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Examination of the Mediating Role of Student Engagement on the Relationship between Personality and Academic Success for Hispanic College Students

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Walden University
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Abstract

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Proposal Submitted in Partial Fulfillment

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Psychology

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Abstract

Traditionally, college and universities have relied on achievement indicators to estimate students' potential for success. More current researchers have demonstrated that other noncognitive factors provide incremental predictive validity to traditional achievement measures in predicting student success. This study is intended to contribute to the scholarly work in this regard by examining the mediating role that student engagement has on the relationship between Big Five personality traits and student success for Hispanic, two-year college students. First factor analysis derived four factors of engagement: Mental Activities, School Opinions, Collaborative Learning, and Student Services. Mediation models showed that there was a negative relationship between Neuroticism and GPA. This relationship was partially mediated by Mental Activities, School Opinions, and Student Services, with engagement factors mitigating the negative effect on GPA. Agreeableness was positively related to GPA ($r = .222$) and was partially mediated by School Opinions and Student Services. Lastly, Conscientiousness was also positively related to GPA ($r = .196$), and this relationship was fully mediated by all four factors of student engagement. By assessing these processes, colleges—particularly those with historically underserved populations—can modify their practices, policies, and environments to ensure they are creating opportunities for students of all personality dispositions to succeed.

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Dedication

This is dedicated to my children, Andrea M. Chapa and Vincent F. Chapa. I know that my time spent on my education was time spent away from you but I know someday you will understand what this meant for me. I am yours from now on. Watching both of you grow up into wonderful people has been the most significant aspect of my life. My hopes for both of you are that one day you will find something in your life that you will work passionately towards, always follow your heart to achieve what it is you strive for, and most importantly that you keep a childlike curiosity towards things you are passionate about—may you stay forever young.

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commitment to improving the lives of our community by leading a solid educational

institution for the community allows me a platform to do my best work in this regard.

Most importantly, the students of South Texas College, especially those who took part in

this study, I admire your courage to go in the direction of your dreams.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Introduction

Personality has been consistently linked to a variety of educational outcomes for many populations and across educational settings (Corker, Oswald, & Donnellan, 2012; Kuncel, Ones, & Sackett, 2010; McAbee & Oswald, 2013; Poropat, 2009; Ridgell & Lounsbury, 2004; Trapmann, Hell, Hirn, & Schuler, 2007). The construct of student engagement has also been useful in understanding the behaviors that lead to students' success, particularly in postsecondary settings (Angell, 2009; Mandarino & Mattern, 2010; Marti, 2009; McClenney, 2006; McCormick & McClenney, 2011; Kuh, 2009). What is missing from the literature is testing the relationship between personality and engagement and how these variables together can influence academic performance.

The American Psychological Association defines personality as "individual differences in characteristic patterns of thinking, feeling and behaving" (2014, para. 1). The Five-Factor Model (FFM) of personality assumes that most, if not all, human traits can be subsumed under five broad domains: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness (McCrae & Costa, 2003).

While the term engagement has been used loosely in the educational literature, engagement for this study is generally defined as educationally relevant behaviors that contribute to student success (Kuh, 2003; Kuh, 2009; Wolf-Wendel, Ward, & Kinzie, 2009). More specifically, this study defined and measured engagement with the Community College Survey of Student Engagement (CCSSE). CCSSE is an instrument used to measure student engagement particularly for community colleges students

(McClenney, 2006). CCSSE is designed to measure student and institutional practices that lead to students' success as a measure of institutional quality (McClenney, 2006). Such practices can range from time spent studying, participation in extra-curricular activities, utilization and satisfaction with student support services such as advising and career counseling, to interaction with faculty and peers (Kuh, 2009). The CCSSE items that will be used for this study are provided in Appendix A. While such behaviors primarily depend on students' actions, the institution also can impact the nature and degree to which students engage. Institutions have the ability to create environments that can either encourage students to engage in behaviors that are conducive to learning, yet they also may create barriers and push students away from engaging (Chickering & Gamson, 1987).

