profile.** The job titles and SOC codes were used to obtain the Occupational Interest Profile (OIP) that indicates scores in each of Holland's (1997) six dimensions (RAISEC) for each SOC code.

**Subjective Task Value**

Attainment value, intrinsic value, utility value, and cost were assessed with a measure of subjective task value created and validated by Beier et al. (2019), who found that the subjective task value facets were significantly correlated with career aspirations in STEM and significantly correlated with STEM self-efficacy (except for relative cost; correlations ranging from small to large in magnitude). Participants rated the extent to which they agreed with given statements using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Attainment value was assessed with a four-item measure: “It is personally important to me to do well in STEM classes,” “I consider myself to be a person who does well in STEM disciplines,” “I am known by my friends and family as someone who excels in STEM disciplines,” and “I’m proud of my ability to do well in STEM courses.” ($\alpha = .72$)
Intrinsic value was measured by a four-item measure: “I enjoy my STEM courses more than other courses I have taken,” “I derive more satisfaction from STEM courses than any other courses,” “I prefer working on homework related to my STEM courses more than any other homework,” and “I seem to be always thinking of topics related to STEM, even when I’m not in class or studying.” ($\alpha = .88$)

Utility value was assessed with a four-item measure: “Getting a degree in a STEM discipline will be important for reaching my long-term career goals,” “It is important to me to do well in STEM courses, because I want to go to graduate school in STEM after this,” “I need to do well in my STEM courses to be able to pursue my career goals,” and “A STEM major will not be necessary for my career goals” (reverse-coded). ($\alpha = .80$)

Relative cost was measured with a four-item measure: “Pursuing a degree in a STEM discipline requires a fair amount of sacrifice in terms of my social life,” “I spend a lot of time studying for my STEM courses while other students I know study relatively little,” “I don’t think STEM courses require any more work than courses outside of STEM,” and “Doing well in my STEM courses requires me to be focused on STEM at the expense of other subjects that might be interesting to me.” ($\alpha = .67$)

**Perceived Career Fit**

The perceived career fit measure was adapted from a perceived person-vocational fit measure used in prior research (Vogel & Feldman, 2009) by replacing the word ‘occupation’ and ‘vocation’ with ‘profession.’ The measure is shown to be a valid predictor of job satisfaction, intention to leave, career satisfaction, and performance using full time professional and administrative employees of a nationwide restaurant chain (Vogel & Feldman, 2009).

Participants rated the extent to which they agreed with 3 statements about their current career
(i.e., 2018 career) using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The items were: “There is a good fit between my personal interests and the kind of work I perform in my profession,” “My skills and abilities are well suited for the profession that I am currently in,” and “When I think about my interests, I doubt about if I chose the right profession after all” (reverse-scored). ($\alpha = .78$)

**STEM degree**

Data on graduating major(s) for each participant were obtained from the university’s registrar’s office. Majors were classified as STEM if students obtained degrees from the Natural Sciences and Engineering departments at the university where the study was conducted. Participants with multiple degrees were considered to have graduated with a STEM major if any of their degrees was STEM. Majors were coded as STEM = 1, non-STEM = 0.

**Job History**

**Survey.** Participants were asked to indicate their current job title, industry, and to provide a brief job description. They were also asked to upload their most recent resume or enter job titles and industry of previous jobs they had after graduating from college.

**LinkedIn.** Job history information including job title, company name, and years in the job were obtained from LinkedIn and coded independently by two research assistants as described above. Participants were searched on LinkedIn using their full names and years they graduated from college.

**STEM Jobs**

STEM jobs (first job, 2018 job) were identified using a list of STEM jobs from O*NET, which is based on Standard Occupation Classification (SOC) that is used by federal agencies to classify workers into occupational categories. For instance, computer programmers and dentists
are listed as STEM jobs, but bakers or photographers are not listed as STEM jobs. Additionally, job information obtained from both the survey and LinkedIn was used to identify a job as STEM or non-STEM (STEM = 1, Non-STEM = 0). For example, tutors were not listed as a STEM job in O*NET, but we identified a math tutor as a STEM job based on the job’s relevance to STEM field. This exception coding was done for less than 3% of subjects STEM jobs were double coded with an agreement of 87%, and the discrepancies were resolved by discussion between the two coders and the lead author.

