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The Effect of True Colors Workshop Participation on Time-to-Degree

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THE EFFECT OF TRUE COLORS WORKSHOP PARTICIPATION ON TIME-TO-DEGREE

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The School of Education

by
Rachel K. Davis
B.A., Webster University, 2008
May 2016

To my husband, Joshua, for encouraging me to pursue my long-delayed goal of earning a graduate degree. I could not have asked for a better partner to have by my side throughout this journey. Thank you for always having my back “when the heat gets hot.”

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ABSTRACT

This study explores the relationship between major changes and time-to-degree at a large, public university in the Southeastern United States. In addition, it analyzes the effects of participation in True Colors workshops (a major decision-making intervention) on major changes and time-to-degree while controlling for competing explanations (i.e., demographic factors, GPA, major). While researchers have often suggested a link between major changes and enrollment beyond four years, they have not often studied this relationship. Moreover, researchers have not studied the effectiveness of True Colors major decision-making workshops on major changes and/or time-to-degree.

Existing research establishes the negative effects of extended enrollment (e.g., shortage of institutional resources and workforce) and examines the interrelationship between student demographics, institutional selectivity, and time-to-degree. Additionally, researchers have found personality to be highly related to choice of major, and interventions by higher education professionals may be beneficial to students' major decision-making process.

Using a quasi-experimental research design, the researcher conducted bivariate and multivariate regression analyses to determine the relationship between major changes and time-to-degree, and the effect of participation in True Colors workshops on major changes and time-to-degree. The researcher found a significant positive relationship between major changes and time-to-degree after controlling for competing explanations ($n=349$; $\beta=0.16$; $p\leq 0.01$). The researcher also determined participation in True Colors workshops had no effect on major changes ($n=684$) or time-to-degree ($n=351$), even after controlling for competing explanations.

CHAPTER ONE: INTRODUCTION

According to the National Center for Education Statistics (NCES) (2014), approximately one third of American students graduate within four years of enrolling at a public university, and 59% of students graduate within six years (Luckerson, 2013; NCES, 2014). Scholars have researched this phenomenon to identify the roles of institutional resources, student demographics, or student academic preparation in affecting students' timely college completion (Bound, Lovenheim, & Turner, 2010; Bound & Turner, 2010; Bowen, Chingos, & McPherson, 2009). The results of these studies eliminate some explanations for the rise in the number of students extending their enrollment (e.g., academic preparation) and revealed potential correlating factors (e.g., institutional selectivity), but they have also uncovered other potential causes in their analyses (Bound et al., 2010; Bound & Turner, 2010; Bowen et al., 2009). Those causes include college choice, employment status, transferring institutions, course offering sequence, and major changes (Bound et al., 2010; Bound & Turner, 2010; McCormick & Horn, 1996). Because of its connection to the concerns of student affairs professionals in advising and career services functional areas, the potential role of major changes in time-to-degree is particularly interesting. Researchers have often referenced students changing majors multiple times or after several semesters of enrollment in connection with delayed graduation (Bound et al., 2010; Bound, Lovenheim, & Turner, 2012; Bound & Turner, 2010; Bowen et al., 2009; California State Postsecondary Education Commission, 1988; Colorado Commission on Higher Education, 1993; Illinois State Board of Higher Education, 1995; Lehman, 2002; Oklahoma State Regents for Higher Education, 1996). An estimated 75% of college students change their major at least once during their enrollment (Bound et al., 2012; Kramer, Higley & Olsen, 1994). When students delay their selection of a major or change their major multiple times, this

indecision may prevent them from graduating within four years (Bound et al., 2012; Kramer et al., 1994). As extending time-to-degree beyond four years has become increasingly common since the 1980s, the effects of extended enrollment have significant financial ramifications for both students and institutions (Bound et al., 2012; Knight, 1994; Turner, 2004).

When students do not complete their degree in the length of time expected by universities, administrators must spread limited institutional resources more thinly to provide services to the larger-than-anticipated population (Bound et al., 2010; Bound et al., 2012; Knight, 1994; Turner, 2004). As colleges are able to spend less money providing services per student, the student's academic experience may suffer (Bowen et al., 2009). Moreover, as the cost of college continues to rise, it is in students' best financial interest to complete their degrees quickly to avoid incurring additional debt (Dowd, 2004; King, 2003; Kramer, 1993). As of 2014, the average amount of educational loans per student with a bachelor's degree is \$28,950 (The Institute for College Access & Success, 2015).

Researchers have often suggested examining the relationship between major decision-making and time-to-degree as an area for further study, but they have rarely followed through on exploring that relationship (Bound & Turner, 2010; Kramer et al., 1994). Studies conducted by state-level higher education commissions seem to confirm the relationship between major changes and time-to-degree in their large-scale surveys of students (California State Postsecondary Education Commission, 1988; Colorado Commission on Higher Education, 1993; Illinois State Board of Higher Education, 1995; Lehman, 2002; Oklahoma State Regents for Higher Education, 1996). However, after searching multiple databases, the researcher found only a handful of studies explicitly analyzing the relationship between major changes and time-to-degree, only one of which was peer-reviewed (Illinois State Board of Higher Education, 1995;

Knight & Arnold, 2000; Kramer et al., 1994; Micceri, 2001; Murphy, 2000). While the Illinois State Board of Higher Education (1995) and Knight and Arnold (2000) found a relationship between major changes and time-to-degree, other studies did not (Kramer et al., 1994; Micceri, 2001; Murphy, 2000). With contradictory results, these studies leave the question of how major changes affect time-to-degree unanswered (Illinois State Board of Higher Education, 1995; Knight & Arnold, 2000; Kramer et al., 1994). Beyond these few studies, researchers have generally examined either time-to-degree or academic major decision-making, but not the relationship between the two.

Universities have acknowledged the importance of major decision-making and graduating in a timely manner by creating programs to help students select their majors (Gordon & Steele, 1992; Mau & Jepsen, 1992; Oliver & Spokane, 1988; Whiston, Sexton & Lasoff, 1998). These types of programs offer a variety of services and assessments for students to explore their interests and consider a wide range of options with the help of higher education professionals. In order to help students effectively select a major, Louisiana State University (LSU)'s University College First Year (UCFY) division offers one such program (LSU University College, 2014). Throughout the academic year, academic advisors offer a series of True Colors workshops based on Carolyn Kalil's (1998) book, *Follow Your True Colors to the Work You Love*, intended to help undecided students and students interested in changing majors select a major early and "improve the likelihood of a four-year graduation" (LSU University College, 2014, p. 14).

Using a quantitative approach, the researcher will determine the effect of participation in True Colors workshops on time to degree completion, if any. The researcher will also use a quasi-experimental research design to compare the time-to-degree and major changes of students

who did not participate in True Colors workshops with students who did. Students who participated in True Colors self-selected into this group by voluntarily participating in the workshops prior to the study. The researcher requested data on randomly selected students who did not participate in True Colors and who matriculated during the same period as True Colors students from the LSU Registrar's Office to comprise the Control group.

With the knowledge gained from this study, academic advising and career services departments can better understand how major and career decision-making interventions can affect time-to-degree. Future researchers can identify successful and/or unsuccessful attributes of similar interventions to design programs and resources to reduce time-to-degree.

Purpose of the Study and Research Questions

The purpose of this study is to compare the time-to-degree (i.e., number of semesters enrolled until graduation) of LSU students who did not participate in True Colors workshops with students who did, controlling for possible alternative explanations (e.g., gender, race/ethnicity, and in-state resident status). The researcher also compared the number of major changes for workshop participants versus non-participants to examine the relationship between number of major changes and time-to-degree. In addition, the researcher sought to answer further questions:

- a. Demographically, what population(s) of students participate in True Colors workshops?
- b. Do students who participate in the True Colors workshop graduate in fewer semesters than students who do not?
- c. What is the effect of participation in the True Colors workshops on the number of times a student changes her/his/zir major?
- d. What is the effect of major changes on time-to-degree?

- e. Does time-to-degree correlate with any demographic factors, including race/ethnicity, gender, GPA, composite ACT/SAT scores, on-campus residence, and major?

CHAPTER TWO: REVIEW OF THE LITERATURE

Prior research examining the relationship between major decision-making and extended time-to-degree is limited. As such, existing research generally focuses on either the subject of time-to-degree or major decision-making (Bound et al., 2012; Bowen et al., 2009; Kramer et al., 1994; Soria & Stebleton, 2013). Therefore, these two major themes shape the review of the current literature. In the section that follows, the discussion will begin by explaining why time-to-degree is an important issue with implications for both higher education and the broader United States economy. Next, the researcher will discuss the related institutional and student demographic factors related to continued enrollment beyond four years.

The subsequent section focuses on literature relating to major decision-making, beginning with an exploration of who changes majors. Then, the researcher examines the external and internal motivators for students changing their major. The discussion then explores the characteristics and benefits of institutional interventions in major decision-making. Finally, the researcher discusses specific types of major decision-making programming with particular emphasis on True Colors and other similar programs. In combination, the literature discussed within these two major themes provide a compelling argument for the potential relationship between program participation, major changes, and time-to-degree.

Time-to-Degree

Research on the subject of extended time-to-degree has grown over the past three decades, just as the number of students continuing their enrollment beyond four years has increased (Bound & Turner, 2010; Bowen et al., 2009; NCES, 2014). While the concept of taking longer than four years to complete an undergraduate degree is not a new one, the steady increase in the number of students choosing to do so since the 1980s has been cause for concern

for student affairs professionals, policy makers, and economists (Bound et al., 2012). Beyond the obvious additional financial burden “extenders” face individually, this decrease in student turnover also has significant effects at the institutional level and beyond (Bound, Lovenheim, & Turner, 2007; Knight, 1994; Turner, 2004). When students continue their enrollment beyond four years, colleges must attempt to accommodate larger-than-projected numbers of students with inflexible budgets (Knight, 1994; Turner, 2004). With already limited availability for financial aid, housing, and courses, a larger-than-anticipated number of students can compound these problems further as institutional leadership must spread those limited resources more thinly across its inflated student population (Bound et al., 2012; Knight, 1994; Turner, 2004). For example, fifth and sixth year students may occupy seats in courses, leaving less space for first-year and transfer students for whom those same courses may be required for graduation (Turner, 2004). Extended time-to-degree has been particularly prevalent at public institutions, and in fact, over the past 30 years, multiple state-level higher education commissions have conducted research on extended time-to-degree in an effort to address its effects (California State Postsecondary Education Commission, 1988; Colorado Commission on Higher Education, 1993; Illinois State Board of Higher Education, 1995; Lehman, 2002; Oklahoma State Regents for Higher Education, 1996).