Background

A college education—specifically, a community college education—benefits individuals and society in several ways (Carnevale, Smith, & Strohl, 2013; Economic Modeling Specialist International. [EMSI], 2014; Pew Research Center, 2014; Phillippe & Sullivan, 2005). For individuals, more education is associated with a general increase in many quality of life indicators such as earnings, job satisfaction, and employment opportunities (Pew Research Center, 2014). Economic Modeling Specialist International (EMSI; 2014) estimated in 2012 that two-year college graduates received a 17.8% return on their financial and time investment in their education through subsequent earnings. In turn, community college graduates contributed $806.4 billion to the U.S. economy through employment earnings and $46.6 billion in cost savings related to a reduction in

crime, unemployment and welfare spending and an increase in societal health and welfare (EMSI, 2014).

In addition to the economic benefits of a college education, the economic vitality of the nation will also require an educated work force to fill jobs that will require credentials beyond a high school degree (Carnevale, Smith, & Strohl, 2013). It is estimated that 55 million job openings will be added between 2013 and 2020 in the U.S.—65% of which will require education beyond high school. More alarming, this study estimated that given the current educational production rates, the U.S. will be short five million college graduates to fill these job openings.

While the future economy will require a larger proportion of postsecondary education, as of 2013, however, only 42% of Americans who were 25 and older had attained at least an associate's degree, and only 32% had attained at least a bachelor's degree (U.S. Census Bureau, 2013). In fact, in 1990 the U.S. led the developed world in proportion of the population with a college degree (The White House, n.d.). Currently the U.S. ranks 16th in the number of adults aged 25-34 who have at least a bachelor's degree (American Association of Community Colleges [AACC], 2014a).

This drop in educational attainment rates has spurred the White House to set forth an ambitious goal and call to action to raise the educational attainment of the United States to once again lead the world in citizens with a college degree (The White House, n.d.). As part of this plan, the President realizes to meet this goal the United States will need to increase the rate at which minorities achieve postsecondary credentials, and

leverage the opportunities community college present in awarding degrees to historically underserved populations.

While many students enter community colleges, many do not complete their degrees. As of the year 2012, 12.8 million students were enrolled in community colleges across the country (AACC, 2014b). In fact, of all the undergraduates in the United States, 45% are enrolled in community colleges. Part of the appeal of community colleges is their open access, low tuition, and variety of educational programs and degrees (Phillippe & Sullivan, 2005).

Yet, while 59% of students who begin a four-year degree finish within 150% of program length while only 31% of two-year college students finish within this time range. For public two-year colleges, the figure is even lower: Only 19.8% of students in the 2009 cohort completed their degree within 150% of program length (NCES, 2012b). Therefore, it is not enough to increase enrollment, but colleges must ensure that students also complete their college degrees.

<div align="center">**Problem Statement**</div>

While both personality and engagement have been consistently linked to a variety of educational performance outcomes independently, examining how these variables jointly influence academic outcomes will add to the literature by identifying the psychological, social, and institutional factors that contribute to success. Personality is a natural disposition of an individual, and one that is believed to be relatively stable (APA, 2014; Larsen & Buss, 2008; McCrae & Costa, 2003). Therefore, knowledge of the relationship between personality and academic success does little in informing what

educational practitioners can do in terms of interventions, policies, and practices in their efforts to create environments that are conducive to student learning. Engagement, however, can fill this gap in knowledge by examining the intermediary processes by which personality accounts for students' success and what institutions can do in order to facilitate student success (McCormick & McClenney, 2011; McClenney, 2006; Kuh, 2009).

Another area in which a paucity of research has been found is in the link between personality and academic success for Hispanics. Hispanics have lagged behind other ethnicities in educational attainment (NCES, 2012a). Therefore, it is crucial to examine the specific factors that are positively related to success for these individuals. In addition, two-year college students' experiences are also quite different from four-year university students. Much of the research on personality and educational performance has been conducted with four-year university populations. There has been little research focused on two-year college populations.

Purpose of the Study

Given the ambitious goals that have been set both at the national and state levels in increasing educational attainment, U.S. colleges must examine their practices in order to ensure the success of the students that enroll in their institution. The purpose of this study was exploratory in nature. I sought to (a) derive institution-specific factors of engagement for STC, (b) test for significant relationships between Big-Five personality factors and academic performance for two-year, Hispanic students, and (c) test whether engagement mediates the relationship between personality and academic success for this

particular population. This examination can inform which practices lead to success for students with various personalities and what changes can be instituted by the college in efforts to facilitate student success for such students.