**Career Changes**

The number of times participants changed their career was coded based on job history data. Career changes were considered to be changes in field of work (not just changes in jobs within the same career). For instance, we did not consider a software developer changing industry from technology to oil and gas (but remaining a software developer) to be a career change. Rather, career changes were changes in the field of work such as an engineer becoming a lawyer. One research assistant used the job history data including the participants’ job title, industry, and job descriptions to code number of career changes. These decisions were checked for accuracy by the lead author.

**Work Satisfaction**

Work satisfaction was measured using the work dimension on the Job Descriptive Index (JDI; Gillespie et al., 2016). The construct validity of JDI was supported by internal consistency, test-retest reliability, relationship with job satisfaction, and convergent and discriminant validity (Kinicki et al., 2002). The JDI asked participants to rate the extent to which 18 words or phrases given describe their job using 5-point Likert scale from 1 (strongly agree) to 5 (strongly
disagree). Items included “fascinating,” “boring,” “gives sense of accomplishment,” and “uninteresting” (α = .92).

**Career Commitment**

The 8-item career commitment scale was adapted from a career commitment scale for nurses (Blau, 1985), by replacing the word ‘nurse’ with ‘current profession.’ Career commitment scale shows test-retest reliability and significant negative relationship with career withdrawal cognition (Blau, 1985). This measure used a 5-point Likert scale ranging from, 1 (strongly disagree) to 5 (strongly agree). Items were: “If I could get another job different from my current profession and paying the same amount, I would probably take it,” “If I could do it all over again, I would not choose to work in my current profession,” and “This is the ideal vocation for a life work” (α = .90).

**Career Withdrawal**

Career withdrawal was assessed with a 3-item measure adapted from the job withdrawal cognition scale (Blau, 1985), replacing the word ‘job’ with ‘profession.’ The measure shows significant negative relationship with career withdrawal cognition and discriminant validity with organizational commitment and job involvement (Blau, 1985). This measure used a 5-point Likert scale ranging from, 1 (strongly disagree) to 5 (strongly agree). Items were: “thinking about leaving your current profession,” “intention to look for a different profession,” and “intention to stay in your current profession for some time” (reverse-scored). (α = .94).

**Results**

The sample size, correlations, and internal consistency reliability estimates (coefficient α) for study variables among predictors and outcomes are shown in Table 2. The variability in sample sizes for each variable is a result of participants missing one or more waves of data.
collection and/or missing graduation records from the registrar’s office. Also, 63 out of 72 participants from wave 4 responded to the career attitude measures on the survey.

**The Effect of Major Fit on Major Retention and Job Choice**

We expected objective major fit would relate positively to obtaining a degree in STEM majors (H1a), obtaining a first job in STEM (H1b), and having a STEM 2018 job (H1c). Logistic regression was conducted to test these hypotheses (Table 3). In partial support of the hypotheses, objective fit with STEM major was positively related to obtaining a degree in STEM upon graduation (β = 3.121, SE = .951, p = .001), and was positively related to having a first job after graduation in STEM (β = 1.418, SE = .659, p = .031). However, objective major fit was not related to having a 2018 STEM job.

We hypothesized that facets of subjective task value would mediate the relationship between objective major fit and major retention and the relationship between objective major fit and job choices (H2; Figure 1). To establish mediation, the predictor (major fit) and mediators (subjective task values) need to correlate significantly with the outcome (STEM degree, STEM first job, STEM 2018 job). As stated above, major fit was significantly correlated with STEM degree and STEM first job, but was not correlated with STEM 2018 job. Attainment value (r = .280, p = .002), intrinsic value (r = .346, p < .001), and utility value (r = .328, p < .001) were also positively related to obtaining a degree in STEM, but relative cost was not related to having a STEM degree (Table 2). As such, we tested the mediating effect of attainment value, intrinsic value, and utility value on the relationship between objective major fit and STEM major with a regression analysis using bias-corrected confidence intervals with bootstrapping as described by Hayes (2017). Results shown in the top of Table 4 show that only intrinsic value mediated the relationship between objective major fit and STEM degree. Specifically, the bootstrap
confidence intervals derived from 10,000 samples indicated that the indirect effect coefficient was significant (i.e., did not include zero), \( \beta = .490, \ SE = .292, 95\% \ CI = (0.042, 1.188) \), and the direct effect was also significant \( \beta = 3.852, \ SE = 1.294, 95\% \ CI = (1.315, 6.389); \) Table 4), supporting partial mediation for intrinsic value.

