If it Doesn't Fit, Will They Quit? The Impact of an Interest-Major Fit Signal on College Major Plans

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Abstract

Students' choice of college major is related to their interests (Porter & Umbach, 2006), and students whose major is well-aligned with their interests are more likely to persist in that major (Allen & Robbins, 2008) and complete a college degree in a timely manner (Allen & Robbins, 2010). This study investigates whether a specific signal that high school students receive about the alignment between their initial choice of planned major and their measured interests has an impact on their subsequent choice of planned major. A regression discontinuity design was used to compare consistency of planned major across two ACT administrations for students with Low versus Medium fit and Medium versus High fit. Results did not provide evidence that the signal is effective; possible explanations and recommended future research are discussed.

If it Doesn't Fit, Will They Quit? The Impact of an Interest-Major Fit Signal on College Major Plans

Roughly one out of every three college students change their major at least once during the first three years after their initial enrollment, and approximately one in ten college students change their major two or more times during that same time period (National Center for Education Statistics, 2017). The rate at which students change their major at least once varies substantially by their initial declared program of study, however, ranging from a low of 26% for health care fields to high of 52% for mathematics. In general, the rate at which students change majors at least once in the first three years of college is higher for students who initially declared a STEM major (at 35%) than for those who originally declared a non-STEM major (at 29%).

Although the decision to change majors during college is a common phenomenon, there are some potential negative consequences associated with that decision, especially if the decision is made later in the student's college career. Specifically, changing to a new program of study—particularly to one that has a different set of prerequisite courses than the initial program of study—can increase the number of semesters that it takes for the student to graduate. Although a recent brief from EAB (2016) refers to this assertion as a myth, their own reported descriptive analysis of data from ten colleges shows that 25% of students who change majors as early as the fall of their junior year end up attending college for ten or more semesters—the equivalent of five or more school years.

In perhaps the most comprehensive and nationally-representative study of the issue to date, Sklar (2014) used a discrete-time hazard approach to study the impact of changing majors on time to degree for a sample of students from the Beginning Postsecondary Students Longitudinal Study (BPS:04/09). Although there were many nuances to his findings, two themes emerged from his study. First, he found that switching to a different major later (as opposed to

earlier) in one's college career negatively affects the student's odds of graduating in a given year conditional on having been enrolled the previous year; in other words, changing majors later in college leads to a longer time to degree, all else being equal. Second, he found that students who changed to a STEM major (as opposed to a non-STEM major) later in their college career tended to have the longest times to graduation when compared to students who persisted in their initial major. He speculated that this increased time for students who changed to a STEM major was the result of needing to fulfill a different set of prerequisites than are often required for non-STEM majors.

Admittedly, the research in this area is scarce, but the findings of these studies suggest that changing majors in college can lengthen the amount of time to graduation for many students. This accumulation of excess credit hours as a result of changing majors in turn increases the students' overall cost to attend college. The extra time that the students must be enrolled in college as a result of a change in major also results in greater foregone earnings. Thus, having better information about whether a program of study is a good fit for the student could potentially decrease the rate at which students change majors during college, which in turn would reduce the number of students facing these negative consequences.

There is another, undocumented, side to this story, however. As a result of these negative consequences (whether real or perceived), some students may choose *not* to change majors during college despite being unsatisfied with or uninterested in their current program of study (or conversely, more satisfied with or interested in a different program of study). Similarly, some students may not opt to leave their current program of study because of institutional policies or programs that operate inadvertently as disincentives—like guaranteed tuition rates for a given number of academic years—or because of other institutional constraints—such as enrollment

caps within certain programs of study. Current statistics on the rate at which students change majors in college and the accompanying research on the potential negative consequences of this decision do not currently capture the extent to which students remain in their major despite their own awareness of a lack of fit or interest in that program of study.

Students who choose to stay within a college major that is not a good fit with their interests face their own set of potential negative consequences. Based on a meta-analysis of 18 studies of the relationship between student interests and educational outcomes, Nye, Su, Rounds, and Drasgow (2012) found that the extent to which a student's interests are congruent with those of peers in his or her major (i.e., interest congruence) is positively and moderately related to both college grades ($r = .30$) and college persistence ($r = .34$) (Rounds and Su, 2014). Similarly, using data from the Project Talent longitudinal study, Su (2012) found that interest congruence was positively related to longer-term educational outcomes, even after controlling for measures of ability and personality. Specifically, she found that the amount of congruence between a student's interests and the interests of other students in his or her college major explained 26.6% of the variance accounted for (VAF) in college grades, 21.7% of the VAF in college persistence and 35.4% of the VAF in degree attainment. Other studies not included in the aforementioned meta-analysis have also found that students with higher congruence are more likely to declare a major in the area that they had planned (Cruce & Mattern, 2015), persist in their major (Allen & Robbins, 2008), persist in college and have higher cumulative grade-point averages (Tracey & Robbins, 20016), and complete a college degree in a timely manner (Allen & Robbins, 2010).

Given this line of reasoning and supporting evidence, there should be some value in discovering early on whether a particular program of study is a good fit with a student's interests. In the fall of 2016, ACT-tested students began receiving a new score report that included

information on the alignment between their measured interests and the measured interests of college students within their planned major. This measure of interest congruence, known on the score report as "Interest-Major Fit," indicates whether the degree of fit is "Low," "Medium," or "High." It is hypothesized that students who receive information confirming that their planned major is well-aligned with their interests would be more likely to be consistent in their planned major in that area of study than students who receive information indicating that their interests are not as well-aligned with their planned major. Formally, our research question is as follows:

- For students who take the ACT more than once over a 16-month period, are students whose initial score reports indicate that they have a Medium (or High) degree of Interest-Major Fit more likely to select the same planned major on a subsequent test administration than students whose score reports indicate that they have a Low (or Medium) degree of Interest-Major Fit?

Conceptual Framework

Research on student choice of and persistence and success within a college major is often guided by Holland's theory of career personalities and work environments (1959, 1997). This theory posits that individuals choose career environments that match their career personality types, that career environments reinforce and foster particular career personality types, and that individuals thrive within those environments that are congruent with their career personality types. As part of his theory, Holland proposed six career personality types—Realistic, Investigative, Artistic, Social, Enterprising, and Conventional—and suggested that they are best represented by a hexagon (see Figure 1). As seen in the figure, the personality types that are contiguous are considered most similar, whereas the personality types that are on the opposite sides of the hexagon are considered least similar.

[FIGURE 1 HERE]

Interests associated with each personality type are as follows (ACT, 2009, p. 3):

- Realistic: Working with tools, instruments, and mechanical or electrical equipment. Activities include building, repairing machinery, and raising crops/animals.
- Investigative: Investigating and attempting to understand phenomena in the natural sciences through reading, research, and discussion.
- Artistic: Expressing oneself through activities such as painting, designing, singing, dancing, and writing; artistic appreciation of such activities (e.g., listening to music, reading literature).
- Social: Helping, enlightening, or serving others through activities such as teaching, counseling, working in service-oriented organizations, and engaging in social/political studies.
- Enterprising: Persuading, influencing, directing, or motivating others through activities such as sales, supervision, and aspects of business management.
- Conventional: Developing and/or maintaining accurate and orderly files, records, accounts, etc.; following systematic procedures for performing business activities.