In addition to its adverse effects on institutional-level resources, extended time-to-degree has negative consequences for the United States economy (Turner, 2004). As students have delayed their entry into the workforce, the economy may face a shortage of skilled, college-educated workers (Bowen et al., 2009; Turner, 2004). Moreover, taxpayers must wait longer to see a return on their investment of federal funds in the form of college loan and grant programs

(McCormick & Horn, 1996). Therefore, extended time-to-degree is not only a student development concern, but also a major economic issue.

Researchers have found the reasons behind extended time-to-degree are as complex and varied as college students themselves. At the macro level, some researchers have identified public policy and institution-level issues that unintentionally increase students' time-to-degree, including problems such as budget cuts and limited availability of required classes (Knight, 2004; Turner, 2004). Other studies have found links between institutional selectivity and timely degree completion, arguing the less selective a university is in its admissions, the more likely its students will take more than four years to graduate (Bound et al., 2012; Bowen et al., 2009; Kroc, Howard, Hull, & Woodard, 1997). Although more selective college admissions standards may admit students with higher GPAs and test scores, researchers have debunked the theory that academic preparation is to blame for the increase in time-to-degree. Researchers argue those students would not have completed college anyway, dropping out well before their expected graduation date (Bound et al., 2012; Bowen et al., 2009). Instead, these researchers argue it is the financial resources of highly selective institutions, which are often more substantial than less-selective institutions, that can make a difference in four-year completion rates (Bound et al., 2012; Bowen et al., 2009). Yet, while students' academic preparation may not effect time-to-degree, students' background may play a major role.

In an effort to understand which students are taking longer than four years to graduate, researchers have explored the demographic characteristics of this group of students. Multiple studies have found specific demographic factors, such as race/ethnicity, gender, and socioeconomic status (SES), often correlate to undergraduate enrollment beyond four years (Bowen et al., 2009; Kroc et al., 1997; McCormick & Horn, 1996). Studies have indicated

students from lower socioeconomic backgrounds are not only less likely to complete their degrees, but are also more likely to take longer than their higher-SES peers to graduate (Bowen et al., 2009; Ishitani, 2006). In their study of enrollment data at public universities across multiple states throughout the United States, Bowen et al. (2009) found 18% more of the students in the top income quartile graduated within four years than students in the bottom income quartile. The same study found White and Asian/Asian American students graduated more quickly than non-White, non-Asian/Asian American students, even when controlling for family income and academic preparedness indicators such as standardized test scores (Bowen et al., 2009). In addition, multiple studies have found female students have a shorter time-to-degree than male students (Bowen et al., 2009; Knight & Arnold, 2000; Kroc et al., 1997). Although the specific reasons these correlations appear to exist for time-to-degree are unclear, some researchers have argued the complex relationship between race, gender, and socioeconomic status affects college completion rates (Buchmann & DiPrete, 2006; Light & Strayer, 2002)

As for the specific degree programs students choose, the relationship between major and time-to-degree is less clear. In their quantitative study of more than 204,000 undergraduate students at 38 public and land grant institutions, Kroc et al. (1997) found students in engineering programs took the longest to graduate, while business students graduated the most quickly. However, in an analysis of enrollment data for 868 graduates of a public university in the southeast United States, Knight (1994) found academic major to have little effect on time-to-degree. Bowen et al. (2009) confirmed these findings, arguing with the possible exception of engineering (which institutions often design as a five-year degree program), time-to-degree and graduation rates do not vary significantly among different majors. Yet, while students' choice of major may not have a relationship with time-to-degree, *changing* majors might.

Among the possible explanations for students' extended time-to-degree, research has often mentioned change of major. However, while researchers examining time-to-degree have suggested major changes as a potential area of future examination, the subject has been largely unexplored (Bound & Turner, 2010; Volkwein & Lorang, 1996). Perhaps the most compelling evidence pointing to major changes leading to increased time-to-degree came from policy-related research done by state-level higher education commissions. When these researchers surveyed students to understand why they extended their enrollment beyond four years, students routinely cited changing their majors as a contributing factor (California State Postsecondary Education Commission, 1988; Colorado Commission on Higher Education, 1993; Illinois State Board of Higher Education, 1995; Lehman, 2002; Oklahoma State Regents for Higher Education, 1996). In the Illinois State Board of Higher Education's (1995) analysis of enrollment data at public Illinois universities, researchers directly linked multiple major changes to extended time-to-degree. However, Kramer, Higley, and Olsen (1994) found no relationship between major changes and time-to-degree in their study of student enrollment data at Brigham Young University between 1980 and 1988. Similar studies conducted at individual universities also found no relationship between the number of times students change majors and the amount of time it takes them to graduate (Micceri, 2001; Murphy, 2000). Therefore, while survey data and anecdotal evidence may point to a connection between changing majors and extended time-to-degree, quantitative studies have not always supported this theory (California State Postsecondary Education Commission, 1988; Colorado Commission on Higher Education, 1993; Kramer et al., 1994; Lehman, 2002; Micceri, 2001; Murphy, 2000; Oklahoma State Regents for Higher Education, 1996).

Major and Career Decision-Making

Changing majors is a common occurrence in college, with an estimated 75% of students doing so at least once during their enrollment (Kramer et al., 1994). Indeed, being undecided can allow students to explore their options before prematurely committing to a specific major (Gordon, 1998). Theophilides, Terenzini and Lorang (1984) found students who changed majors during their first year of study performed well academically and developed intellectually throughout their enrollment. However, the same study found students who changed during their sophomore years did not experience similar success (Theophilides et al., 1984). Moreover, students who changed majors during both their first and second years of study performed poorly in academics and exhibited low educational and institutional commitment (Theophilides et al., 1984).

Other researchers have found similar links between extended major indecision and negative student outcomes (Chase & Keene, 1981; Turner, 2004). Chase and Keene (1981) found the longer a student waited to declare a major, the lower their GPA and completed credit hours were. In addition to possible psychosocial and performance concerns, changing majors can result in broader logistical issues for students that can contribute to time-to-degree (Turner, 2004). For example, when a student changes his/her/zir major more than once or after multiple semesters, this can result in “wasted” credit hours if degree requirements vary between majors, leading to additional semesters of study (Turner, 2004). These studies indicate academic major indecision can be problematic; however, to address these concerns, it is important to understand the characteristics of undecided students and major changers.

Researchers have not often explicitly connected major changes with time-to-degree. However, a number of studies exist examining the characteristics and behavior of undecided

students and major changers, some of which may be relevant to time-to-degree (Anderson, Creamer, & Cross, 1989; Ashby, Wall, & Osipow, 1966; Baird, 1967; Cunningham & Smothers, 2010; Chase & Keene, 1981; Ellis, 2014; Graunke, Woosley, & Helms, 2006; Theophilides et al., 1984). Demographically, undecided students are similar to decided students with regard to gender, race, and academic performance (Anderson et al., 1989; Ashby et al., 1966; Baird, 1967; Gordon & Steele, 2003). However, researchers have drawn interesting distinctions between undecided students (i.e., students who enter college without a declared major) and major changers (i.e., students who change their major one or more times), particularly as they relate to psychosocial development and motivation (Anderson et al., 1989; Cunningham & Smothers, 2010; Theophilides et al., 1984). Anderson et al. (1989) found students who changed their major at least once to be more likely than undecided or decided students to persist and graduate in their study of 1,384 first-year students at a public university in Virginia. Graunke, Woosley and Helms (2006) surveyed a sample of 2,492 first-time, first-year students at Ball State University, finding those who were highly committed to a specific career path were less likely to graduate within six years than students who reported lower commitment levels. Cunningham and Smothers (2010) examined the psychosocial development of students who changed their majors multiple times, finding these students exhibited lower levels of self-efficacy than students who changed their majors two times or less.

In addition to exploring the demographic and psychological characteristics of undecided students and major changers, researchers have examined why students choose to change their majors. Students change majors for a variety of reasons and are motivated to do so by both external and internal factors (Beggs, Bantham & Taylor, 2008; Carduner, Padak & Reynolds, 2011; Elliott & Elliott, 1985; Firmin & MacKillop, 2008; Malgwi, Howe, & Burnaby, 2005;

Phillips & Strohmer, 1983; Pizzolato, 2006; Soria & Stebleton, 2013; Workman, 2015). Among the most common external motivations for students' major decision-making is the influence of friends and family (Elliott & Elliott, 1985; Firmin & MacKillop, 2008; Soria & Stebleton, 2013; Workman, 2015). In addition to the opinions of others swaying their decision-making, external factors such as the perceived ease of requirements or class availability may affect a student's choice of major (Soria & Stebleton, 2013). Students may also decide to change their major simply because they have difficulty making decisions, do not use university resources, and/or have a general lack of knowledge about major choices (Beggs et al., 2008; Firmin & MacKillop, 2008; Phillips & Strohmer, 1983).

In addition to the myriad external factors influencing how and why students change their majors, a number of intrinsic motivations exist as well (Beggs et al., 2008; Bowen et al., 2009; Carduner et al., 2011; DelVecchio & Honeycutt, 2002; Firmin & MacKillop, 2008; Galotti, 1999; Lackland & DeLisi, 2001; Malgwi et al., 2005; Pizzolato, 2006; Porter & Umbach, 2006). Some research has indicated race, gender, and SES play a role in major decision-making, with certain majors being more popular for some subpopulations of students than others (Bowen et al., 2009; Galotti, 1999; DelVecchio & Honeycutt, 2002; Lackland & DeLisi, 2001; Malgwi et al., 2005; Porter & Umbach, 2006). Bowen et al.'s (2009) analysis of enrollment data at 21 flagship public universities and four public statewide university systems revealed men were more likely to major in engineering, math, physical science, and business; however, women were more likely to choose education, communications, and professional (e.g., pre-law and pre-medicine) majors. Porter and Umbach (2006) identified racial differences in major selection, and found political views and personality were strong predictors of students' choice of major. Lackland and DeLisi (2001) found male and female students perceived their abilities in different majors differently, as

well as how useful those majors would be in the future. Malgwi et al.'s (2005) survey of 788 undergraduate business students highlighted gender-based differences in career priorities, showing male students were more likely to list career advancement and compensation as more critical to their major decision-making process than their female peers. However, both male and female students ranked "interest in the subject" as the most important factor in selecting their major (Malgwi et al., 2005).