The mediating effect of the facets of subjective task value in the relationship between objective major fit and STEM first job was examined using the same approach (Hayes, 2017). Attainment value \( (r = .349, p < .001) \), intrinsic value \( (r = .213, p = .034) \), and utility value \( (r = .423, p < .001) \) were all positively related to obtaining a first job after graduation in STEM, but relative cost was not (Table 2). Results are shown in the bottom of Table 4. For attainment value, the bootstrap confidence intervals derived from 10,000 samples indicated that the indirect effect coefficient was significant, \( \beta = .383, \ SE = .271, 95\% \ CI = (.015, 1.055) \), and the direct effect was not significant \( \beta = 1.216, \ SE = .747, 95\% \ CI = (-.237, 2.668) \), supporting full mediation for attainment value. For utility value, the indirect effect was significant, \( \beta = .528, \ SE = .309, 95\% \ CI = (.090, 1.287) \), and the direct effect was not significant \( \beta = .857, \ SE = .736, 95\% \ CI = (-.585, 2.300) \), supporting full mediation for utility value. STEM 2018 job was not related to objective major fit (Table 2) and was not examined in this analysis.

**The Effect of 2018 Job Fit on Career Attitudes**

As shown in Table 2, perceived career fit with 2018 job was more consistently related to career attitudes (satisfaction, commitment, and withdrawal) than objective fit was, consistent with previous research (Kristof-Brown et al., 2005). There was a significant relationship between objective and perceived fit with 2018 job \( (r = .308, p = .016) \). Perceived career fit with 2018 job was also significantly related to all of the career attitudes: it was positively related to work satisfaction \( (r = .693, p < .001) \) and career commitment \( (r = .737, p < .001) \), and negatively
related to career withdrawal ($r = -.538, p < .001$). We expected to find positive relations between objective 2018 job fit and work satisfaction and career commitment, and a negative relation between fit and career withdrawal ($H3$). In partial support of the hypothesis, objective 2018 job fit was positively related to career commitment ($r = .264, p = .040$), negatively related to career withdrawal ($r = -.289, p = .024$), but it was not related to work satisfaction.

We hypothesized that perceived career fit would mediate the relationship between objective fit and career attitudes ($H4$). Objective fit showed significant correlations with career commitment and career withdrawal (Table 2), and thus we tested these two career attitudes for mediation using the same approach as described above (Hayes, 2017). Results are shown in Table 5. For career commitment, the bootstrap confidence intervals derived from 10,000 samples indicated that the indirect effect coefficient was significant, $\beta = .486, SE = .206, 95\% CI = (.092, .932)$, and the direct effect was not significant $\beta = .077, SE = .194, 95\% CI = (-.311, .464)$, supporting full mediation. For career withdrawal, the bootstrap confidence intervals derived from 10,000 samples also indicated that the indirect effect coefficient was significant, $\beta = -.386, SE = .193, 95\% CI = (-.814, -.069)$, and the direct effect was not significant $\beta = -.322, SE = .279, 95\% CI = (-.880, .236)$, which also supports full mediation.

**Fit over Time**

Objective job fit over time from first job to 2018 job was examined to test if job fit increases over time ($H5a$). Further, we expected that the number of career changes would moderate the relationship between job fit and time in that the increase in fit between first job and 2018 job will be greater for people with a greater number of career changes ($H5b$). A general linear model (GLM) was used to examine the significance of change in fit over time from first job to 2018 job and the moderating effect of number of career changes on objective fit change
over time. In support of \( H5a \), objective job fit increased from the first job after graduation to 2018 job \( (F(1, 117) = 17.091, p < .001) \). There was also a significant effect of number of career changes on objective fit change over time \( (F(1,117) = 10.971, p = .001) \). The number of career changes was positively associated with greater change in fit over time. In other words, people with more career changes increased their fit over time more than people with fewer career changes.

**Discussion**

The present study investigated the effect of vocational interest fit using vocational interest measures assessed in college on college-to-career trajectory. There is limited longitudinal research that examines the effect of vocational interest fit measured during college on both short-term academic and long-term work outcomes. We aimed to fill this gap by examining how the interest fit with major or job influenced college-to-career trajectories.

**The Effect of Vocational Interest Fit on College-to-Career Trajectory**

Overall, we found that objective fit with STEM major was related to some of major and career choices. We also found that some of subjective task value mediated the relationship between objective fit with STEM major and major and career choices. Objective fit with job was also related with some of the job attitudes measured in the study, and the relationship was mediated by perceived career fit. We also found evidence that people increased their fit over time from their first job after college to their job seven years after graduation.