The ACT Interest Inventory, first introduced in 1977, is based on Holland's theory of career personalities and work environments. The ACT Interest Inventory consists of 72 items to which students respond on a three-point scale ("I would like doing this activity," "I am indifferent (don't care one way or the other)," or "I would dislike doing this activity"). Item responses are summarized into six scale scores that correspond to the six personality types developed by Holland. From these scale scores, an interest profile can be established for each student. The ACT Interest Inventory has been empirically validated and evaluated for gender

balance, internal consistency, and test-retest reliability. More information about the development of the ACT Interest Inventory can be found in the technical manual (ACT, 2009).

The ACT Interest-Major Fit Index was first developed by Allen and Robbins (2010) to study the relationship between interest congruence on timely degree attainment. Interest-Major Fit Index scores were calculated as a rescaled correlation between a student's interest profile (as measured by the six scales scores derived from the ACT Interest Inventory) and the mean interest profile of successful college students in that major. Success was defined as having a 2.0 cumulative GPA in their 3rd year if attending a 4-year college, or in their 2nd year if attending a 2-year college. An Interest Major Fit Index score is available for 281 of the 294 majors that students can choose from when registering for the ACT (adequate numbers of students within major were required to develop the index for a given major). Note that the Interest-Major Fit Index reported to colleges and included in some ACT publications is presented on a 0-99 scale, which is simply a rescaling of the Interest-Major Fit correlation. This study makes use of the correlation rather than the rescaled index.

Starting in the fall of 2016, students who completed the ACT Interest Inventory and indicated a planned college major when registering for the ACT were provided with information on college and career planning as part of their ACT score report (see Figure 2). In addition to receiving general feedback about their interests (e.g., they enjoy working with people and data) and types of occupations that align with their interests, they were also provided with information about how their interests align with their planned major. Although the underlying Interest-Major Fit correlation is continuous, students themselves only see their placement within one of three Interest-Major Fit levels: Low, Medium, or High.

[FIGURE 2 HERE]

We hypothesize that students who receive a signal that their interests are better-aligned with their planned major will be more likely than their peers to select the same planned major on a subsequent test administration. Conversely, we hypothesize that students who receive a signal that their interests are not well-aligned with their planned major will be more likely than their peers to change their planned major on a subsequent test administration. The purpose of this study is to examine whether feedback of this type on the ACT score report is having an intended effect in guiding students toward better-fitting majors.

Methods

Analyses

A Regression Discontinuity (RD) design (Thistlewaite & Campbell, 1960; Bloom, 2012) is a quasi-experimental design that can be used to infer a causal effect in the absence of random assignment. This design requires that participants are assigned to a treatment on the basis of a "forcing variable," a continuous variable having a cut score above which participants are exposed to one treatment, and below which participants are exposed to a different treatment or control condition. The treatment is considered "sharp" if the cut score is absolute with respect to whether the participant receives the treatment or "fuzzy" if there are some exceptions to who receives the treatment and who does not (for example, if test scores and high school grades are jointly considered when awarding a scholarship, some students who score below a given cut off may still receive a scholarship if their grades are sufficiently high). In this study, the forcing variable is the continuous Interest-Major Fit correlation, and there are two sharp cut scores; all students within each score band are given the same signal: students with an Interest-Major Fit correlation less than 0.20 receive the signal that they have Low Interest-Major Fit, all students

with a correlation between 0.20 and 0.59 receive the Medium Fit signal, and all students with a correlation between 0.60 and 1.0 receive the High fit signal.

The RD design capitalizes on local randomization around a cut score. While in general, higher values of Interest-Major Fit will correspond to higher degrees of fit, due to measurement error, students within a narrow band of scores are likely to have very similar degrees of fit. Therefore, participants scoring just below a cut score and participants scoring just above a cut score can be considered to be approximately equivalent with respect to their degree of fit. This allows us to treat the two groups as though they had been randomly assigned to a treatment group, emulating an experimental design. That the Interest-Major Fit signal provided to students is being derived from the underlying continuous Interest-Major Fit correlation makes the RD design appealing for investigating the impact of providing information about Interest-Major Fit level on consistency of planned major.

One assumption of the RD design is that the treatment is substantial and distinct. In this study, students are not being exposed to a treatment per se, but rather a signal indicating whether their degree of Interest-Major Fit is Low, Medium, or High, which may call into question the substantiality of the treatment. In addition, most RD designs assume a single cut score, whereas this study had two. This was addressed by splitting the sample into different groups for analysis. One model compared students with Low and Medium fit, and the other model compared students with Medium and High fit. Other assumptions include that the treatment is assigned based on a specific cut score of the forcing variable, which is the case in this study. Additionally, the treatment effect is a local effect and the results may not generalize to subjects who do not score near the cut score. There also should be no other factors that are influenced by the cut score,

which could in turn influence the outcome, and to our knowledge there are no such factors present in this study.

The RD design allows for flexibility in modeling linear and non-linear relationships, interaction effects, and depending on the assumptions of the design, parametric or non-parametric models can be applied. Because the cut scores were sharp rather than fuzzy, a parametric approach was used in this study. We applied several functional forms to explore linear, quadratic, and cubic relationships between Interest-Major Fit and planned major consistency. Graphical representations of the results were also explored.

Sample

This study used ACT score report data from students who took the ACT at least twice between September, 2016 and December, 2017. In addition to students' scores on a battery of standardized assessments in the subject areas of English, mathematics, reading, and science, ACT score report data contain a student profile section, which includes information such as their background characteristics, degree aspirations and educational plans, and an interest inventory which measures the six career interests that correspond with Holland's six personality types.

Over 1 million students (N=1,059,422) took the ACT at least twice over the 16-month period under study. Students were excluded from the study sample, however, if they retested within two months of their initial test date. This decision was made in order to minimize the likelihood that a student registered for a subsequent ACT test date prior to receiving the score report from their initial test date, as these students would not have been exposed to the Interest-Major Fit signal. Students were also excluded from the study if they did not receive an Interest-Major Fit level after their first test event. This would occur if they did not complete the Interest Inventory and/or did not indicate a planned major for which the Interest-Major Fit correlation is

available. In cases where a student tested more than twice during the 16-month time period, the Interest-Major Fit level that they received following their first test event was considered as the signal or treatment, and the planned major that they selected when registering for the first subsequent test event that occurred outside of the 2-month window was considered for the outcome; any subsequent test events beyond that indicated were not considered in this analysis.

Based on these restrictions, the final sample for our study was 490,769. This sample was divided into two sub-samples for our analyses. The first sub-sample (N=299,256) comprises those students in the Low and Medium Interest-Major Fit levels. The second sub-sample (N=346,631) comprises those students in the Medium and High Interest-Major Fit levels.

Measures

Planned Major Consistency. At the time that students register for the ACT they are asked "Which college major (program of study) do you plan to enter?" Students are able to select a college major from a list of 294 possible options. For our outcome of interest, students were defined as having planned major consistency if their planned major was the same across two test administrations. Consistency in planned major was coded as 1; inconsistency was coded as 0.

Interest-Major Fit. As developed by Allen & Robbins (2010), interest- major fit scores were computed as the correlation between a student's interest profile and the mean interest profile of successful students in that major. Successful students comprised juniors (at four-year colleges) and sophomores (at two-year colleges) in that major who had earned a cumulative GPA of 2.0 or higher. Interest profiles are created by the six scale scores produced by responses to the ACT Interest Inventory. Interest-Major Fit correlation values can range from -1.0 to 1.0.