Career development theorists have long acknowledged the importance of matching an individual's interests, personality, skills and values with her/his/zir career path (Holland, 1959; Holland, 1973; Holland, 1997; Murray, 1938; Niles & Harris-Bowlsbey, 2013; Spokane, 1996; Spranger, 1928). In his typology theory, Holland (1959; 1973; 1997) argued an individual would be most satisfied in a career in which her personality and interests matched her work environment. Researchers have repeatedly examined the validity of Holland's (1959; 1973; 1997) Person-Environment Fit theory, consistently finding it to be effective in matching individuals' characteristics with suitable careers (Miller, 2002; Lent, Brown, Nota & Soresi, 2003; Spokane, Luchetta, & Richwine, 2002). Tracey (2008) examined the effectiveness of using Holland's (1997) theory in an undergraduate career development course, finding students who considered career paths congruent with their Holland code had better decision-making outcomes than those who did not. Career counselors have widely adopted Holland's (1959; 1973; 1997) approach in practice, often in the form of assessments like the Self-Directed Search, to help individuals match their personal attributes and personality with possible careers (Holland, 1994; Niles & Harris-Bowlsbey, 2013).

Multiple studies have shown a student's personality may predict their choice of major and career, particularly as it relates to Myers-Briggs types (Goldschmid, 1967; McPherson &

Mensch, 2007; Pulver & Kelly, 2008). Goldschmid (1967) analyzed the results of five personality assessments, including the MBTI, along with students' major choice and found "students in a particular major share certain personality traits which are significantly different from those in other majors" (p. 307). McPherson and Mensch (2007) examined the MBTI types of 248 students along with their choice of major and determined a relationship existed between personality types and selected major. Pulver and Kelly (2008) explored the major prediction ability of the MBTI in combination with the Strong Interest Inventory (SII) for 458 undecided students at a large, public university. In this study, the combined SII and MBTI analysis predicted 48.3% of students' major choices correctly overall, which was significantly better than chance (Pulver & Kelly, 2008). Therefore, in both theory and practice, personality and interests play a significant role in students' major discernment process.

Students routinely cite personal interest as one of their primary intrinsic motivators for selecting a major (Beggs et al., 2008; Carduner et al., 2011; Firmin & MacKillop, 2008; Malgwi et al., 2005). They not only want to be able to perform well in their chosen field, but also have an interest in the subject matter (Beggs et al., 2008; Carduner et al., 2011; Firmin & MacKillop, 2008; Malgwi et al., 2005). Analyzing data from 28 two- and four-year institutions, Allen and Robbins (2010) found students whose interests aligned with their chosen major graduated in a more timely manner. In another analysis of nearly 50,000 students from 25 four-year institutions, Allen and Robbins (2008) found students who selected majors that matched their interests were less likely to change their majors. Selecting a career that is congruent with one's personality according to the Holland Codes (1997) may also decrease the likelihood of changing careers (Donohue, 2006). However, selecting a major and career that matches their interests may be difficult for students, as some studies have indicated students feel uninformed on the specifics

of majors and possible career paths (Beggs et al., 2008; Carduner et al., 2011; Firmin & MacKillop, 2008). As Beggs et al. (2008) revealed through interviews and surveys of undergraduates at a public university in the Midwest, students might be basing their perception of a specific major's match with their interests on faulty or incomplete information from friends, family, and popular culture. Therefore, the role of advising and career services can be vital in educating students and helping them choose a major and subsequent career that matches their interests and personality (Beggs et al., 2008).

Academic and career advising services in higher education have sought to respond to students' desire to match their major to their interests and personality by creating a number of interventions in the form of counseling, classes, structured advising programs, and workshops in line with career development theories (Cunningham & Smothers, 2014; Gordon & Steele, 1992; Mau & Jepsen, 1992; Niles & Harris-Bowlsbey, 2013; Oliver & Spokane, 1988; Whiston et al., 1998). Oliver and Spokane (1988) conducted a meta-analysis of 58 studies on various career and major advising interventions and found individual counseling to be most effective for students; however, it is both time- and cost-intensive for institutions. The same study found workshops and structured groups to be the second most effective intervention for students, as well as a more cost-effective option for departments (Oliver & Spokane, 1988). Whiston et al. (1998) conducted a similar meta-analysis of 47 studies, again finding individual counseling was the most effective treatment for students. However, they determined computer-assisted career counseling was the most cost-efficient and second most effective treatment, with workshops and group counseling being less effective interventions (Whiston et al., 1998).

One such workshop is True Colors, which higher education professionals utilize to help individuals identify potential majors, career paths, and leadership styles at multiple colleges

throughout the United States (Arizona State University, n.d.; Central New Mexico Community College, 2008; Lone Star College, 2016; LSU University College, 2014; Mountain View College, n.d.; Palomar College, 2015; San Diego State University, n.d.; The George Washington University, n.d.; University of California San Diego, n.d.). The main assumption of True Colors workshops that focus on career decision-making is if a student better understands his/her/zir own personality traits, he/she/ze can better select a major (Honaker, 2003; LSU University College, 2014; Whichard, 2006). An analysis of True Colors activities, including assessments and word clusters, indicated a strong correlation between participants' results from True Colors and the MBTI, indicating these tests have the ability to measure similar personality, temperament, psychological, and behavioral characteristics (Honaker, 2003; Whichard, 2006). Gordon and Carberry (1984) argued the use of the MBTI in academic advising could be beneficial for students' cognitive and identity development. Therefore, based on previous research on the connections between personality and major/career decision-making, the information learned in True Colors workshops may be beneficial to students in the process of selecting a career path (Donohue, 1996; Goldschmid, 1967; Gordon & Carberry, 1984; Holland, 1997; Honaker, 2003; McPherson & Mensch, 2007; Pulver & Kelly, 2008; Whichard, 2006).

Based on the theory established in existing literature, the researcher hypothesizes students who participate in a True Colors workshop will change their major less frequently, and subsequently graduate in fewer semesters, than those who do not.

CHAPTER THREE: METHODOLOGY

In this chapter, the researcher provides detailed information regarding the study's participants, including relevant demographic information for both the Treatment (True Colors participants) and Control (non-participants) groups. The researcher also operationally defines the study's independent (True Colors participation) and dependent variables (major changes and time-to-degree), describes data collection procedures, and explains which competing theoretical explanations were controlled for in the quantitative analysis.

Participants

The participants in this study were full-time undergraduate students ($N=1,052$) at LSU who matriculated between Fall 2010 and Spring 2015. Participants fell into one of two groups: those who participated in LSU's UCFY True Colors major discernment program at some point during their enrollment ($n=311$) and those who did not ($n=741$). The researcher requested data on randomly selected students who did not participate in True Colors through the LSU Registrar's office, which manages the university's enrollment data.

Of the original samples, 61 of the True Colors group and 218 of the Control group were not currently enrolled at and/or did not graduate from LSU. The data did not include information on the reason these students discontinued enrollment. In addition, the researcher omitted one student from the True Colors group and 48 students from the Control group because they matriculated in Spring 2015. Because these students enrolled only one semester prior to the data analysis, they did not have an opportunity to change majors, and thus could have caused the data regarding major changes to appear artificially low. The researcher also had to remove four students from the randomly selected Control group because they had participated in True Colors. After eliminating duplicates and students who did not meet the qualifying criteria of current

enrollment, matriculation before Spring 2015, or graduation from LSU, the True Colors sample included 249 students, and the Control group included 471 students (total $N=720$).

Treatment Group

The True Colors group included 74.7% female and 25.3% male students. Seventy percent identified as White, 12.4% as Black/African American, 5.2% as Hispanic/Latino, 7.2% as Asian/Asian American, and 4% as multiracial. One student identified as American Indian or Alaskan Native, and one student did not respond. Eighty-eight percent received TOPS (a state-funded, merit-based scholarship for Louisiana residents who earned a minimum high school GPA of 2.5 and ACT score equal to or higher than the prior year's state average) (Louisiana Office of Student Financial Aid, n.d.). Twenty-four percent of students identified as first-generation, 91.6% were Louisiana residents, and 62% lived on campus at some point during their enrollment. True Colors participants had an average cumulative GPA of 3.13, an average ACT score of 25.07, and entered LSU with an average of 1.63 advanced placement (AP) or international baccalaureate (IB) credit hours.

Control Group

The Control group had nearly equal representation with regard to gender, with 50.7% female students and 49.3% male students. The majority (66.1%) were White, 14.2% were Black/African American, 6.6% Hispanic/Latino, 7.9% Asian/Asian American, and 3.2% multiracial. Two students identified as American Indian or Alaskan Native, and three students did not respond. Sixty-nine percent were TOPS recipients, and 9.6% had a major in the College of Engineering. Again, the majority of students in this group were Louisiana residents (75.2%). First-generation students comprised 24.2% of the group. Sixty-five percent had lived on campus at some point during their enrollment. The Control group's average cumulative GPA was 3.05,

their average ACT score was 25.57, and entered LSU with an average of 2.09 AP/IB credit hours.

Table 1

Demographic Information Summary for True Colors and Control Groups

Variable	True Colors (<i>n</i> =249)	Control (<i>n</i> =471)
Gender		
Female	186 (74.7%)	239 (50.7%)
Male	63 (25.3%)	232 (49.3%)
Race/Ethnicity		
White	175 (70.3%)	318 (66.1%)
Black/African American	31 (12.4%)	67 (14.2%)
Asian/Asian American	18 (7.2%)	37 (7.9%)
Hispanic/Latino/a	13 (5.2%)	31 (6.6%)
Multiracial	10 (4.0%)	15 (3.2%)
American Indian/Alaskan Native	1 (0.4%)	2 (0.4%)
No Response	1 (0.4%)	3 (0.6%)
TOPS		
Yes	219 (88.0%)	323 (68.6%)
No	30 (12.0%)	148 (31.4%)
Engineering Major		
Yes	24 (9.6%)	108 (22.9%)
No	225 (90.4%)	363 (77.1%)
First-Generation		
Yes	61 (24.5%)	114 (24.2%)
No	188 (75.5%)	357 (75.8%)
LA Resident		
Yes	228 (91.6%)	354 (75.2%)
No	21 (8.4%)	117 (24.8%)
On-campus		
Yes	155 (62.2%)	307 (65.2%)
No	94 (37.8%)	164 (34.8%)

Table 2

Academic Information Summary for True Colors and Control Groups

Variable	Treatment (<i>n</i> =249)		Control (<i>n</i> =471)	
	M	SD	M	SD
Time-to-degree	8.40 (<i>n</i> =124)	1.08	8.46 (<i>n</i> =243)	1.14
Major changes	1.38	1.20	0.99	1.11
Major changes after True Colors	1.11	1.14		
ACT	25.07	3.30	25.57	3.52
Cum. GPA	3.13	0.53	3.05	0.59
AP/IB Credits	1.63	4.49	2.09	5.51

Participant Summary

The True Colors and Control groups were similar in many variables, including race/ethnicity, first-generation student status, GPA, ACT score, and AP credits earned. With regard to those variables for which the two groups were dissimilar, gender is perhaps the most problematic. Seventy-five percent of the True Colors group identified as female, versus only 50% of the Control group. In addition, 22.9% of the Control group consisted of students in the College of Engineering, whereas engineering students made up only 9.6% in the True Colors group. Although the True Colors group had a higher proportion of students who were Louisiana residents (91.6% versus 75.2% in the Control group) and students who received TOPS (88% versus 68.6% in the Control group), these differences are less troublesome in terms of this particular analysis. Existing research does not link time-to-degree and/or major changes to in-state student status; therefore, the researcher does not expect in-state students to graduate in a more timely manner than out-of-state students (Bound et al., 2012; Bowen et al., 2009). In addition, no evidence exists linking TOPS award with time-to-degree or major changes. Therefore, the disproportionate number of TOPS recipients in the True Colors group is not necessarily cause for concern.