Specifically, we found that objective fit with STEM major was related to obtaining a degree in a STEM major and to obtaining a first job in STEM after graduation, but it was not related to having a 2018 job in STEM. The theory of work adjustment (Dawis & Lofquist, 1984) can explain why objective fit with STEM major was related to outcomes in earlier career
trajectory but was not related to outcomes in later career trajectory. The theory of work adjustment explains the relationship between the individual and their work environment, and how this relationship influences satisfaction and tenure. The individual contributes the skills needed to achieve the tasks required by the work. The work provides compensation and work conditions such as salary and a safe work environment, required by individuals in return for their work. Work adjustment is the process of maintaining these mutual requirements and is indicated by work satisfaction that impacts tenure. Individuals’ requirements for work conditions can change over the course of one’s career, however. It may be that right out of college, people can be more driven by their interests in terms of job choice. However, as people get older and need to support families and establish themselves as adults, there are many other factors that will influence their job choice. As participants age, they may consider factors such as salary, workload, work prospect, or the need to pursue higher education. These research findings show that objective fit with major is predictive of more proximal outcomes, including major retention and first job after college, but not distal outcomes, such as the job seven years after college. The study findings call for future research to investigate if and how different predictors including fit can influence career choices at different stages of peoples’ career, which is described in the future direction section.

Further, we found that some facets of subjective task value mediated the relationship between objective major fit and STEM degree and STEM first job. Intrinsic value mediated the relationship between objective major fit with STEM and STEM degree. Objective major fit contributed to intrinsic value, which in turn led to STEM degree. In other words, people with higher objective major fit with STEM were genuinely interested in the subject, which in turn led to obtaining a degree in STEM. This is consistent with previous research that suggests that
having a good interest fit with a major is one of the most important factors for choosing and retaining a major (Adams et al., 1994; Beggs et al., 2008; Collins & Giordani, 2003; Stanislaw, 2014). Moreover, attainment value and utility value mediated the relationship between objective major fit and STEM first job. People who had higher objective major fit with STEM perceived that doing well in STEM was important for their self-concept and that STEM activities were useful for pursuing their career goals, and these values led to obtain a first job in STEM after graduation. We incorporated the expectancy value model (Eccles & Wigfield, 2002) in our study. The study findings supported the model in the context of college to career transition by showing that subjective values mediated the relationship between fit with STEM major and STEM first job.

Objective 2018 job fit was related to career commitment and career withdrawal, but it was not related to work satisfaction. Perceived fit was more strongly related to career attitudes compared to objective fit, as suggested in previous literature (Kristof-Brown et al., 2005). Perception of fit with one’s job was related to all of the career attitudes measured in the study including work satisfaction, career commitment, and career withdrawal. People who perceived greater fit with their jobs experienced higher levels of work satisfaction, career commitment, and lower levels of career withdrawal compared to people who perceived lower fit with their jobs. Because it is itself an attitude, perceived fit is a closer antecedent to career attitudes compared to objective fit, so these findings are not altogether surprising.

The relationship between objective 2018 job fit and career attitudes were mediated by perceived career fit. Specifically, perceived job fit mediated the relationship between objective 2018 job fit and career commitment and career withdrawal. Having a high objective 2018 job fit contributed to high perception of fit with 2018 job, which in turn led to higher career
commitment and lower career withdrawal. It has been suggested that objective fit would theoretically inform perceived fit (Wessel et al., 2008), but the mediating role of perceived fit on the relationship between objective fit and career attitudes has received little attention in previous research. The current study provides evidence for the mediating role of perceived fit in the relationship between objective fit and career attitudes. One caveat to this result is that the timing of when the constructs were measured may have had an effect on the results. The vocational interest component of the participants’ objective fit profile was measured in 2007 when the participants matriculated into college, and perceived fit and career attitudes were measured in 2018 via electronic survey. Because perceived fit and career attitudes were measured at the same time, this could have increased the correlation between the two constructs compared to the relationship between career attitudes and objective fit, which were measured 11 years apart. Although the timing of our study may have not been ideal, this is an issue that is often apparent in longitudinal research (Lerner et al., 2009).