Cut scores to create the three Interest-Major Fit levels—Low, Medium, and High—were set at 0.20 and 0.60 to differentiate Low from Medium and Medium from High, respectively. The

cut scores were determined internally at ACT based on a sample of 62,494 ACT-tested students who entered college between 2000 and 2006 and remained enrolled in the second (2-year students) or third (4-year students) year of college. Cut scores were established by examining the within-major persistence rates (at the 2-digit CIP code level) of students by their Interest-Major Fit correlation after adjusting for linear and quadratic effects of the ACT Composite score on those persistence rates. For Interest-Major Fit correlation values below 0.20, within-major persistence rates were relatively flat. Beginning at a score of 0.20, however, within-major persistence rates began to increase with Interest-Major Fit correlation scores. A cut score of 0.60 was then selected to distinguish Medium from High, as the within-major persistence rates continued to increase over this region of the index, and as 0.60 was the midpoint of the first cut score and the maximum score on the index.

Major Certainty. When students register for the ACT, they are asked "How sure are you about your current choice of college major? The response options are "I am very sure," "I am fairly sure," and "I am not sure." For the purpose of this study, responses of "I am fairly sure" and "I am not sure" were dummy coded whereas the response option "I am very sure" served as the reference group.

Initial Planned Major. For the purpose of this study, the 294 planned majors that students selected during their initial test administration were recoded into one of 18 broad planned major areas (i.e., Agriculture and National Resources Conservation; Architecture; Area, Ethnic, & Multidisciplinary Studies; Arts: Visual and Performing; Business; Communication, Family, and Personal Services; Communications; Computer Science and Mathematics; Education; Engineering Technology and Drafting; Engineering; English and Foreign Language; Health Administration and Assisting; Health Science and Technology; Philosophy, Religion, and

Theology; Repair, Production, and Construction; Sciences: Biological and Physical; and Social Sciences and Law) that are also found on the ACT registration form.

Timing. Two variables represented timing in our study. The first variable, timing of initial test date, ranges from 1 to 34 and represents a monthly increment within the students' high school career. Specifically, 1=September of 10th grade, 2=October of 10th grade, and so forth to 34=June of 12th grade. The second timing variable, time between initial and subsequent test dates, ranges from 3 to 15 in monthly increments.

ACT Composite Score. Students' ACT Composite score is a continuous measure of academic achievement. Ranging from 1 to 36, the Composite score is the numeric average of students' scores on the English, mathematics, reading and science subject tests. Information about the validity and reliability of ACT test scores, as well as other documentation about the construction and properties of the ACT test, can be located in the technical manual (ACT, 2017a).

Other Student Characteristics. Information on students' gender, race/ethnicity, family income, parents' highest educational level, and high school type (i.e., public vs. private) were obtained from students' responses to the ACT registration form. All variables in this section are categorical, and were dummy coded prior to entering our regression analyses. Additional information about these variables can be found in ACT's *Student Information Booklet* (ACT, 2017b).

Descriptive data for all of the study variables for both sub-samples are located in Table 1. All variables serving as a reference group in our statistical models are marked accordingly. Table 2 provides descriptive statistics for all study variables separately for each of the three Interest-Major Fit levels. As seen in Table 2, there are some notable differences in these descriptive

statistics across the three groups, which it why it is important to add these covariates to our statistical models.

Results

Figure 3 provides a visual representation of the planned major consistency rates of students by their Interest-Major Fit level. The data points represent the average Interest-Major Fit correlation (on the x axis) and the planned major consistency rate (on the y axis) for students that have been binned into 1000 equal-sized groups (N ~ 490) based on the percentile rank of their Interest-Major Fit correlation. A linear regression line has also been provided for each Interest-Major Fit level in order to visualize possible discontinuities at the two cut scores on the Interest-Major Fit correlation.

Based on visual inspection of Figure 3, there appears to be a slight upward shift in the planned major consistency rate between the Low and Medium Interest-Major Fit levels, and a more pronounced upward shift in the planned major consistency rate between the Medium and Low levels. This visual evidence alone, however, is not sufficient for making a determination about the effectiveness of the Interest-Major Fit level on the students' subsequent choice of planned major. First, the quality of this type of visual evidence is susceptible to the number of bins chosen; choosing too many bins may result in excess noise in the visualization, whereas choosing too few bins may result in a loss in sensitivity to detect a difference between the groups. Second, this type of visual evidence is only descriptive in nature. As such, conclusions based on it do not take into consideration other important student characteristics that differ by Interest-Major Fit level and that also predict the students' consistency over time in their choice of planned major.

To provide a multivariate approach to our research question, we divided our students into two sub-samples to estimate RD models (noting that students in the "Medium" Interest-Major Fit level are in both analyses). Tables 3 and 4 provide the results of our RD analyses for the Low-Medium and Medium-High sub-samples, respectively. We estimated three separate linear probability models for each sub-sample to obtain an estimate of the percentage-point gap in students' planned major consistency at the respective Interest-Major Fit correlation cut score based on either a linear (Model 1), quadratic (Model 2), or cubic (Model 3) functional form of the relationship between Interest-Major Fit correlation and planned major consistency. For both sub-samples, the introduction of the quadratic and cubic terms into the model did not improve the model fit, so we will focus the remainder of this section discussing the results of Model 1.

As seen in Model 1 in Tables 3 and 4, the parameter estimate for the percentage-point gap in students' planned major consistency at the respective cut score was statistically non-significant. This null finding does not provide supporting evidence that the signal students receive from their ACT score report regarding the Interest-Major Fit of their initial planned major between either "Low" and "Medium" or "Medium" and "High" has an effect on their planned major consistency on a subsequent test occasion. While we did not find a significant signal effect for either sub-sample, for the model comparing the signal of Low fit to Medium fit, we did find a positive relationship between the students' underlying Interest-Major Fit correlation and their planned major consistency on a subsequent test administration. This same relationship, however, was not evident for the model comparing the signal of Medium fit to High fit. We believe that the absence of evidence in support of this relationship in the Medium-High sub-sample was the result of range restriction in the correlation as a result of our splitting the sample in order to analyze each cut score separately. While range restriction is an issue for both

sub-samples, it is much more substantial at the upper extreme of the Interest-Major Fit range. Specifically, the “High” and “Medium” levels combined span 80 points on the underlying correlation, whereas the “Medium” and “Low” levels combined span 120 points on the underlying correlation.

With the exception of the Interest-Major Fit score, all other predictors in Model 1 had the same direction and similar magnitude regardless of the sub-sample under consideration. The remainder of the results section will highlight some of these findings.

Consistent with previous research (Cruce & Mattern, 2015) on students’ consistency in choice of major, we found that the degree of certainty that students have in their initial choice of planned major is positively related to the consistency of their choice over time. For both the Low-Medium and Medium-High sub-samples, students who were only fairly sure or not sure of their choice of major had lower planned major consistency rates compared to those students who were very sure of their initial planned major choice. Consistency in planned major also differed by the students’ initial choice of planned major. For example, students who initially selected planned majors in the areas of business; communications; engineering; and biological and physical sciences had higher consistency rates, whereas students who initially selected planned majors in the areas of repair, production and construction; community, family and personal services; and engineering technologies and drafting had lower consistency rates.