Conceptual Framework

For this study I combined two theoretical frameworks—FFM of personality and engagement—into a single conceptual framework. The conceptual model for this study is based on the Input-Environment-Outcome (IEO) model (Astin & Antonio, 2012). The IEO model is used to interpret the relationship between personality (input), engagement (environment) and GPA (output)—this is visually displayed in Figure 1. The IEO model is useful for examining how dispositional factors of the individual and aspects of their environment influence academic success in a postsecondary setting. The IEO model was originally developed by Astin as a method to evaluate and assess institutions of higher education. It was developed on the assumption that any institution cannot be evaluated based on student outcomes alone, the students' entry characteristics should be considered as well.

According to the model, inputs are what students bring with them when they enter the institution (Astin & Antonio, 2012). For example, some students' innate dispositions may make them more likely to succeed. One such factor that has been shown to be related to student success is personality (Corker, Oswald, & Donnellan, 2012; Kuncel, Ones, & Sackett, 2010; McAbee & Oswald, 2013; Poropat, 2009; Ridgell & Lounsbury, 2004; Trapmann et al, 2007). Personality is defined and conceptualized by the FFM of personality (McCrae & Costa, 2003). Under this definition, there are five broad domains

of personality, and individuals possess varying degrees of each trait. The five domains are Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Therefore, the role of the institution in producing outcomes is in part influenced by such characteristics.

Input:
Personality
Neuroticism
Extraversion
Openness
Agreeableness
Conscientiousness

Environment:
Engagement
Factor 1
Factor 2
Factor 3
Factor 4
Factor 5

Output:
Cumulative GPA
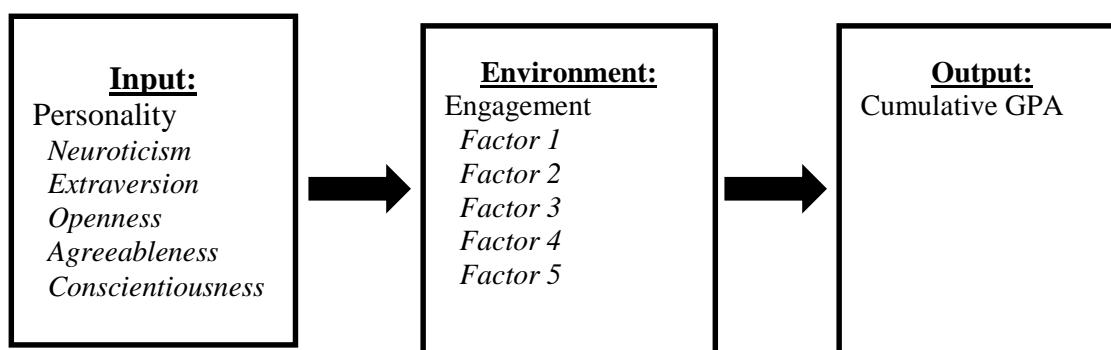
Figure 1. IEO model applied to variables of interest in this study.

Environmental factors also play a part in producing outcomes. Environment, in the case of the IEO model, represents the sum of all experiences the student has had while enrolled in the college, such as interactions with faculty, completing course work, course rigor, and social support (Astin & Antonio, 2012). For this particular study, environment is conceptualized by the construct of student engagement by Kuh (2009) and measured by the Community College Survey of Student Engagement ([CCSSE], n.d.). CCSSE measures various behaviors of the student at the college. Engagement has also been shown to significantly influence a variety of educational performance outcomes (Angell, 2009; Mandarino & Mattern, 2010; Marti, 2009). Engagement is defined as "educationally purposeful activities" (Kuh, 2009, p. 11) and is based on the result of both student behaviors and the institutional environment (Chickering & Gamson, 1987; Kuh, 2009). While students have the ultimate responsibility for practicing such behavior, the

institution has the ability to produce climates that encourage students to engage. The outcome portion refers to the "talents" that institutions are trying to instill (Astin & Antonio, 2012). For this study, outcomes are operationalized as end of year cumulative grade point average (GPA).