We also found evidence that participants tended to change jobs to increase their fit over time, from their first job after graduation to their job seven years after graduation. We also found a moderating effect of the number of career changes in that people with a greater number of career changes showed greater change over time. It is interesting that people gravitated toward jobs that produced better fit based on an interest profile measured when they were freshman in college. Life-span, Life-space approach (Super, 1980) suggests that career development is a continuous, life-long process. The theory explains that people explore and stabilize their career path through work experiences. As previous research suggests, these findings likely reflect the idea that people gain better knowledge of themselves and environments that are more compatible with their characteristics with age and experience (Caspi et al., 2005; Kooij et al., 2017).
Moreover, these findings suggest that people tend to take initiative to change their environment to fit their needs and desires as they age (Sheldon & Kasser, 2001).

Limitations and Future Directions

There are several limitations in this study. First, the study participants are students who indicated an interest in STEM when they matriculated. There are certain characteristics of STEM students that may not generalize to students outside of STEM majors. As Holland (1997) theorized, people are attracted to certain environmental characteristics of an environment based on their interest, values, and abilities. Hence, there may be characteristics specific to STEM-oriented participants that would lead to specific patterns of outcomes unique to this group that would limit the generalizability of our findings. For example, students in STEM majors are reported to have greater high school GPA, and come from wealthier and more educated families compared to non-STEM major students (Chen, 2009).

Another limitation is related to the relatively small sample used in this study. The sample size in the original study was 159, and the participants who responded to the survey at Wave 4 was smaller (n = 72). We were able to attain data through the registrar’s office and through online resources, but a larger sample would have been desirable. Unfortunately, study attrition is more common in longitudinal research. Even with our limited sample size, however, we found significant effects. A more extensive study – in terms of number of participants and range of interests – is recommended in future research. Moreover, additional longitudinal studies using students in various major backgrounds would help researchers understand the effect of fit in predicting both short-term and long-term academic and career outcomes generalizable across different career fields.
A third limitation is that we used job information that participants provided on LinkedIn. It may be that people only highlight certain aspects of their job history to create an ideal job profile for LinkedIn. Matching job data collected on LinkedIn with our survey results for participants who had both (n = 44) provides some evidence of the validity of the job data on LinkedIn given that the agreement between the two was 88.6%. Using both sources for job data also permitted us to create a more complete picture by integrating data from both sources for the 11.4% of cases were LinkedIn did not match the survey exactly.

Another interesting future research approach would be to examine the relationship among vocational interest measured at different time points, fit, major and career choices, and job attitudes in a longitudinal study. Our study showed that objective fit with major was related to major retention at graduation and first job after college, but not seven years after graduation. It would be very informative to measure and track different predictors to explore if different factors predict career outcomes at different stages of people’s career. These factors would include objective fit, perceived fit with major and job, career changes, and major or job attitudes and performance. It would be interesting to examine if and how people’s job profiles change throughout life, particularly before and after they change majors in school and jobs in the workplace. It would also be interesting to examine if people change their careers when objective or perceived fit is low to obtain better fit, which in turn would improve job attitudes and performance. In summary, it would be valuable to examine the changes and interactions among objective fit, perceived fit, career changes, and job-related outcomes to investigate when and how different factors influences people’s career trajectory and job outcomes to provide valuable insights for career counseling.
Conclusion

This research investigated college-to-career trajectories using vocational interest fit. We used vocational interest measured in college to predict both academic and career outcomes. The major strength of this research is that we measured people’s vocational interest early in college and found that vocational interest fit had a significant impact on academic and job outcomes in a 11-year longitudinal study. The study demonstrates the important aspect of using vocational interest measured as early as the beginning of college in predicting retention in the major, career attitudes, and how people change their jobs to achieve better fit over time.
References


Stanislaw, H. (2014). Why students change majors plugging leaks in the STEM Pipeline. *California State University, Stainslaus U.S. Dept. of Education Title III HSI STEM and Articulation Grant # P031C110082.*


Table 1

*Participant Data Collected by Wave*

<table>
<thead>
<tr>
<th>Wave (Semester Year)</th>
<th>Data Collected</th>
<th>Participants (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1 (Fall 2007)</td>
<td>RIASEC vocational interest measure</td>
<td>159</td>
</tr>
<tr>
<td>Wave 2 (Spring 2008)</td>
<td>Subjective Task Value</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td>- Attainment Value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Intrinsic Value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Utility Value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Relative Cost</td>
<td></td>
</tr>
<tr>
<td>Wave 3 (Spring 2011)</td>
<td>Graduating major</td>
<td>152</td>
</tr>
<tr>
<td>Wave 4 (Spring 2018)</td>
<td>Electronic survey</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>- Job history</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>- Job attitudes</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Job History</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- LinkedIn</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>- Combined Survey/LinkedIn</td>
<td>120</td>
</tr>
</tbody>
</table>