Regardless of the sub-sample considered, we found that the relationship between academic achievement, as represented by ACT Composite score, and planned major consistency followed a quadratic functional form. Over most of the ACT Composite score range we found that the relationship between the test score and the planned major consistency rate is positive, but that it increases at a decreasing rate. This function is maximized at a score of 29 (on a scale of 1

to 36). For scores above a 29 on the ACT Composite score range, we found that the relationship between the test score and the planned major consistency rate becomes negative, and it begins to decrease at an increasing rate. Although not examined in this study, this curvilinear relationship between academic achievement and planned major consistency suggests that students may be considering their "academic fit" with a planned major, whereby students whose academic achievement is either too low or too high compared to the average in that major may be pursuing other programs of study. In addition to the influence of academic achievement, students' degree aspirations are related to their planned major consistency; specifically, students with higher aspirations had greater consistency rates as compared to students with lower degree aspirations.

Timing also appears to be an important factor in predicting planned major consistency. First, we found that the timing within their high school careers at which students initially tested was significantly related to the students' planned major consistency rates. Specifically, students that initially tested later in high school were more likely to select the same college major on a subsequent test date. This findings suggests that students may be putting greater thought into their choice of planned major as their prospect of enrolling in college and having to declare a major becomes more imminent. Second, we found that the amount of time between the initial and subsequent test dates was positively related to the students' consistency over time in their choice of major. This finding seems somewhat counterintuitive, however. We would hypothesize that students would be more consistent in their planned major choices when there is less duration between those choice events, so this finding needs further investigation.

Both the socioeconomic and demographic characteristics of students were related to the consistency over time in their choice of planned major. We found that both the students' family income level and their parents' education level were positively related to their planned major

consistency rate. Males had lower planned major consistency rates than females, whereas Asian American and Hispanic students had higher planned major consistency rates than White students.

Discussion

The purpose of this study was to examine whether receiving a signal after an initial ACT administration about the degree of fit between the students' measured interests and the interests of successful students in their planned major had an effect on the consistency (vs. change) in their choice of planned major during a subsequent ACT administration. In particular, we wanted to know if being provided with an indication that the degree of "Interest-Major Fit" was "Medium," vs. "Low" or "High" vs. "Medium" encouraged students to select that same major during a subsequent test event. Because assignment to one of the three Interest-Major Fit levels was based on cut scores from an underlying continuous Interest-Major Fit measure, we used a regression discontinuity (RD) design to examine the differences in planned major consistency rates for students on the margins of the cut scores.

Although there were a number of interesting findings from our model, we did not find any evidence to support that the Interest-Major Fit level that appears on the students' ACT score report provides a strong enough signal to influence a subsequent choice of planned major. There are several possible explanations for our null findings. First, our hypothesis about the causal effect of this signal assumes that students' choice of planned major is nontrivially influenced by a desire to study in an area that aligns with their interests. It is possible that other factors, such as prospective earnings, may outweigh student interests, in which case the relationship between interests and planned major may be less pronounced.

It is also possible that the signal may not be sufficiently effective for those students whose interests are not well-aligned with their choice of planned major. Although the signal that

there is a High degree of fit between a student's interests and choice of planned major may reinforce that choice at a later test date, the signal that fit is Medium or Low is not currently accompanied by additional information explaining why the discrepancy exists. Nor does students' the score report currently provide recommended majors that would be a better fit with the students' interests. It may be the case that students are electing to choose the same major as before in absence of this additional information that could help them make a better choice.

Finally, it is possible that the signal may not be effective because it is competing with other information presented on the score report. Given the high stakes of college admissions testing, students are likely focusing most of their attention on their test scores, and the ACT score reports appear to be designed with this in mind. The entire first page of the two-page score report presents the ACT Composite score, subject test scores, and sub-scores for different sections of the subject tests. Information on college and career planning and the Interest-Major Fit level appears on the second page of the score report, accompanied by other information on how to send score reports to colleges, how to retest, and how students' ACT Composite score aligns with their progress toward the ACT National Career Readiness Certificate. It is possible that students prioritized other information on the score report over their Interest-Major Fit level.

These hypotheses open up new directions for future research. In addition to exploring these topics, as data become available over time, future research can investigate the impact of providing this information on longer-term student outcomes such as consistency between planned major and declared major and persistence within declared major.

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Table 1

Descriptive Statistics for Regression Discontinuity Analysis Sub-samples

	Medium vs. Low		High vs. Medium	
Variable	Mean	Std Dev	Mean	Std Dev
Planned Major Consistency	0.792	0.406	0.813	0.390
I-M Fit correlation (centered at cut off score)	-0.064	0.358	0.019	0.212
Cut score indicator	0.518	0.500	0.552	0.497
I-M Fit correlation * Cut score indicator	0.113	0.137	0.101	0.119
Very sure of initial planned major†	0.336	0.472	0.356	0.479
Fairly sure of initial planned major	0.486	0.500	0.486	0.500
Not sure of initial planned major	0.176	0.381	0.156	0.363
Didn’t report sureness of initial planned major	0.002	0.044	0.002	0.042
Time of initial test date	18.506	5.207	18.333	5.097
Time between test dates	5.449	2.232	5.379	2.196
ACT Composite score	21.458	4.909	22.353	4.860
Attended a public high school†	0.852	0.355	0.849	0.358
Attended private high school	0.148	0.355	0.151	0.358
Plans to earn less than an associate's degree†	0.032	0.176	0.024	0.154
Plans to earn a bachelor’s degree	0.477	0.499	0.421	0.494
Plans to earn a graduate degree	0.477	0.499	0.543	0.498
Didn't report degree plans	0.013	0.115	0.012	0.109
Male	0.414	0.493	0.407	0.491
Female†	0.586	0.493	0.593	0.491
Income less than $36k†	0.205	0.404	0.173	0.378
Income $36k-$60k	0.164	0.370	0.154	0.361
Income $60k-$100k	0.214	0.410	0.219	0.414
Income $100k-$150k	0.168	0.374	0.181	0.385
Income $150k+	0.137	0.344	0.156	0.362
Didn't report income	0.112	0.316	0.118	0.323
Parent received no college†	0.153	0.360	0.131	0.338
Parent received some college	0.231	0.421	0.216	0.411
Parent received bachelor's degree	0.317	0.465	0.326	0.469
Parent received graduate degree	0.280	0.449	0.307	0.461
Didn't report parents' education	0.020	0.138	0.020	0.139
African American	0.147	0.354	0.107	0.310
American Indian	0.007	0.083	0.006	0.080
Asian American	0.055	0.229	0.060	0.237
Hispanic	0.115	0.319	0.114	0.318
Pacific Islander	0.002	0.042	0.002	0.040
White†	0.588	0.492	0.626	0.484
Two or more races	0.041	0.198	0.042	0.200
Didn't report race/ethnicity	0.044	0.205	0.044	0.204

Table 1. (Continued)