Data Collection Procedures

The Registrar's office collected each student's data upon their enrollment at LSU. Students self-reported demographic information, including gender and race/ethnicity. The Registrar's office collected and maintained other information, such as major, number of major changes, ACT score, and GPA. Data were preexisting, and the Institutional Review Board (IRB) at LSU approved the researcher to include the following information:

- Original entry type (e.g., Undergraduate – Full-Time)
- Original entry term
- Last term enrolled
- Graduation date or anticipated graduation date
- Last major
- Number of program/major changes
- Gender
- Race/ethnicity
- TOPS recipient status
- ACT composite score
- SAT composite score
- Overall GPA
- First generation status
- Louisiana resident status
- Number of AP/IB hours
- On campus resident (Current)
- On campus resident (Ever)

The researcher anonymized the data by omitting identifying information, including names and student identification numbers.

Measurement

In this study, the researcher is primarily concerned with two dependent variables: number of major changes and time-to-degree. This is because UCFY's stated goal for the True Colors workshops indicates that participants will be able to commit to a major and, as a result, graduate in a more timely manner (LSU University College, 2014). As such, the researcher explores both major changes and time-to-degree in this analysis.

Major Changes

The Registrar's office calculated the variable of "program changes" by counting the number of times a student switched programs of study during their enrollment. At LSU, many students enter the institution as a student of UCFY, where they declare an intended major and complete general education requirements to meet the admission standards for their intended senior colleges (e.g., the College of Engineering, the College of Humanities and Social Sciences, etc.). Upon being admitted to a senior college, a student's record would reflect a program change due to the Registrar's office program coding system, even if the student's intended major itself did not change. For example, if the College of Business admitted a student who entered as a UCFY Marketing major, the Registrar's office would record that as one program change, even if the student's intended major remained the same. If that same student were to fail to make adequate progress in his degree program in the senior college, the senior college may demote him back to UCFY or University College Center for Advising and Counseling (UCAC). UCAC works with students who have earned 30 or more credit hours, but who have not met their senior college's admission requirements (LSU University College, 2016). The Registrar's data would

also count this kind of shift as a program change, even if the student had the same major. Because the Registrar's office data does not delineate between such classification changes and actual changes in major, the researcher used "program changes" as a proxy for the number of major changes. However, the researcher can still consider this an adequate representation of major changes because while it may overestimate the number of major changes in some instances, it does not underestimate them. Therefore, in this study, the researcher understands "program changes" as roughly equivalent to major changes.

Time-to-Degree

The researcher measured the variable of time-to-degree based on two data points recorded for each student: "Original Entry Term" and "Actual/Anticipated Degree Completion Date." The Registrar's office recorded each student's original entry term by the semester and academic year in which the student matriculated. "Actual Degree Completion Date" data included the semester and year in which the student graduated from LSU. For those students who had not graduated at the time of the study, the students self-reported their "Anticipated Degree Completion Date" with the semester and year they intended to graduate. While it is possible for students to change their anticipated degree completion date, advisors encourage students to update their anticipated degree dates prior to registration to ensure students receive appropriate advising and resources (E. Anthony, personal communication, August 4, 2015). Therefore, the researcher calculated time-to-degree by counting the number of semesters enrolled between the student's original entry term and actual/anticipated degree date. By using semesters instead of academic years, the researcher was able to capture the nuance between students who took one additional semester to graduate versus those who took two or three additional

semesters. Use of semesters rather than years is also consistent with previous research on the subject of time-to-degree (Knight & Arnold, 2000; Kramer et al., 1994).

True Colors Participation

The independent variable in this study is whether the student participated in UCFY's True Colors program. UCFY advertised this program to new students (both first time and transfer) and students within the UCFY advising unit through emails, flyers, and informational sessions during orientation (E. Anthony, personal communication, August 4, 2015). The sessions were open to all students and held up to 24 times throughout both the fall and spring semesters of each of the academic years included in this study (LSU University College, 2015). An advisor from UCFY serves as a facilitator for the 60-minute workshops, which include introductions, assessments, and discussion (E. Anthony, personal communication, January 13, 2016). During the workshop, the facilitator guides students through two qualitative assessments: a card sort and a "describe yourself" score sheet (E. Anthony, personal communication, January 13, 2016). After completing the assessments, the students' results indicate their personal ranking of the four True Colors personality types: Blue, Green, Gold, and Orange (E. Anthony, personal communication, January 13, 2016). The facilitator then describes the related values, talents, careers, and majors for each of the four colors (E. Anthony, personal communication, January 13, 2016). At the end of the workshop, the facilitator provides information on other career exploration resources and collects student contact information (E. Anthony, personal communication, January 13, 2016).

Students included in this study participated in UCFY's True Colors workshops voluntarily, and the researcher did not assign students to this group. The researcher assigned

students who participated in True Colors the value of 1 for this variable, and assigned students who did not participate in True Colors the value of 0.

Control Variables

Based on the existing body of literature, a number of factors correlate with time-to-degree, including gender and race/ethnicity (Bowen et al., 2009; Ishitani, 1996; Kroc et al., 1997; Volkwein & Lorang, 1996). Therefore, it was essential to include not only the amount of time each student was enrolled and the number of major changes in the data, but also a range of demographic information. In order to analyze the data and control for conflicting explanations of extended time-to-degree, the researcher re-coded nominal demographic variables.

Students self-reported gender and race/ethnicity information as part of their application process to the university. From the self-reported information on gender, the researcher created the variable “female.” This variable took a value of 1 if the student reported identifying as female, and a value of 0 if the student reported identifying as a male. Race/ethnicity is a nominal variable that could take the following values: White, Black/African American, Hispanic/Latino, Asian (including Asian American), American Indian/Alaskan Native, Multiracial, and No Response. The researcher created variables for each ethnicity, assigning a value of 1 for the one race/ethnicity with which the student identified and 0 for those they did not. Students also self-reported their first-generation student status. For students who identified as first generation, the researcher assigned the value of 1 for the variable “First Generation.” For students who did not identify as first generation, the researcher assigned the value of 0.

In addition to demographic factors, researchers have found academic performance and preparation to be important considerations in understanding time-to-degree (Bowen et al., 2009; Ishitani, 1996; Knight, 1994; Kroc et al., 1997; McCormick et al, 1996; Volkwein & Lorang,

1996). The researcher collected data on three variables related to academic performance and preparation: ACT/SAT composite score, overall grade point average (GPA), and number of advanced placement/international baccalaureate (AP/IB) credit hours. The Registrar's office collected and verified data on student's ACT and SAT composite scores, as well as the number of AP/IB credit hours earned, using official test score reports and academic transcripts. Per LSU admission guidelines, the University awards varying amounts of AP/IB credit hours (between 3 and 14 hours) for accepted AP test scores (between 3 and 5) (LSU Undergraduate Admissions, 2015). Because most students in the dataset submitted ACT scores, the researcher converted composite SAT scores to the ACT scale using the ACT's SAT score conversion table (ACT Inc., 2015). In cases where students submitted both SAT and ACT composite scores, the researcher used the ACT score. When the data did not include a standardized test score, the researcher did not include the student in the related analysis. The Registrar also reported each student's cumulative GPA on a 4.0 scale, reflecting the student's cumulative GPA either at the time the Registrar produced the dataset or at the time of the student's graduation.

While researchers have found choice of academic major to be unrelated to time-to-degree in most cases, this is not the case for students pursuing a degree in the field of engineering (Bowen et al., 2009). One contributing factor for this phenomenon is the norm within the engineering field for students to take semesters off to work in full-time internships (Bowen et al., 2009). This norm exists within the LSU College of Engineering programs (LSU College of Engineering, 2015). Therefore, the researcher created the variable "engineering," and assigned a value of 1 to all students whose degree program was in LSU's College of Engineering. These majors included biological engineering, chemical engineering, civil engineering, computer engineering, computer science, construction management, electrical engineering, environmental

engineering, industrial engineering, mechanical engineering, and petroleum engineering (LSU Office of Enrollment Management, 2016). For students whose degree program was not in the College of Engineering, the researcher assigned a value of 0.

CHAPTER FOUR: FINDINGS

This chapter includes the results and findings of the researcher's analysis of the effect of participation in True Colors workshops on major changes and time-to-degree. Additionally, the researcher examines the relationship between major changes and time-to-degree to determine whether the fundamental theory behind True Colors workshops (i.e., fewer major changes would decrease students' time-to-degree) is valid.

The chapter begins with a description of the researcher's methods of quantitative analysis. The researcher then includes descriptive statistics regarding the number of major changes for both the Treatment and Control groups. Next, the researcher details the results of two t-tests, which compared the True Colors and Control Groups' measures of central tendency (i.e., mean and standard deviation) for both dependent variables (i.e., major changes and time-to-degree). The researcher then discusses the results of three multivariate regression models. The first model explored the potential relationship between major changes and time-to-degree. The subsequent two models compared the Treatment and Control groups' measures on the dependent variables while controlling for possible competing explanations. The researcher concludes this chapter by summarizing the results of the analysis and responding to the hypothesis.

Data Analysis

Based on the *N* size and the type and scope of data collected in the datasets, quantitative analysis is the best method for exploring this research question (Creswell, 2015). A t-test and comparison of means would provide some insight into the question of how True Colors program participation affects time-to-degree; however, multivariate regression allows the researcher to control for the effects of multiple variables simultaneously (Nolan & Heinzen, 2014). This is an appropriate approach because existing literature suggests factors such as gender, race/ethnicity,

and academic preparation/ability have an effect on extended time-to-degree (Bowen et al., 2009; Ishitani, 1996; Knight, 1994; Kroc et al., 1997; McCormick et al., 1996; Volkwein & Lorang, 1996). Therefore, in order to understand how participation in True Colors affects time-to-degree, the researcher must control for these possible confounding variables and analyze the data through multivariate regression.