*Note.* There was job history data available for N=120 participants including 44 participants for whom we obtained both survey and LinkedIn data, 25 participants from the survey only, and 51 participants from LinkedIn only.
Table 2

Reliability Estimates and Intercorrelations among Predictors and Outcomes

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
<th>13.</th>
<th>14.</th>
<th>15.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Objective major fit</td>
<td>159</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Objective first job fit</td>
<td>119</td>
<td>.149</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Objective 2018 job fit</td>
<td>119</td>
<td>.005</td>
<td>.547**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>4. Attainment value</td>
<td>127</td>
<td>.145</td>
<td>.101</td>
<td>.102</td>
<td>(.72)</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>5. Intrinsic value</td>
<td>127</td>
<td>.185*</td>
<td>.149</td>
<td>.004</td>
<td>.566** (.88)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. Utility value</td>
<td>127</td>
<td>.122</td>
<td>.095</td>
<td>.063</td>
<td>.453**</td>
<td>.484** (.80)</td>
<td></td>
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<td></td>
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<tr>
<td>7. Relative cost</td>
<td>127</td>
<td>-.001</td>
<td>-.039</td>
<td>-.139</td>
<td>-.097</td>
<td>-.022</td>
<td>.223* (.67)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Perceived career fit</td>
<td>63</td>
<td>-.072</td>
<td>.043</td>
<td>.308*</td>
<td>.364**</td>
<td>.298*</td>
<td>.179</td>
<td>-.036</td>
<td>(.78)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Career changes</td>
<td>120</td>
<td>-.143</td>
<td>-.381**</td>
<td>-.118</td>
<td>-.128</td>
<td>-.212*</td>
<td>-.283**</td>
<td>-.008</td>
<td>-.077</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. STEM degree</td>
<td>152</td>
<td>.284**</td>
<td>.047</td>
<td>-.036</td>
<td>.280**</td>
<td>.346**</td>
<td>.328**</td>
<td>.138</td>
<td>.122</td>
<td>-.176</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>11. STEM first job</td>
<td>120</td>
<td>.202*</td>
<td>.202*</td>
<td>.035</td>
<td>.349**</td>
<td>.213*</td>
<td>.423**</td>
<td>.165</td>
<td>.053</td>
<td>-.321**</td>
<td>.293**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. STEM 2018 job</td>
<td>120</td>
<td>.075</td>
<td>.091</td>
<td>-.040</td>
<td>.240*</td>
<td>.171</td>
<td>.396**</td>
<td>.088</td>
<td>-.084</td>
<td>-.172</td>
<td>.249**</td>
<td>.451**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Work satisfaction</td>
<td>63</td>
<td>-.153</td>
<td>-.061</td>
<td>.174</td>
<td>.262</td>
<td>.202</td>
<td>.091</td>
<td>.126</td>
<td>.693**</td>
<td>-.121</td>
<td>-.016</td>
<td>-.026</td>
<td>-.184</td>
<td>(.92)</td>
<td></td>
<td></td>
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<tr>
<td>14. Career commitment</td>
<td>63</td>
<td>-.032</td>
<td>.081</td>
<td>.264*</td>
<td>.291*</td>
<td>.269*</td>
<td>.129</td>
<td>.001</td>
<td>.737**</td>
<td>-.162</td>
<td>.108</td>
<td>.014</td>
<td>-.117</td>
<td>.765**</td>
<td>(.90)</td>
<td></td>
</tr>
<tr>
<td>15. Career withdrawal</td>
<td>63</td>
<td>.138</td>
<td>-.080</td>
<td>-.289*</td>
<td>-.275*</td>
<td>.002</td>
<td>-.163</td>
<td>-.092</td>
<td>-.538**</td>
<td>.052</td>
<td>-.017</td>
<td>-.029</td>
<td>.020</td>
<td>-.652**</td>
<td>-.740**</td>
<td>(.94)</td>
</tr>
</tbody>
</table>