	Medium vs. Low		High vs. Medium	
Variable	Mean	Std Dev	Mean	Std Dev
Agric. & Nat. Res. Cons	0.019	0.136	0.021	0.143
Architecture	0.019	0.137	0.011	0.102
Area, Eth. & Multidiscip. Studies	0.001	0.035	0.001	0.024
Arts: Visual & Performing	0.050	0.219	0.060	0.238
Business†	0.122	0.327	0.126	0.332
Commun, Fam., & Personal Svcs	0.024	0.154	0.015	0.120
Communications	0.022	0.146	0.020	0.139
Comp. Sci. & Mathematics	0.044	0.205	0.032	0.175
Education	0.062	0.241	0.042	0.200
Eng. Tech. & Drafting	0.018	0.132	0.014	0.118
Engineering	0.114	0.318	0.119	0.324
English & Foreign Lang.	0.011	0.104	0.012	0.108
Health Admin. & Assisting	0.048	0.214	0.032	0.176
Health Sci. & Techno.	0.265	0.441	0.281	0.449
Philosophy, Religion, & Theology	0.005	0.068	0.003	0.054
Repair, Production, & Construction	0.005	0.071	0.008	0.087
Sciences: Biological & Physical	0.075	0.263	0.129	0.335
Social Sciences & Law	0.096	0.294	0.076	0.266
N	299,256		346,631	

† Signifies variable that served as reference group in statistical models

Table 2

Student Characteristics (Means) by Interest-Major Fit Level

Variable	Low	Medium	High
Planned Major Consistency	0.7809	0.8025	0.8214
Very sure of initial planned major	0.3307	0.3408	0.3685
Fairly sure of initial planned major	0.4833	0.4891	0.4837
Not sure of initial planned major	0.1839	0.1683	0.1461
Didn’t report sureness of initial planned major	0.0021	0.0018	0.0017
Time of initial test date	18.6446	18.3765	18.2985
Time between test dates	5.4884	5.4119	5.3531
ACT Composite score	20.9221	21.9553	22.6746
Attended a public high school	0.8563	0.8485	0.8497
Attended private high school	0.1437	0.1515	0.1503
Plans to earn less than an associate's degree	0.0370	0.0273	0.0218
Plans to earn a bachelor’s degree	0.5101	0.4467	0.3999
Plans to earn a graduate degree	0.4386	0.5136	0.5666
Didn't report degree plans	0.0144	0.0124	0.0117
Male	0.4145	0.4132	0.4025
Female	0.5855	0.5868	0.5975
Income less than $36k	0.2257	0.1854	0.1630
Income $36k-$60k	0.1705	0.1580	0.1505
Income $60k-$100k	0.2107	0.2165	0.2209
Income $100k-$150k	0.1585	0.1764	0.1839
Income $150k+	0.1256	0.1484	0.1614
Didn't report income	0.1090	0.1152	0.1204
Parent received no college	0.1666	0.1397	0.1245
Parent received some college	0.2403	0.2219	0.2110
Parent received bachelor's degree	0.3108	0.3231	0.3283
Parent received graduate degree	0.2624	0.2960	0.3162
Didn't report parents' education	0.0199	0.0192	0.0199
African American	0.1719	0.1242	0.0938
American Indian	0.0072	0.0066	0.0063
Asian American	0.0531	0.0577	0.0617
Hispanic	0.1160	0.1145	0.1132
Pacific Islander	0.0019	0.0016	0.0016
White	0.5646	0.6106	0.6377
Two or more races	0.0406	0.0413	0.0422
Didn't report race/ethnicity	0.0447	0.0435	0.0436

Table 3 (Continued)

Variable	Low	Medium	High
Agric. & Nat. Res. Cons	0.0153	0.0222	0.0201
Architecture	0.0238	0.0146	0.0072
Area, Eth. & Multidiscip. Studies	0.0017	0.0009	0.0003
Arts: Visual & Performing	0.0485	0.0522	0.0670
Business	0.1219	0.1224	0.1292
Commun, Fam., & Personal Svcs	0.0302	0.0186	0.0114
Communications	0.0234	0.0202	0.0191
Comp. Sci. & Mathematics	0.0523	0.0366	0.0279
Education	0.0751	0.0494	0.0352
Eng. Tech. & Drafting	0.0187	0.0166	0.0121
Engineering	0.1059	0.1220	0.1173
English & Foreign Lang.	0.0108	0.0112	0.0122
Health Admin. & Assisting	0.0576	0.0395	0.0258
Health Sci. & Techno.	0.2489	0.2793	0.2823
Philosophy, Religion, & Theology	0.0057	0.0037	0.0023
Repair, Production, & Construction	0.0035	0.0066	0.0084
Sciences: Biological & Physical	0.0498	0.0982	0.1534
Social Sciences & Law	0.1067	0.0859	0.0688
N	144,138	155,118	191,513

Table 4

RD Linear Probability Models for Impact of Interest-Major Fit Level (Medium vs. Low) on Consistency of Planned Major

	Model 1			Model 2			Model 3		
	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|
Intercept	0.0869	0.0146	<.0001	0.0858	0.0146	<.0001	0.0841	0.0148	<.0001
I-M Fit correlation (centered at cut score)	0.0148	0.0038	<.0001	0.0064	0.0124	0.6040	-0.0154	0.0278	0.5792
I-M Fit correlation squared				-0.0090	0.0127	0.4792	-0.0650	0.0652	0.3181
I-M Fit correlation cubed							-0.0368	0.0420	0.3803
Cut score indicator	-0.0001	0.0027	0.9659	0.0024	0.0041	0.5472	0.0031	0.0054	0.5662
I-M Fit correlation * Cut score indicator	-0.0054	0.0095	0.5696	-0.0164	0.0379	0.6648	0.0347	0.0955	0.7165
I-M Fit correlation sq * Cut score indicator				0.0559	0.0849	0.5108	-0.0648	0.5189	0.9006
I-M Fit correlation cu * Cut score indicator							0.3249	0.8290	0.6952
Fairly sure of initial planned major	-0.0262	0.0017	<.0001	-0.0262	0.0017	<.0001	-0.0262	0.0017	<.0001
Not sure of initial planned major	-0.0356	0.0022	<.0001	-0.0356	0.0022	<.0001	-0.0356	0.0022	<.0001
Didn’t report sureness	-0.1890	0.0163	<.0001	-0.1890	0.0163	<.0001	-0.1890	0.0163	<.0001
Time of initial test date	0.0108	0.0002	<.0001	0.0108	0.0002	<.0001	0.0108	0.0002	<.0001
Time between test dates	0.0013	0.0003	0.0001	0.0013	0.0003	0.0001	0.0013	0.0003	0.0001
ACT Composite score	0.0253	0.0012	<.0001	0.0253	0.0012	<.0001	0.0253	0.0012	<.0001
ACT Composite score squared	-0.0004	0.0000	<.0001	-0.0004	0.0000	<.0001	-0.0004	0.0000	<.0001
Attended private high school	0.0647	0.0021	<.0001	0.0647	0.0021	<.0001	0.0647	0.0021	<.0001
Plans to earn a bachelor’s degree	0.1042	0.0043	<.0001	0.1042	0.0043	<.0001	0.1042	0.0043	<.0001
Plans to earn a graduate degree	0.1142	0.0044	<.0001	0.1142	0.0044	<.0001	0.1142	0.0044	<.0001
Didn't report degree plans	0.1218	0.0076	<.0001	0.1218	0.0076	<.0001	0.1217	0.0076	<.0001
Male	-0.0189	0.0016	<.0001	-0.0189	0.0016	<.0001	-0.0189	0.0016	<.0001
Income $36k-$60k	0.0091	0.0024	0.0002	0.0091	0.0024	0.0002	0.0091	0.0024	0.0002
Income $60k-$100k	0.0326	0.0024	<.0001	0.0326	0.0024	<.0001	0.0326	0.0024	<.0001
Income $100k-$150k	0.0528	0.0027	<.0001	0.0528	0.0027	<.0001	0.0528	0.0027	<.0001
Income $150k+	0.0812	0.0030	<.0001	0.0812	0.0030	<.0001	0.0812	0.0030	<.0001
Didn't report income	0.1277	0.0030	<.0001	0.1277	0.0030	<.0001	0.1277	0.0030	<.0001