Given the dependent variable in this study can take several distinct values on an interval scale – and given that outcomes are more-or-less normally distributed – the researcher utilized an ordinary least squares (OLS) regression model (Nolan & Heinzen, 2014). The regression returns coefficient estimates of each independent variable’s impact on the dependent variable. By examining the direction, magnitude, and significance of these coefficients, the researcher can assess the legitimacy of the hypothesized relationship between True Colors participation and time-to-degree. Given the research hypothesis, the researcher expected there would be a negative coefficient on the True Colors participation variable.

In this section, the researcher discusses the statistical analyses performed for both the True Colors and Control groups. Analyses included descriptive statistics for both groups, t-tests to examine the relationship (if any) between variables, and multiple regressions to control for competing explanations for the results. The researcher then makes connections between the analyses and research questions to determine the validity of the hypotheses.

Descriptive Statistics

The researcher first examined the number of major changes for each group in order to establish whether students who participated in True Colors workshops ($n=249$) changed their majors less often than students in the Control group ($n=471$) after participating in the workshop. Data regarding the number of times a True Colors participant changed his/her/zir major after

workshop participation was unavailable for three students; therefore, this analysis did not include these observations.

Table 3

Major Changes for True Colors Participants

# Major changes after workshop	Frequency	Percent	Cumulative
0	91	36.99	36.99
1	82	33.33	70.33
2	37	15.04	85.37
3	28	11.38	96.75
4	7	2.85	99.59
5	1	0.41	100.00
Total	246	100	

Table 4

Major Changes for Control Group

# Major changes	Frequency	Percent	Cumulative
0	203	43.10	43.10
1	136	28.87	71.97
2	84	17.83	89.81
3	37	7.86	97.66
4	6	1.27	98.94
5	4	0.85	99.79
6	1	0.21	100.00
Total	471	100.00	

These results indicate that after participating in the workshops, students who attend True Colors change their major with roughly the same frequency as students who do not. Seventy percent of True Colors students change their major one or fewer times after participating in the workshop, versus 72% of the Control group. Although the goal of the True Colors workshops is to help students decide on a major, which may result in a major change, the data indicates approximately 30% of participants ultimately change their major two or more times after participating (LSU University College, 2014). If the workshop had indeed met its goal of

helping students select a major (and subsequently remain in that major), one would expect to see a much higher proportion of True Colors participants changing their major one or fewer times than the Control group.

T-Tests of the Hypothesis

Next, the researcher performed two t-tests to understand how participation in the True Colors workshops affected the dependent variables of number of major changes and time-to-degree.

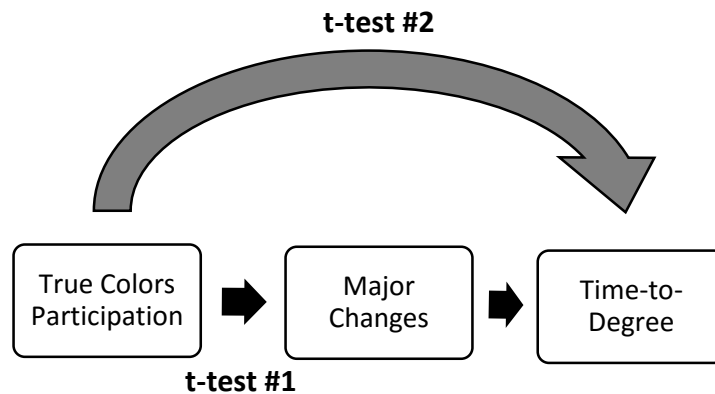


Figure 1. Visualization of t-tests.

In the first t-test, the researcher compared the mean number of major changes between the True Colors participants ($n=246$) and the Control group ($n=471$).

Table 5

Measures of Central Tendency for True Colors Participation and Number of Major Changes

Group	n	M	SD
True Colors	246	1.11	1.14
Control	471	0.99	1.11

Note. $|Difference| = 0.12$; $p \leq 0.16$

On average, True Colors students changed their major 1.11 times, while non-participants changed their major 0.99 times during their enrollment. Although True Colors participants

change majors 0.12 times more than non-participants, this difference is not statistically significant; therefore, the researcher cannot reject the null hypothesis ($p \leq 0.16$). These results indicate taking part in True Colors does not have an effect on the number of times a student changes majors.

Next, the researcher compared the mean time-to-degree (number of semesters enrolled) between True Colors participants ($n=124$) and the Control group ($n=243$).

Table 6

Measures of Central Tendency for Time-to-Degree

Group	<i>n</i>	<i>M</i>	<i>SD</i>
True Colors	124	8.40	1.08
Control	243	8.46	1.14

Note. $|Difference| = 0.06; p \leq 0.59$

Once again, the results indicate the researcher cannot reject the null hypothesis. On average, True Colors participants graduated in 8.40 semesters, whereas students from the Control group graduated in 8.46 semesters. No significant difference in time-to-degree exists between True Colors participants and the Control group.

Multivariate Tests of Hypothesis

Using OLS regression, the researcher then analyzed the data to determine whether participation in True Colors affected the number of times a student changed his/her/zir major, and/or the amount of time it took the student to graduate while controlling for factors previous researchers have shown to be related to time-to-degree (e.g., race/ethnicity, gender, GPA) (Bound et al., 2012; Bowen et al., 2009; Kramer et al., 1994; McCormick et al., 1996; Turner, 2004).

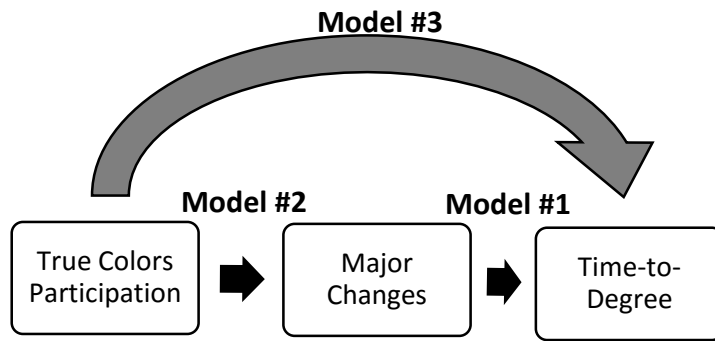


Figure 2. Visualization of multivariate regression models.

Table 7

OLS Regression Model of the Effect of Major Changes on Time-to-Degree

Variable	β	Std. Error
# major changes	0.16***	0.04
Transfer student	-0.95*	0.49
Female	0.10	0.11
Black/African American	-0.09	0.16
Hispanic/Latino/a	-0.16	0.24
Asian/Asian American	0.20	0.23
American Indian/Alaskan Native	-0.72	0.98
Multiracial	0.03	0.30
TOPS recipient	0.29	0.23
ACT score	-0.01	0.02
GPA (cumulative)	-0.61***	0.13
AP/IB hours	-0.01	0.01
Engineering major	1.18***	0.15
First generation	0.01	0.13
Louisiana resident	-0.11	0.27
On-campus (ever)	-0.04	0.11
Constant	10.19***	0.58

Note. $N = 349$. $R^2 = 0.32$

* $p \leq 0.10$ ** $p \leq 0.05$ *** $p \leq 0.01$

In the first model, the researcher examined the relationship between major changes and time-to-degree. This model did not take into account whether a student had participated in True Colors, and instead focused on analyzing how a student changing her/his/zir major affected the

amount of time it took the student to graduate. It is important to examine this relationship because it tests the mechanism by which the True Colors workshops seek to decrease time-to-degree (LSU University College, 2014).

The results of this model (see Table 7), which were highly significant, provide evidence that major changes affect time-to-degree, with each major change adding 0.16 semesters onto the amount of time it takes a student to graduate. Therefore, if an intervention like True Colors were to decrease the number of times a student changed his/her/zir major, the program could plausibly decrease a student's time-to-degree. These results confirm the intuitions of both the researcher and multiple existing survey-based studies in which students have repeatedly cited changing majors as a contributing factor to extended time-to-degree (California State Postsecondary Education Commission, 1988; Colorado Commission on Higher Education, 1993; Illinois State Board of Higher Education Commission, 1995; Lehman, 2002; Oklahoma State Regents for Higher Education, 1996). However, the results also contradict some existing research on major changes and time-to-degree, in which researchers have found little or no relationship between changing majors and the amount of time it takes students to graduate (Kramer et al., 1994; Micceri, 2001; Murphy, 2000). As was the case with previous studies, the researcher of this study analyzed data from one specific institution; therefore, it is possible major changes affect students' time-to-degree at different institutions differently (Micceri, 2001; Murphy, 2000). For example, researchers have found less selective public institutions (similar to LSU) to have higher numbers of students extending their enrollment beyond four years (Bound et al., 2012; Bowen et al., 2009). Therefore, these incongruent results may be indicative of other institutional factors.

In line with previous research on academic preparedness and the amount of time it takes students to graduate, this analysis indicates a negative relationship between GPA and time-to-

degree (Bowen et al., 2009). For one unit increase of GPA, the student would shorten her/his/zir time-to-degree by three-fifths of a semester.

Unsurprisingly, transfer students graduate nearly one full semester more quickly than non-transfer students. This is likely because they enter the university with credits accumulated from a previous institution. This confirms the results of Belcheir's (2000) analysis of degree completion rates, which found transfer students were 6.8 times more likely than first-year students to graduate in four years.

Students with a major in the College of Engineering take an additional 1.18 semesters to complete their degrees than non-engineering majors. This confirms existing research linking engineering to extended time-to-degree (Bowen et al., 2009; Kroc et al., 1997). Notably, being an engineering major has the greatest effect on time-to-degree among the variables the researcher analyzed. This may be because engineering students at LSU sometimes take a semester off to participate in full-time internships and/or cooperative learning experiences ("co-ops") (LSU College of Engineering, 2015).

Unlike other studies, this analysis does not indicate a statistically significant relationship between gender and race/ethnicity with time-to-degree (Bowen et al., 2009). This may be because the researcher collected data solely from LSU, unlike other researchers who collected data across multiple states and/or institutions (Bowen et al., 2009). Although the racial/ethnic makeup of this sample was representative of LSU's population (70% White as of Fall 2015), it is not representative of the national population of college students (39.6% White as of 2012) (LSU Office of Budget and Planning, 2015; NCES, 2013).