Note. Internal consistency reliability estimates (α) appear on the diagonal. * \( p < .05 \), ** \( p < .01 \) level. Objective fit used linear correlation between person profile and environment (major/job) profile. STEM degree coded 1 = STEM degree, 0 = non-STEM degree. STEM job coded 1 = STEM job, 0 = non-STEM job. Reliability estimates are unavailable for fit calculations and one-item measures indicated with a dash.
Table 3

Logistic Regression of Objective Major Fit (predictor) on STEM Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Effects</th>
<th>S.E.</th>
<th>p</th>
<th>Exp(B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEM degree</td>
<td>3.121</td>
<td>.951</td>
<td>.001</td>
<td>22.674</td>
<td>[3.518, 146.142]</td>
</tr>
<tr>
<td>STEM first job</td>
<td>1.418</td>
<td>.659</td>
<td>.031</td>
<td>4.130</td>
<td>[1.135, 15.033]</td>
</tr>
<tr>
<td>STEM 2018 job</td>
<td>.522</td>
<td>.634</td>
<td>.410</td>
<td>1.685</td>
<td>[.487, 5.834]</td>
</tr>
</tbody>
</table>

Note. STEM degree coded 1 = STEM degree, 0 = non-STEM degree. STEM first job and STEM 2018 job coded 1 = STEM job, 0 = non-STEM job.
Table 4

Test of Mediation of Subjective Task Values on the Relationship between Objective Fit and STEM Degree and STEM Job

<table>
<thead>
<tr>
<th>Predictor on outcome</th>
<th>Mediator</th>
<th>Effects</th>
<th>SE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major fit on STEM degree</td>
<td>Attainment value</td>
<td>Direct effect</td>
<td>3.513</td>
<td>1.180</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indirect effect</td>
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<td>.208</td>
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<td></td>
<td>Intrinsic value</td>
<td>Direct effect</td>
<td>3.852</td>
<td>1.294</td>
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<td></td>
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<td>Indirect effect</td>
<td>.490</td>
<td>.292</td>
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<td>Utility value</td>
<td>Direct effect</td>
<td>3.170</td>
<td>1.140</td>
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<td></td>
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<td>Indirect effect</td>
<td>.241</td>
<td>.197</td>
</tr>
<tr>
<td>Major fit on STEM first job</td>
<td>Attainment value</td>
<td>Direct effect</td>
<td>1.216</td>
<td>.741</td>
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<td>.730</td>
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<td></td>
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<td>.200</td>
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<td>Utility value</td>
<td>Direct effect</td>
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<td>.736</td>
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<td></td>
<td></td>
<td>Indirect effect</td>
<td>.528</td>
<td>.309</td>
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</table>

Note. Mediation tested using bias-corrected confidence intervals with bootstrapping (Hayes, 2017). STEM degree coded 1 = STEM degree, 0 = non-STEM degree. STEM first job coded 1 = STEM job, 0 = non-STEM job. Confidence intervals that do not contain zero are significant at p < .05.
### Table 5

*Test of Mediation of Perceived Job Fit on the Relationship Between Objective 2018 Job Fit and Career Attitudes*

<table>
<thead>
<tr>
<th>Predictor on outcome</th>
<th>Mediator</th>
<th>Effects</th>
<th>SE</th>
<th>95% CI</th>
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<tr>
<td>2018 job fit on</td>
<td>Perceived career fit</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>career commitment</td>
<td>Direct effect</td>
<td>.077</td>
<td>.194</td>
<td>[-.311, .464]</td>
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<td></td>
<td>Indirect effect</td>
<td>.486</td>
<td>.206</td>
<td>[.092, .932]</td>
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<td>2018 job fit on</td>
<td>Perceived career fit</td>
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<td></td>
<td></td>
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<tr>
<td>career withdrawal</td>
<td>Direct effect</td>
<td>-.322</td>
<td>.279</td>
<td>[-.880, .236]</td>
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<td></td>
<td>Indirect effect</td>
<td>-.386</td>
<td>.193</td>
<td>[-.814, -.069]</td>
</tr>
</tbody>
</table>

*Note.* Mediation was examined using bias-corrected confidence intervals with bootstrapping (Hayes, 2017). Perceived career fit was measured in 2018. Confidence intervals that do not contain zero are significant at p < .05.
Figure 1. Objective Major Fit – Subjective Task Value – Major Retention Model. Subjective task values mediate the relationship between objective fit and retention outcomes.
Figure 2. Objective Job Fit - Perceived Job Fit - Career Attitudes Model. Subjective fit mediates the relationship between objective fit and job attitudes.