Table 5 (Continued)

	Model 1			Model 2			Model 3		
	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|
Parent received some college	0.0258	0.0025	<.0001	0.0259	0.0025	<.0001	0.0259	0.0025	<.0001
Parent received bachelor's degree	0.0507	0.0025	<.0001	0.0507	0.0025	<.0001	0.0507	0.0025	<.0001
Parent received graduate degree	0.0635	0.0027	<.0001	0.0635	0.0027	<.0001	0.0635	0.0027	<.0001
Didn't report parents' education	0.0390	0.0058	<.0001	0.0390	0.0058	<.0001	0.0390	0.0058	<.0001
African American	0.0058	0.0024	0.0147	0.0058	0.0024	0.0147	0.0058	0.0024	0.0145
American Indian	-0.0008	0.0087	0.9270	-0.0008	0.0087	0.9272	-0.0008	0.0087	0.9272
Asian American	0.0747	0.0033	<.0001	0.0747	0.0033	<.0001	0.0747	0.0033	<.0001
Hispanic	0.0798	0.0025	<.0001	0.0798	0.0025	<.0001	0.0798	0.0025	<.0001
Pacific Islander	0.0062	0.0173	0.7208	0.0062	0.0173	0.7219	0.0062	0.0173	0.7209
Two or more races	0.0001	0.0037	0.9679	0.0001	0.0037	0.9678	0.0002	0.0037	0.9665
Didn't report race/ethnicity	-0.0392	0.0036	<.0001	-0.0392	0.0036	<.0001	-0.0392	0.0036	<.0001
Agric. & Nat. Res. Cons	-0.0285	0.0057	<.0001	-0.0285	0.0057	<.0001	-0.0285	0.0057	<.0001
Architecture	-0.0168	0.0056	0.0027	-0.0168	0.0056	0.0027	-0.0168	0.0056	0.0027
Area, Eth. & Multidiscip. Studies	-0.0830	0.0203	<.0001	-0.0830	0.0203	<.0001	-0.0830	0.0203	<.0001
Arts: Visual & Performing	-0.0479	0.0039	<.0001	-0.0479	0.0039	<.0001	-0.0479	0.0039	<.0001
Commun, Fam., & Personal Svcs	-0.1112	0.0051	<.0001	-0.1112	0.0051	<.0001	-0.1112	0.0051	<.0001
Communications	0.0037	0.0053	0.4836	0.0037	0.0053	0.4811	0.0037	0.0053	0.4818
Comp. Sci. & Mathematics	0.0006	0.0041	0.8736	0.0007	0.0041	0.8712	0.0006	0.0041	0.8728
Education	-0.0098	0.0036	0.0072	-0.0097	0.0036	0.0075	-0.0098	0.0036	0.0071
Eng. Tech. & Drafting	-0.0590	0.0058	<.0001	-0.0590	0.0058	<.0001	-0.0590	0.0058	<.0001
Engineering	0.0023	0.0030	0.4401	0.0023	0.0030	0.4424	0.0023	0.0030	0.4431
English & Foreign Lang.	-0.0349	0.0072	<.0001	-0.0349	0.0072	<.0001	-0.0349	0.0072	<.0001
Health Admin. & Assisting	-0.0444	0.0040	<.0001	-0.0444	0.0040	<.0001	-0.0444	0.0040	<.0001
Health Sci. & Techno.	-0.0090	0.0026	0.0006	-0.0091	0.0026	0.0006	-0.0091	0.0026	0.0006
Philosophy, Religion, & Theology	-0.0437	0.0107	<.0001	-0.0437	0.0107	<.0001	-0.0436	0.0107	<.0001

Table 6 (Continued)

	Model 1			Model 2			Model 3		
	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|
Repair, Production, & Construction	-0.1719	0.0104	<.0001	-0.1718	0.0104	<.0001	-0.1718	0.0104	<.0001
Sciences: Biological & Physical	-0.0029	0.0034	0.4038	-0.0029	0.0034	0.4051	-0.0029	0.0034	0.4040
Social Sciences & Law	-0.0179	0.0032	<.0001	-0.0179	0.0032	<.0001	-0.0179	0.0032	<.0001

Table 4

RD Linear Probability Models for Impact of Interest-Major Fit Level (High vs. Medium) on Consistency of Planned Major

	Model 1			Model 2			Model 3		
	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|
Intercept	0.1203	0.0138	<.0001	0.1213	0.0140	<.0001	0.1223	0.0142	<.0001
I-M Fit correlation (centered at cut score)	0.0093	0.0084	0.2644	0.0264	0.0324	0.4140	0.0573	0.0792	0.4689
I-M Fit correlation squared				0.0442	0.0809	0.5845	0.2442	0.4745	0.6068
I-M Fit correlation cubed							0.3410	0.7972	0.6688
Cut score indicator	0.0042	0.0025	0.0903	0.0017	0.0037	0.6444	-0.0013	0.0049	0.7926
I-M Fit correlation * Cut score indicator	0.0032	0.0118	0.7831	0.0092	0.0454	0.8402	0.0414	0.1112	0.7094
I-M Fit correlation sq * Cut score indicator				-0.1062	0.1157	0.3586	-0.7227	0.6728	0.2827
I-M Fit correlation cu * Cut score indicator							0.3946	1.1506	0.7317
Fairly sure of initial planned major	-0.0260	0.0015	<.0001	-0.0261	0.0015	<.0001	-0.0260	0.0015	<.0001
Not sure of initial planned major	-0.0380	0.0020	<.0001	-0.0380	0.0020	<.0001	-0.0380	0.0020	<.0001
Didn’t report sureness	-0.2089	0.0154	<.0001	-0.2089	0.0154	<.0001	-0.2089	0.0154	<.0001
Time of initial test date	0.0098	0.0001	<.0001	0.0098	0.0001	<.0001	0.0098	0.0001	<.0001
Time between test dates	0.0018	0.0003	<.0001	0.0018	0.0003	<.0001	0.0018	0.0003	<.0001
ACT Composite score	0.0246	0.0011	<.0001	0.0246	0.0011	<.0001	0.0246	0.0011	<.0001
ACT Composite score squared	-0.0004	0.0000	<.0001	-0.0004	0.0000	<.0001	-0.0004	0.0000	<.0001
Attended private high school	0.0606	0.0019	<.0001	0.0606	0.0019	<.0001	0.0606	0.0019	<.0001
Plans to earn a bachelor’s degree	0.1051	0.0044	<.0001	0.1051	0.0044	<.0001	0.1052	0.0044	<.0001
Plans to earn a graduate degree	0.1186	0.0045	<.0001	0.1186	0.0045	<.0001	0.1186	0.0045	<.0001
Didn't report degree plans	0.1142	0.0074	<.0001	0.1142	0.0074	<.0001	0.1142	0.0074	<.0001
Male	-0.0159	0.0015	<.0001	-0.0159	0.0015	<.0001	-0.0159	0.0015	<.0001
Income $36k-$60k	0.0128	0.0023	<.0001	0.0128	0.0023	<.0001	0.0128	0.0023	<.0001
Income $60k-$100k	0.0305	0.0023	<.0001	0.0305	0.0023	<.0001	0.0305	0.0023	<.0001
Income $100k-$150k	0.0498	0.0024	<.0001	0.0498	0.0024	<.0001	0.0498	0.0024	<.0001
Income $150k+	0.0749	0.0026	<.0001	0.0749	0.0026	<.0001	0.0749	0.0026	<.0001
Didn't report income	0.1197	0.0027	<.0001	0.1197	0.0027	<.0001	0.1197	0.0027	<.0001