The data indicated null results for a relationship between ACT score and time-to-degree, which controverts the findings of previous studies that have indicated higher college entrance

exam scores decreased time-to-degree (Knight, 1994; McCormick et al., 1996). First-generation status, living on campus at any point during enrollment, and being a Louisiana resident had no effect on the amount of time it took students to graduate.

Table 8

OLS Regression Model of the Effect of True Colors Participation on Number of Major Changes

Variable	β	Std. Error
True Colors participation	0.03	0.09
Transfer	-0.07	0.45
Female	0.16*	0.09
Black/African American	0.21	0.13
Hispanic/Latino/a	-0.37**	0.19
Asian/Asian American	-0.05	0.17
American Indian/Alaskan Native	0.04	0.62
Multiracial	0.09	0.22
TOPS recipient	0.27	0.18
ACT score	-0.04**	0.01
GPA (cumulative)	-0.40***	0.08
AP/IB hours	-0.01	0.01
Engineering major	-0.32***	0.12
First generation	0.04	0.10
Louisiana resident	-0.22	0.21
On-campus (ever)	0.03	0.09
Constant	3.14***	0.40

Note. $N = 684$; $R^2 = 0.13$

* $p \leq 0.10$ ** $p \leq 0.05$ *** $p \leq 0.01$

In the second model (see Table 8), the results indicated GPA and ACT score both had a highly significant negative relationship to the number of times a student changes her/his/zir major. As a student's GPA and/or ACT score rise, the fewer times she/he/ze will change majors. Additionally, students who study engineering change their major 0.32 fewer times than non-engineering majors.

While most of the variables related to race/ethnicity did not have a significant relationship to the number of major changes, Hispanic and Latino/a students changed their

majors 0.37 fewer times than White students. Female students, however, changed their majors 0.16 times more than male students.

Notably, there was no significant relationship between True Colors participation and number of major changes. This indicates taking part in True Colors workshops has no effect on the number of times a student changes majors. These findings confirm the researcher’s results from both the descriptive statistics (see Table 1) and earlier t-tests (see Table 5). Therefore, the True Colors workshop does not appear to meet its intended goal of decreasing the number of major changes for its participants.

Living on campus at any point during enrollment, being a Louisiana resident, and being a first-generation student had no relationship with the number of times a student changed majors.

Table 9

OLS Regression Model of the Effect of True Colors Participation on Time-to-Degree

Variable	β	Std. Error
True Colors participation	0.06	0.12
Transfer	-1.01**	0.50
Female	0.08	0.12
Black/African American	-0.11	0.16
Hispanic/Latino/a	-0.29	0.24
Asian/Asian American	0.16	0.24
American Indian/Alaskan Native	-0.69	1.01
Multiracial	0.03	0.31
TOPS recipient	0.39	0.24
ACT	-0.02	0.02
GPA (cumulative)	-0.72***	0.13
AP/IB hours	-0.01	0.01
Engineering major	1.09***	0.16
First generation	-0.02	0.13
Louisiana resident	-0.22	0.27
On-campus (ever)	-0.05	0.12
Constant	11.02***	0.55

Note. $N = 351$; $R^2 = 0.29$

* $p \leq 0.10$ ** $p \leq 0.05$ *** $p \leq 0.01$

Results of this model (see Table 9) indicate once again that GPA has a significant negative relationship with time-to-degree. For every unit a student increases her/his GPA, she/he decreases their time-to-degree by three-quarters of a semester. This is consistent with existing research, which links academic performance with shortened time-to-degree (Bowen et al., 2009; Knight, 1994; McCormick et al., 1996). This model also indicates transfer students graduate approximately one semester more quickly than non-transfer students, which the researcher can attribute to the fact that these students enter the university with previously earned credits. Engineering students, however, take approximately one semester longer than non-engineering students do to complete their degrees. Again, the researcher can attribute this to established norms within the College of Engineering regarding participation in full-time internships (LSU College of Engineering, 2015).

Participating in True Colors workshops had no discernible effect on the number of semesters it took students to graduate. This confirms the results of the earlier t-test (see Table 6) and indicates the True Color workshops are not meeting their intended goal of decreasing students' time-to-degree (LSU University College, 2014).

The researcher found no significant relationship between demographic factors (i.e., gender and race/ethnicity) and time-to-degree. This contradicts the findings of other researchers, who have found that female, White, and Asian/Asian American students have a shorter time-to-degree than male, Black/African American, and Hispanic/Latino/a students (Bowen et al., 2009). Again, this may be a result of the sample being from a single university rather than multiple universities throughout the United States. In addition, being a first-generation student, Louisiana resident, or a student who lived on campus did not have a significant relationship to time-to-degree.

Summary

One of the stated goals of LSU's UCFY True Colors workshops is to "improve the likelihood of a four-year graduation" and select a major early in their enrollment (LSU University College, 2014, p. 14). Through the analysis of data collected from undergraduate students at LSU who matriculated between Fall 2010 and Fall 2015 ($n=349$), the researcher found evidence to support the argument that changing majors increases the amount of time it takes students to graduate. However, the researcher found participating in True Colors had no effect on number of major changes or time-to-degree. Students who took part in True Colors workshops did not graduate more quickly or change majors less frequently than students who did not participate. Therefore, while the theory upon which LSU UCFY based its True Colors workshops is sound (i.e., if a student selects a major and does not change it, she will graduate in four years), the workshops do not accomplish this intended goal.

The researcher's finding that changing majors increases the amount of time it takes students to graduate is notable. This finding confirms the researcher's intuition regarding the relationship between major changes and time-to-degree, as well as provides statistical support for previously conducted survey-based research on the subject (California State Postsecondary Education Commission, 1988; Colorado Commission on Higher Education, 1993; Illinois State Board of Higher Education Commission, 1995; Lehman, 2002; Oklahoma State Regents for Higher Education, 1996). In addition, the researcher found transfer students and students with higher GPAs graduated more quickly, while students within the College of Engineering graduated more slowly. The results did not indicate any relationship between demographic factors and time-to-degree; however, this may be a result of the limited sample.

CHAPTER FIVE: CONCLUSION

Approximately 75% of undergraduates change their major over the course of their enrollment (Kramer et al., 1994). Changing majors is normal behavior for college students, particularly as their interests, skills, and motivations change and develop (Cunningham & Smothers, 2010; Firmin & MacKillop, 2008; Galotti, 1999). However, some students have difficulty committing to a specific major and/or career path, leading them to change majors multiple times (Malgwi et al., 2005; Tinsley, Tinsley, & Rushing, 2002). While some degree of major changes is to be expected, students who change majors multiple times and/or after multiple semesters of enrollment may need more than four academic years to graduate (Illinois Board of Higher Education, 1995; Turner, 2004). Taking more than four years to graduate is not uncommon; however, with just one third of college students completing their undergraduate degree within four years, both individual institutions and the United States economy have experienced negative financial effects as a result (Bound et al., 2012; NCES, 2014; Turner, 2004). Therefore, it is in the best interest of colleges and universities to help students graduate within four years.

While there are many reasons for students extending their time-to-degree, institutions have varying levels of control over these factors (Bound et al., 2012; Bowen et al., 2009). However, student affairs professionals may be able to shorten time-to-degree by helping students select a major through various interventions, including workshops, one-on-one counseling, and presentations. One such intervention is LSU UCFY's True Colors workshops, which the advisors have implemented to encourage students to select a major early, not change that major, and then graduate within four years (LSU University College, 2014).

In this study, the researcher has found a relationship between the number of times a student changes majors and the amount of time it takes the student to graduate. Indeed, each major change added 0.16 semesters to a student's time-to-degree. However, the researcher also found students who participated in a True Colors workshop did not change their major less frequently or graduate more quickly than students who did not participate. Therefore, while decreasing the number of major changes a student makes decreases time-to-degree, True Colors workshop participation has no effect on these variables.

Previous research indicates some possible reasons for True Colors workshops' ineffectiveness for decreasing major changes. For example, researchers have argued that the workshop format is significantly less effective on students than other interventions, including one-on-one counseling and computer-assisted career counseling (Oliver & Spokane, 1988; Whiston et al., 1998). The personality of the student participating in the intervention may also play a role in its effectiveness on influencing decision-making (Tinsley et al., 2002). While the workshop format is both cost- and time-efficient for departments because of the low staff-to-student ratio, it does not provide opportunities for meaningful, one-on-one interaction between the presenter and attendees (Oliver & Spokane, 1988; Whiston et al., 1998). In addition, the single, 60-minute session may be too short to make a lasting impression on students' decision-making skills. Researchers have argued interventions with a duration longer than 12 weeks are more effective than shorter ones (Niu, Behar-Horenstein, & Garvan, 2013). Therefore, the fundamental structure of the workshop may be flawed in terms of its ability to have a long-lasting effect on students' decision-making behavior.

In addition, the students who take part in the True Colors workshops may be unprepared to make a decision regarding their majors (Elliot, 1984; Pizzolato, 2006; Tinsley et al., 2002).

Although all LSU students are eligible to participate in the workshop, LSU UCFY specifically lists first-year students as their target population for the intervention (LSU University College, 2014). These students may be unable to commit to a major for the duration of their undergraduate enrollment from a developmental perspective (Blimling, 2013; Gordon, 1998; Pizzolato, 2006; Tinsley et al., 2002). Neurologically, traditional-age college students have not fully developed the ability to make complex decisions and understand consequences (Blimling, 2013). Psychologically, first-year students in particular are often in the early stages of epistemological and identity development (Baxter Magolda, 1992; Baxter Magolda 1995; Chickering, 1969; Evans, Forney, Guido, Patton, & Renn, 2010). In fact, as Graunke et al. (2006) argued, students who commit to a specific major, rather than a specific career goal, may be less likely to graduate in six years. Therefore, when students are still just beginning the developmental process, it may be difficult for them to select and subsequently commit to a major early in their enrollment. As such, the True Colors workshop may be less effective for students in their first semester of study.

Still, it is important to note the benefits of True Colors workshop participation likely include factors unrelated to major changes or time-to-degree. In LSU University College's (2015) own assessment of the True Colors workshops in the 2013-2014 academic year, 95% of participants surveyed reported that they "strongly agreed" or "agreed" True Colors provided preliminary steps in exploring majors and careers, and 100% said they would recommend the workshops to a friend. In addition to serving as a venue to discuss career decision-making, the workshop may provide other beneficial opportunities for students, including networking with others, promoting identity development, and connecting with LSU UCFY staff and services (Clarke, Hyde, & Drennan, 2013; Thomson, 2008). For example, Astin (1984) argued

involvement in out-of-classroom experiences like True Colors workshops encourage student development. Tinto (1993) found students who actively engaged in university life to be more likely to graduate. According to Kuh (2005), academic advising plays a particularly important role in establishing a supportive environment for first-year students. Therefore, while True Colors may not affect major changes or time-to-degree, it may provide an important opportunity for students to establish a relationship with the institution.