The IEO model is simple and thus can be generalized to a variety of settings, contexts, and disciplines. Figure 2 visually represents the process flow of how these three components influence each other. Student inputs consistently predict their direct relationship to outcomes (path c). However inputs also influence the environments students lean towards (path a), and these self-selecting environments further influence the outcome (path b) (Astin & Antonio, 2012). Astin and Antonio go on to explain, "Different types of students often choose different types of environments" (p. 20). By examining personality and engagement together it is possible to determine if students of various personality dispositions gravitate towards particular engagement patterns, how such manners of engagement may differ depending on students' natural personality disposition, and if these particular patterns of engagement contribute to student success. For example, extraverted students may be more likely to engage in active learning and interact with faculty and peers. Similarly, it may be that introverted students prefer to work alone.
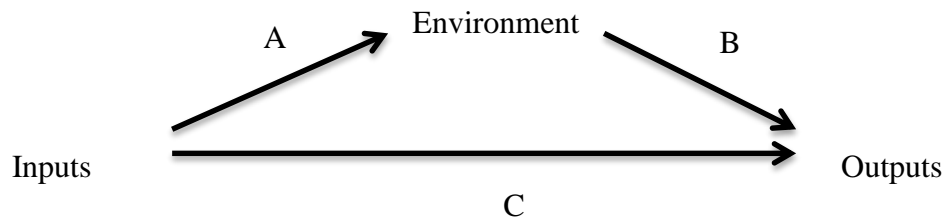
Figure 2. IEO model. Reproduced from *Assessment for Excellence: The Philosophy and Practice of Assessment and Evaluation in Higher Education* (p. 20., 2nd ed.), by A. W. Astin and A. L. Antonio, 2012, Lanham, MD: Rowan and Littlefield. Copyright 2012 by Rowman and Littlefield. Reprinted with permission.

Research Questions

This analysis is an exploratory examination of a conceptual model. As outlined by Jaccard and Jacoby (2010) this examination is a causal building model, and employs general propositions instead of strict hypotheses. As recommended by Jaccard and Jacoby (2010), the conceptual model is represented by path diagrams, as generically represented in Figure 2. In developing these models, empirical analyses guided the development of mediator models. In Phase I of this study, locally derived factors of engagement were extracted from the CCSSE for Hispanic students at STC as recommended by Angell (2009). These factors of engagement were then used in Phase II of this research. Phase II consists of mediational analysis and the general model for this portion is visually displayed in Figure 2. In this phase of model building, each of the five personality factors was tested to determine which are significantly related to GPA. This portion is represented as path c in Figure 2. Next, for each personality factor significantly related to GPA, regressions were conducted with each derived engagement factor—this is represented as path a in the model. Then, depending on which factors of engagement are

significantly related to respective personality factors, appropriate models were developed

and tested for significant mediation—displayed as path b in Figure 2.

Definitions

Community College: Community colleges are institutions of higher education

which offer degrees that are shorter in length than the typical four-year bachelor's degree,

such as certificate and associates (Phillippe & Sullivan, 2005). Other common

characteristics of community colleges are a greater focus on developing vocational skills

and workforce training, low tuition rates, and are open-access (Phillippe & Sullivan,

2005). For this study, as is such in the literature, community college and two-year college

are used interchangeably.

Engagement: conceptualized as is defined by Kuh (2009) as educationally

relevant behaviors (Kuh, 2009). Engagement for this study was measured by the

Community College Survey of Student Engagement (CCSSE).

Five-Factor Model (FFM) of Personality: The Five-Factor Model of personality

is used as the theoretical basis of the conceptual model to define, operationalize, and

measure personality. This was operationalized by the definition provided by McCrae and

Costa (2010) as five broad domains of personality: Neuroticism, Extraversion, Openness,

Agreeableness, and Conscientiousness (McCrae & Costa, 2010). They will be measured

by using the NEO-FFI-3 personality inventory.

Grade Point Average (GPA): GPA is defined as the total amount of grade points

awarded to the student divided by the total credit hours attempted. For this study only

grade points and credit hours awarded at the research site—STC—were used. Academic year GPA is based on fall 2014 and spring 2015 terms.

Hispanic: Hispanics are identified as any individual who self-identifies as being of Hispanic or Latina/o descent, which can include Cuban, Mexican, Puerto Rican, Spanish or Central American descent (U.S. Office of Management and Budget, 1997).