Table 4 (Continued)

	Model 1			Model 2			Model 3		
	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|
Parent received some college	0.0303	0.0023	<.0001	0.0303	0.0023	<.0001	0.0303	0.0023	<.0001
Parent received bachelor's degree	0.0505	0.0023	<.0001	0.0505	0.0023	<.0001	0.0505	0.0023	<.0001
Parent received graduate degree	0.0589	0.0025	<.0001	0.0589	0.0025	<.0001	0.0589	0.0025	<.0001
Didn't report parents' education	0.0338	0.0053	<.0001	0.0338	0.0053	<.0001	0.0338	0.0053	<.0001
African American	0.0020	0.0023	0.3918	0.0020	0.0023	0.3930	0.0020	0.0023	0.3941
American Indian	0.0078	0.0081	0.3313	0.0078	0.0081	0.3306	0.0079	0.0081	0.3303
Asian American	0.0718	0.0028	<.0001	0.0718	0.0028	<.0001	0.0718	0.0028	<.0001
Hispanic	0.0726	0.0022	<.0001	0.0726	0.0022	<.0001	0.0726	0.0022	<.0001
Pacific Islander	-0.0021	0.0160	0.8955	-0.0021	0.0160	0.8964	-0.0021	0.0160	0.8971
Two or more races	-0.0046	0.0033	0.1614	-0.0046	0.0033	0.1606	-0.0046	0.0033	0.1608
Didn't report race/ethnicity	-0.0270	0.0032	<.0001	-0.0270	0.0032	<.0001	-0.0270	0.0032	<.0001
Agric. & Nat. Res. Cons	-0.0406	0.0048	<.0001	-0.0406	0.0048	<.0001	-0.0406	0.0048	<.0001
Architecture	-0.0364	0.0065	<.0001	-0.0364	0.0065	<.0001	-0.0364	0.0065	<.0001
Area, Eth. & Multidiscip. Studies	-0.1243	0.0268	<.0001	-0.1244	0.0268	<.0001	-0.1243	0.0268	<.0001
Arts: Visual & Performing	-0.0548	0.0032	<.0001	-0.0548	0.0032	<.0001	-0.0548	0.0032	<.0001
Commun, Fam., & Personal Svcs	-0.0994	0.0057	<.0001	-0.0994	0.0057	<.0001	-0.0994	0.0057	<.0001
Communications	-0.0162	0.0050	0.0011	-0.0162	0.0050	0.0011	-0.0162	0.0050	0.0011
Comp. Sci. & Mathematics	-0.0227	0.0041	<.0001	-0.0228	0.0041	<.0001	-0.0227	0.0041	<.0001
Education	-0.0234	0.0037	<.0001	-0.0234	0.0037	<.0001	-0.0234	0.0037	<.0001
Eng. Tech. & Drafting	-0.1047	0.0057	<.0001	-0.1047	0.0057	<.0001	-0.1047	0.0057	<.0001
Engineering	-0.0150	0.0026	<.0001	-0.0150	0.0026	<.0001	-0.0150	0.0026	<.0001
English & Foreign Lang.	-0.0429	0.0062	<.0001	-0.0429	0.0062	<.0001	-0.0429	0.0062	<.0001
Health Admin. & Assisting	-0.0569	0.0041	<.0001	-0.0569	0.0041	<.0001	-0.0569	0.0041	<.0001
Health Sci. & Techno.	-0.0081	0.0023	0.0004	-0.0081	0.0023	0.0004	-0.0081	0.0023	0.0004
Philosophy, Religion, & Theology	-0.0677	0.0121	<.0001	-0.0678	0.0121	<.0001	-0.0677	0.0121	<.0001

Table 4 (Continued)

	Model 1			Model 2			Model 3		
	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|	Coeff	Std Err	Pr > |t|
Repair, Production, & Construction	-0.1830	0.0078	<.0001	-0.1830	0.0078	<.0001	-0.1830	0.0078	<.0001
Sciences: Biological & Physical	-0.0162	0.0026	<.0001	-0.0162	0.0026	<.0001	-0.0162	0.0026	<.0001
Social Sciences & Law	-0.0217	0.0030	<.0001	-0.0217	0.0030	<.0001	-0.0217	0.0030	<.0001