The results of this study provide additional support for a connection between major changes and time-to-degree. While multiple studies have suggested this connection exists, only one peer-reviewed manuscript has previously provided statistical evidence of the relationship (California State Postsecondary Education Commission, 1988; Colorado Commission on Higher Education, 1993; Illinois State Board of Higher Education, 1995; Knight & Arnold, 2000; Kramer et al., 1994; Lehman, 2002; Micceri, 2001; Murphy, 2000; Oklahoma State Regents for Higher Education, 1996). In addition, while other researchers have examined the effectiveness of various types of career decision-making interventions, none studied True Colors specifically (Oliver & Spokane, 1988; Whiston et al., 1998). As such, the researcher's examination of True Colors in terms of its ability to limit major changes and shorten time-to-degree is a unique contribution to the existing literature.

Limitations

The researcher's study has several limitations worth noting. The sample for this study, though representative of the institution at which the researcher conducted it, is not representative of the broader United States college student population; therefore, it may be difficult to generalize the results (NCES, 2013). In addition, the researcher did not randomly select the students who participated in True Colors workshops; rather, the students self-selected into the

treatment group. As such, there may be additional, unmeasured factors about these students that may affect the results (e.g., personality traits). The researcher randomly selected students for the Control group in coordination with the LSU Registrar's office; however, the Control group was about 1% of the LSU population, providing a somewhat limited perspective. Nonetheless, this study provides a solid framework for possible future research on the subjects of major decision-making and time-to-degree.

Suggestions for Future Research

To build upon the findings in this study, future researchers may find it beneficial to explore the effectiveness of different types of major and career decision-making interventions, particularly as they affect time-to-degree. The phenomenon of how and why students select a major is a complicated one; however, understanding the importance of *when* students declare a major may be an area worthy of additional examination. Finally, researchers could replicate the same study at other universities or on a national scale to improve the generalizability of the results.

Conclusion

Participation in True Colors workshops does not decrease the number of times a student changes majors or shorten their time-to-degree. However, the researcher found statistical support for the workshops' underlying assumption that decreasing major changes shortens the amount of time it takes to graduate. Therefore, while participating in True Colors workshops in their current incarnation does not have an effect on major changes (and therefore time-to-degree) for this population of students, another intervention might.

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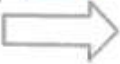

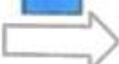




















APPENDIX A: TRUE COLORS WORKSHOP SUPPLEMENTARY MATERIALS

True Colors: Workshop Procedures

- 1) Introduce yourself and allow the participants to introduce themselves. Write down names of the attendants, their LSU ID numbers and current majors, which you will provide to True Colors Coordinator after session has ended.
- 2) Ask participants probing background questions and encourage them to jot down notes. Some examples of questions are:
 - A. What do you like to do in your free time?
 - B. What is your current major? What led to you picking that? Favorite subjects?
- 3) Complete the color card exercise (putting the color cards in order)
 - A. Ask each participant to lay the 4 cards in front of them, scan the photos and read the descriptions. Then, ask him/her to select the card that he/she feels BEST characterizes them the best. Next, have them choose the card that is LEAST like them.
 - B. The two remaining cards should be placed in the middle of the two previously chosen cards and ordered by 2nd most like them and 3rd most like them.
 - C. Discuss the participants' choices, asking them for feedback on why they made the choices they did. Ask 1) Did they find any surprises or did they already have a good idea about their personality, needs, values? 2) Did they have a hard time making the decisions, if so why?
- 4) Complete the Describe Yourself Score Sheet
 - A. Participant scores themselves with 4 through 1 points on each description word, with 4 being the MOST like them and 1 being the least like them.
 - B. Discuss results and inform participants that
 - 1) The color with the highest score is the color/personality that they relate to most strongly.
 - 2) The 2nd color will often influence how you express your 1st color
 - 3) The combination of the first two highest scored colors will have a big impact on your career decisions (self-esteem and job satisfaction)
- 5) Clarification of Primary and Secondary Color Type Using Spreadsheet
 - 1) Discuss Values – Identify the words that best describe things important to you
 - 2) Discuss Gifts & Talents – Identify skills participants feel they might possess or want to explore
 - 3) Careers – Identify some careers that might be of interest to you
 - 4) Examine careers that may appear in both your primary and secondary color types
- 6) Relate Color Types to College Major
 - A. Explore LSU majors that match primary and secondary color types selected
 - B. Inform participants of more detailed career exploration tools/resources
 - 1) Career Services
 - 2) Contacting LSU program departments
- 7) Give participants evaluation form and collect after making sure that you have written down attendants' names , LSU ID numbers and current major (even if undecided).

Describe yourself.

With the boxes below are groups of words in rows. Score each group of words giving yourself (4) for the most like you, (3) for the second, (2) for the third, and (1) for the least like you. (Score words across then add the totals down)

Active Opportunistic Spontaneous		Parental Traditional Responsible		Authentic Harmonious Compassionate		Versatile Inventive Competent		
								
Realistic Impetuous Impactful		Loyal Sensible Dependable		Unique Empathetic Communicative		Curious Conceptual Knowledgeable		
Daring Impulsive Fun		Concerned Procedural Cooperative		Tender Inspirational Dramatic		Determined Complex Composed		
Exciting Courageous Skillful		Orderly Conventional Caring		Vivacious Affectionate Sympathetic		Philosophical Principled Rational		
<hr/>								
Total Orange			Total Gold			Total Blue		
						Total Green		

APPENDIX B: REGRESSION DIAGNOSTICS

In order to rule out potential issues of multicollinearity, the researcher conducted additional analyses to find the variable inflation factor (VIF) for each of the three multivariate regressions included in this study (see Table 7, Table 8, Table 9). By conducting the VIF tests, the researcher is able to determine whether two or more variables are highly correlated, which would lead to inaccurate results (Faraway, 2014). The results of the VIF analyses found a mean VIF below 10 for all three OLS regressions (see Table 10, Table 11, Table 12), indicating multicollinearity is not an issue (Faraway, 2014).

Table 10

VIF for OLS Regression Model of the Effect of Major Changes on Time-to-Degree

Variable	VIF
LA resident	3.82
Transfer student	1.09
TOPS recipient	3.60
ACT	1.80
GPA	1.56
AP/IB hours	1.48
Engineering major	1.28
Black/African American	1.26
Asian/Asian American	1.06
Hispanic	1.06
American Indian/Alaskan Native	1.10
Female	1.25
Major changes after True Colors	1.25
First generation	1.19
On campus	1.15

Note. Mean VIF = 1.57

Table 11

VIF for OLS Regression Model of the Effect of True Colors Participation on Number of Major Changes

Variable	VIF
LA resident	3.29
TOPS	3.25
ACT	1.56
AP/IB Hours	1.33
GPA	1.27
Female	1.26
Engineering Major	1.19
Black/African American	1.18
On campus	1.13
True Colors participant	1.11
First generation	1.10
Transfer	1.06
Multiracial	1.06
Asian/Asian American	1.04
Hispanic/Latino/a	1.03
American Indian/Alaskan Native	1.02

Note. Mean VIF = 1.43

Table 12

VIF for OLS Regression Model of the Effect of True Colors Participation on Time-to-Degree

Variable	VIF
LA resident	3.78
TOPS	3.60
ACT	1.81
AP/IB hours	1.47
GPA	1.46
Female	1.32
Black/African American	1.27
Engineering major	1.26
True Colors participation	1.22
First generation	1.19
On campus	1.16
American Indian/Alaskan Native	1.10
Transfer	1.10
Multiracial	1.09
Asian/Asian American	1.07
Hispanic/Latino/a	1.04

Note. Mean VIF = 1.56

The researcher also analyzed the data to determine whether an outlier(s) expressed any undue influence on the regression results using a diagnostic test in Stata. This test measures each data point in the sample to determine its normalized residual squared and leverage. If a data point has high values on both the leverage and normalized residual squared dimensions, it may be artificially skewing the results. In this case, a problematic data point would appear in the upper right-hand quadrant of the plot. However, in the diagnostic tests conducted for the regressions in this study, no data point falls in this area of the plot (see Figure 3, Figure 4, Figure 5). Therefore, outliers are not a problem for the analyses conducted in this study.