Personality: Personality as a broad construct is defined as "individual differences in characteristic patterns of thinking, feeling and behaving" (APA, 2014, para. 1).

Assumptions

It is assumed that participants answered the items for the both the engagement survey (CCSSE) and personality inventory (NEO-FFI-3) truthfully and accurately. It is also assumed that personality precedes engagement and performance, and that engagement precedes performance. While there has been some discussion about these facts in the literature, the relationship between these factors is complex. Each of these factors can influence each other in a feedback loop process (Astin, 2012; Bean & Eaton, 2001). For example, grades may influence students to study harder, which can make them more Conscientious. While this may be the case, it is generally believed that students enter the institution with a given set of factors that initially influence the manner in which they interact with the college (Astin & Antonio, 2012; Bean & Eaton, 2001).

While the conceptual model attempts to explain a social phenomenon, it is a simplified artifact and thus only represents a representation of the student experience at a given moment in time. Conceptual models do however provide a heuristic device for bringing deeper understanding to social phenomena (Jaccard & Jacoby, 2010).

Mediation, as well, at best only provides support for a causal process. Thus, this analysis only lends support to the causal processes explicated in the derived conceptual model. Further research and testing of this model and reliability of findings of this analysis will further support or refute the model.

Limitations

Primary limitation of this study is the limited generalizability. This study was only conducted with STC, Hispanic students. Further generalizability will require additional studies with varied populations. This study also only focused on the FFM of personality. Other theorists have offered contradicting accounts and explanations of personality. FFM was chosen due to its ability to account for many aspects of human nature, and its ability to be operationalized, measured, and assessed (McCrae & Costa, 2010).

Engagement was also limited to engagement as defined by Kuh (2009). Engagement can refer to many aspects of the individual and their experiences at college. However, as the authors of the CCSSE have stated, the instrument is not a perfect instrument, and thus may not capture all of the behaviors that could possibly be related to students' success (McCormick & McClenney, 2012) (see Appendix A for list of CCSSE items). However, it does provide valuable information, albeit incomplete. Another important limitation is this study only examined those students who have completed the CCSSE, personality inventory, and provide accurate student ID #'s. This may have skewed the sample, and thus limited generalizability to the total target population of STC students.

Significance

College degrees not only benefit the individual, but also benefit the prosperity of the nation and society. Research has shown that educational attainment is the path out of poverty and into the middle class for many Americans (Carnevale, Smith, & Strohl, 2013; Phillippe & Sullivan, 2005). Education also improves the lives of individuals, leading to lower rates of unemployment, better health, less reliance on federal subsidies, lower crime rates, and overall quality of life; all of which in turn improve the vitality of the community (Carnevale, Smith & Strohl, 2013; EMSI, 2014). Additionally, not only are there large disparities in earnings based on education attainment levels, but such disparities have only widened with subsequent generations (Pew Research Center, 2014).

It is for these reasons that there have been several interventions at the national, state, and local levels to increase the college degree attainment for the respective populations. The national government has made it a national priority to increase the educational attainment of the nation, of minorities, and community college students (The White House, n.d.). Similar to the national efforts, Texas has also instituted such initiatives. In the year 2000, the Texas Higher Education Coordinating Board (THECB) launched an initiative entitled *Closing the Gaps by 2015* (THECB, 2010). The goals of this plan were in "increasing participation in higher education…and increasing success" (p. 4). This plan was instituted in order to bring Texas' educational attainment rates on par with the rest of the country in regards to "participation, success, excellence, and research" (p. 4) in postsecondary settings. Part of this plans focuses on implementing and creating strategies that facilitate degree completion—particularly for Blacks and

Hispanics. In this regard, THECB (2010) urges institutions to develop strategies that increase persistence and completion for minorities. They go on to give specific strategies that will focus on "accelerating the implementation of comprehensive student support systems" (p. 7) and that such systems should also be designed to effectively meet the needs of Hispanics. This study thus informs practice and policy in this regard for the college and the state, by advancing the existing knowledge on the particular needs that Hispanic, two-year college students may have in completing their postsecondary education.