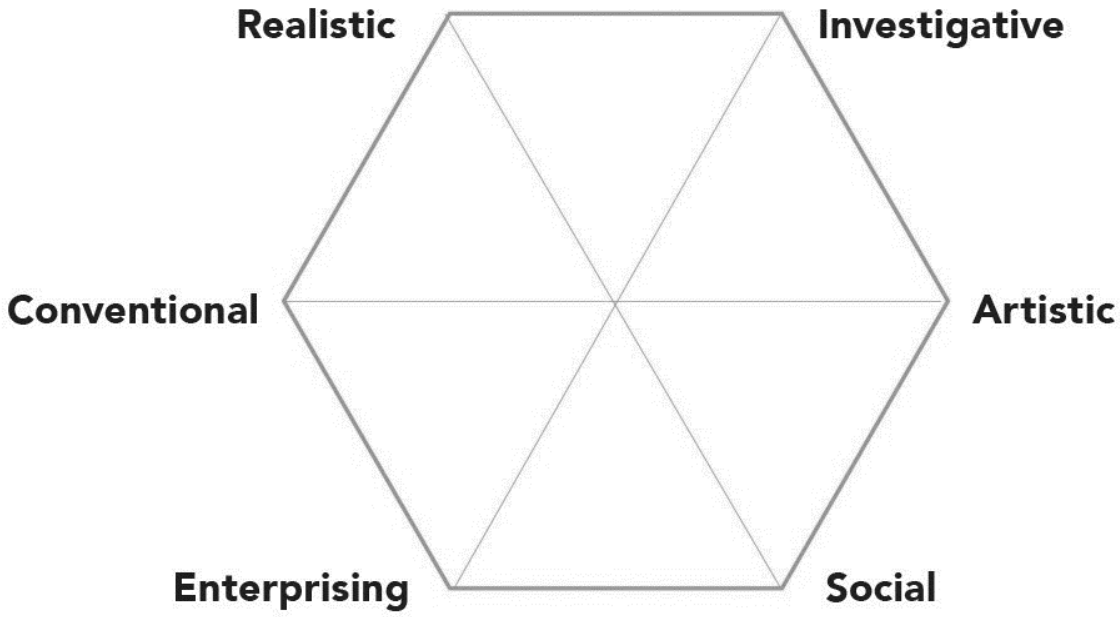
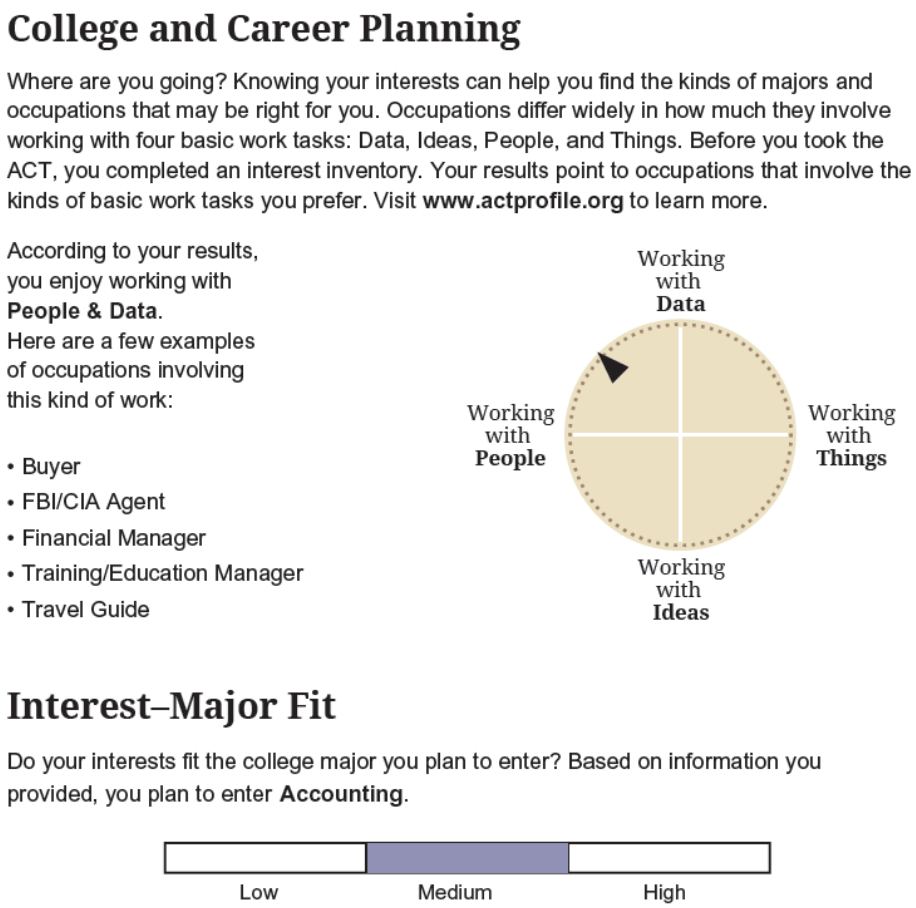


Figure 1: Holland's Career Personality Types



College and Career Planning

Where are you going? Knowing your interests can help you find the kinds of majors and occupations that may be right for you. Occupations differ widely in how much they involve working with four basic work tasks: Data, Ideas, People, and Things. Before you took the ACT, you completed an interest inventory. Your results point to occupations that involve the kinds of basic work tasks you prefer. Visit **www.actprofile.org** to learn more.

According to your results, you enjoy working with **People & Data**. Here are a few examples of occupations involving this kind of work:

- Buyer
- FBI/CIA Agent
- Financial Manager
- Training/Education Manager
- Travel Guide

Interest–Major Fit

Do your interests fit the college major you plan to enter? Based on information you provided, you plan to enter **Accounting**.

Figure 2. Screenshot from Sample ACT Student Score Report

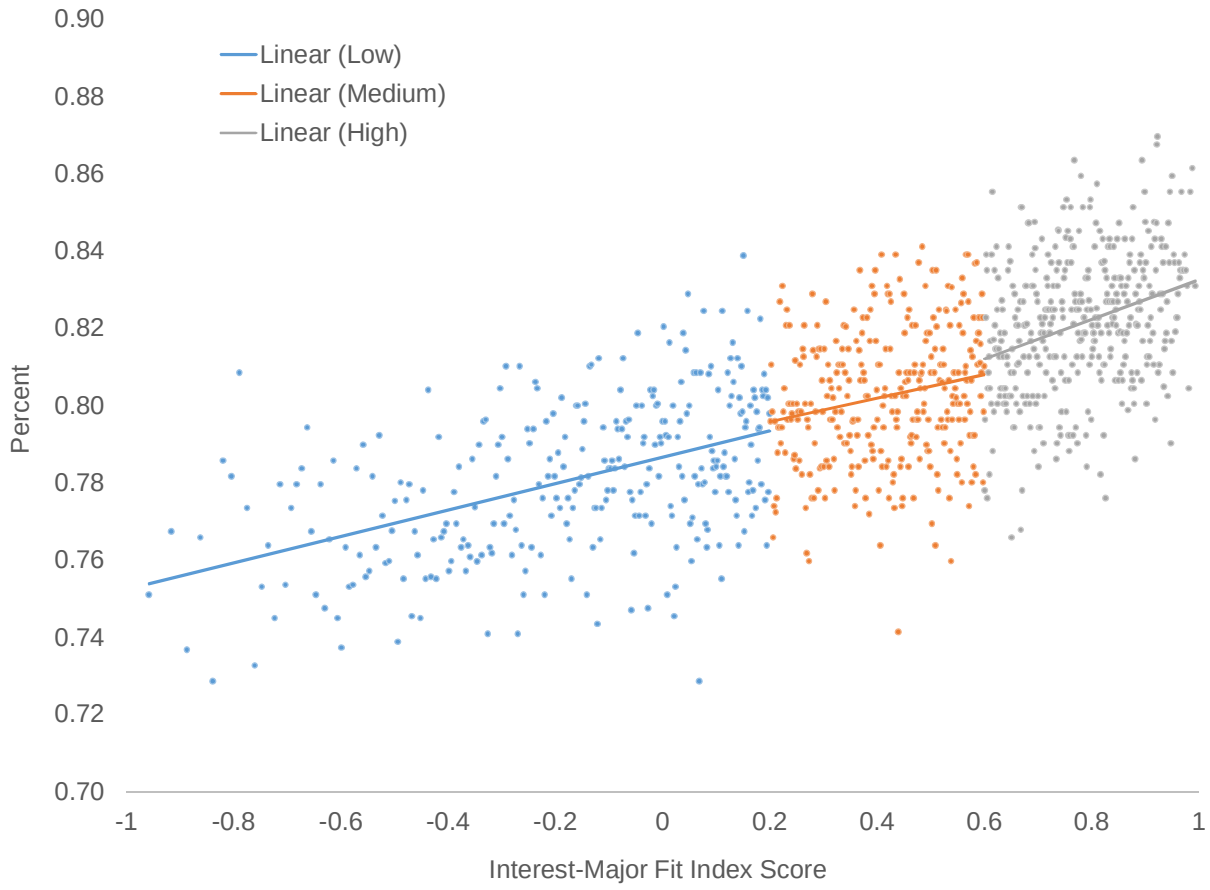


Figure 3. Planned Major Consistency Rates by Interest Major Fit Correlation