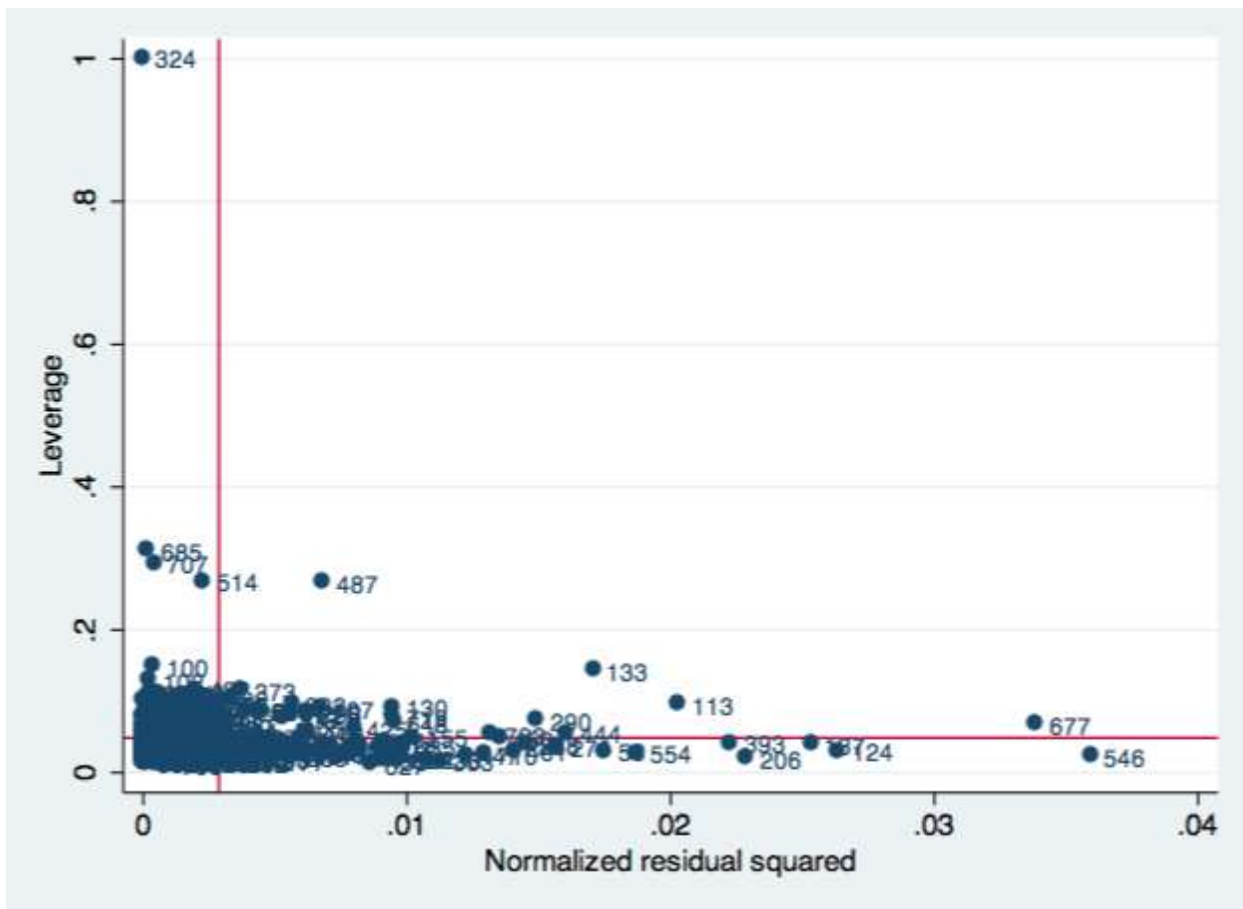


Figure 3. Analysis of outliers for OLS regression model of the effect of major changes on time-to-degree

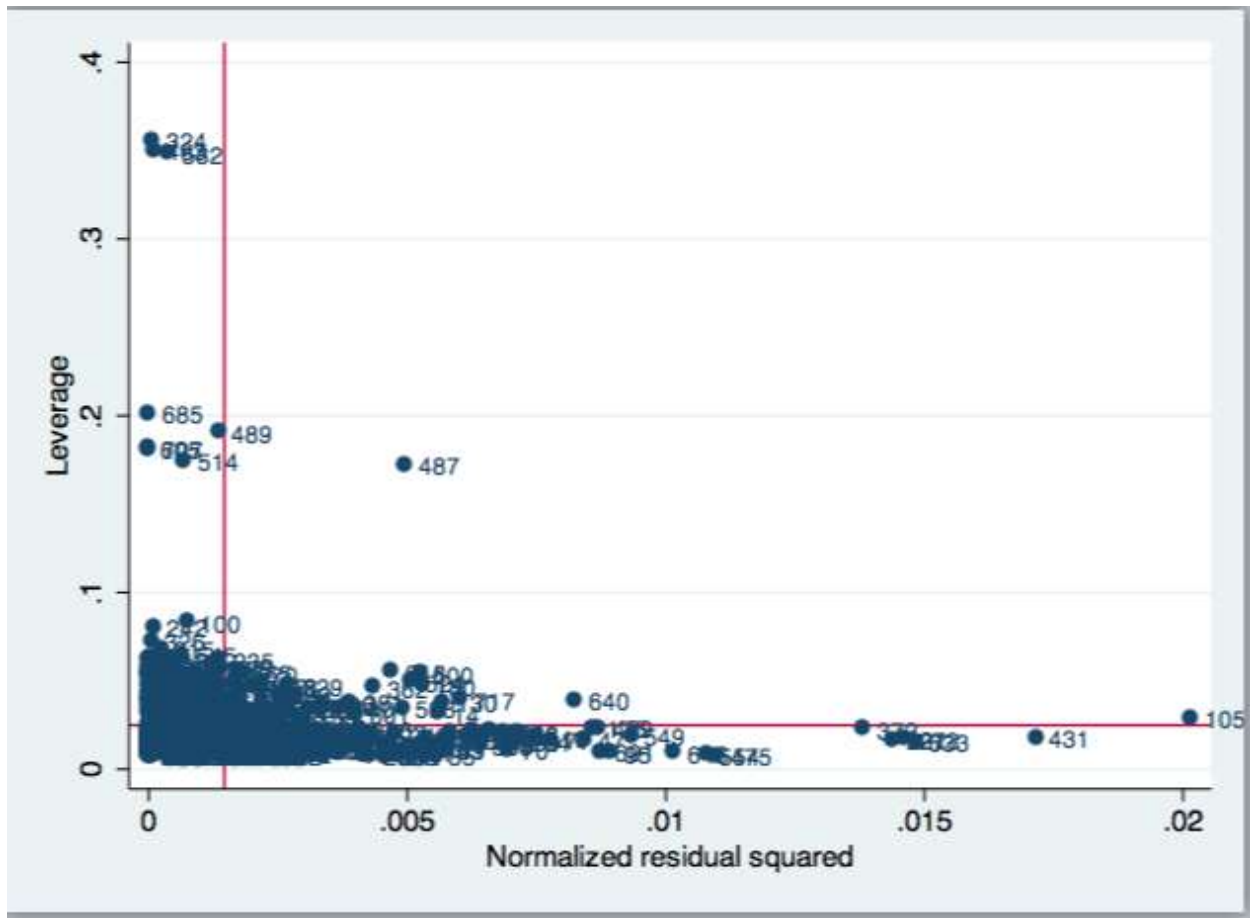


Figure 4. Analysis of outliers for OLS regression of the effect of True Colors participation on number of major changes

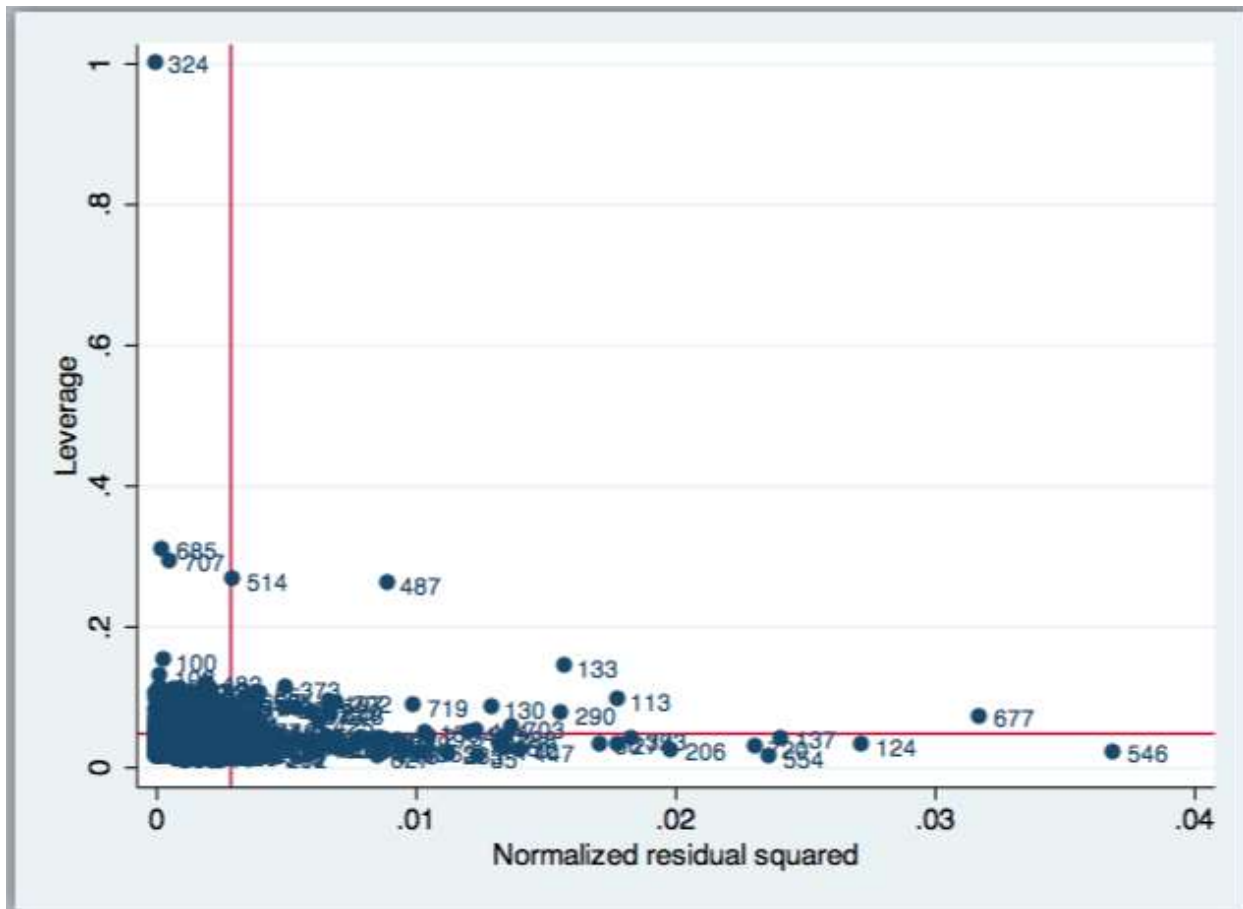


Figure 5. Analysis of outliers for OLS regression of the effect of True Colors participation on time-to-degree

APPENDIX C: LOUISIANA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD
(IRB) FOR PROTECTION OF HUMAN SUBJECTS APPROVAL LETTER

ACTION ON EXEMPTION APPROVAL REQUEST



TO: Rachel Davis
ELRC

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: June 2, 2015

RE: IRB# E9368

TITLE: The effect of major/career discernment workshop participation on time-to-degree

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb

New Protocol/Modification/Continuation: New Protocol

Review Date: 6/2/2015

Approved X Disapproved _____

Approval Date: 6/2/2015 Approval Expiration Date: 6/1/2018

Exemption Category/Paragraph: 1, 4a

Signed Consent Waived?: NA. All data are existing, aggregated and anonymous.

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE:

*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>

APPENDIX D: NATIONAL INSTITUTE OF HEALTH (NIH) CERTIFICATE OF COMPLETION



VITA

Rachel Kay Davis is a native of St. Charles, Missouri. She received her bachelor's degree in English Literature at Webster University in 2008. Thereafter, she began her career in higher education at Washington University in St. Louis, where she assisted undergraduate and graduate students in various academic advisory and administrative roles within the Department of Political Science. She began pursuing her MA in education with a concentration in higher education from Louisiana State University in the Fall of 2014 and expects to graduate in the Spring of 2016. Upon graduation, she plans to continue her work as a higher education professional.