Phase I of this study, factor analysis of CCSSE survey extrapolated institution-specific factors of student engagement. Institutions create specific environments, which in turn shape the manner in which students engage at the institution (Angell, 2009; McClenney, 2006; McCormick & McClenney, 2012). Thus, engagement patterns will inevitability differ depending on various institutional characteristics. Conducting sample-specific analysis of CCSSE data informs administrators, faculty, and staff at the college of the specific engagement patterns that exist on their campus. This information will be shared with the college so that the institution can have a better understanding of the nature and patterns of engagement on their campus. Findings can also lead to actionable recommendations in efforts to tailor educational environments to suit student needs.

There currently have been no studies that I could identify that have examined the relationship between personality and student success for Hispanic students using the FFM. Likewise, there have been no studies that have examined this relationship for community college students. Some research has shown that the relationship between

personality and educational achievement differs as a function of educational level

(O'Connell & Sheikh, 2011; Poropat, 2009). Most of the studies on personality and

postsecondary performance have been conducted with four-year university student

populations. This study adds to the literature in this regard to determine if this

relationship exists in community colleges. Additionally, other researchers have

demonstrated that ethnicity can act as a moderator for the relationship between

personality and performance (Trapmann et al., 2007). Lastly, by framing the intermediary

processes of personality on performance as engagement adds to the practical implications

of this study. Institutions have a large impact on the environment and culture that exist on

their campus, which in turn influence the manner and frequency with which their students

engage at their campuses.

  Community colleges face various pressures stemming from limited and shrinking

budgets, increase in enrollments, diverse student demographics, and increased

accountability (Phillippe & Sullivan, 2005). In Texas, for example, the state has moved to

a performance funding approach for colleges (THECB, 2012). In this funding approach

the THECB recommended 10% of the total funding provided to two-year colleges be

based on various educational outcomes, such as course completions, degree completions,

and transfer to four-year universities. This study will inform college administrators as to

how students of various personalities engage at their college. This will allow them to

make more opportunities available for such students to engage in the manner that they

prefer and the manner which contributes to their success. The information gleaned from

this study can be used by college stakeholders to develop new strategies, modify practices

that seek to increase student learning, engagement, and eventual degree completion in efforts to ensure students of various personality dispositions have the opportunity to engage in a manner they prefer and that facilitates their academic performance.

Summary

Given the paucity of research that was found on the relationship between personality and engagement, this study is primarily exploratory in nature. This study adds to the scholarship in this area by testing a mediation model on the relationship between personality, engagement, and academic performance. This study also combines the theories of the FFM of personality and engagement to examine patterns of student success for Hispanic, community college students in south Texas.

This chapter briefly defined and introduced the constructs of personality and engagement and the IEO model that serve as the theoretical and conceptual foundation of this analysis. Operational definitions for each component of this analysis were given as well. The next chapter will provide an extensive literature review on the FFM model of personality, engagement, and empirical findings on the relationship each of these concepts to academic performance. Chapter 3 details the methodology. This will include a description of the sample, population, research design, as well as the data analysis for this study.

Chapter 2: Literature Review

Organization of the Literature Review

The literature review is organized around the main constructs of this study—student engagement and personality. The general approach of the organization of the literature was working from the general to specific. First the conceptual framework is delineated, along with prominent work regarding each construct of interest. Student engagement is defined in a general construct level. Previous theories and theorists that were influential in the developmental of this theory are discussed as well as their contribution to the development of the theory. Next an exploration of how engagement has been applied to the particular population and context of this investigation is provided. An in-depth review is also provided on the CCSSE, from its creation, and its application and relationship to academic success.

The next major section of the literature review discusses personality—also going from the general to specific. Personality is defined at a broad conceptual level. Then the FFM of personality is defined. Prominent work in the development of FFM of personality is also discussed. Empirical evidence is then summarized and critiqued on the relationships between personality and student success. The last section brings the theories of student engagement and personality together. This section also addresses the literature between the concepts of engagement and personality, and how the interaction of these variables can influence student success.

Literature Search Strategy

The major key literature search terms used were: student engagement, personality, Big-Five, Five-Factor, student success, academic success, GPA, postsecondary, CCSSE, and Hispanics. These terms were used in various combinations. The library databases used were: ERIC, Teacher Reference Index, Sociology, PsycArticles, Psychinfo, ProQuest, Academic Search Complete, and Google Scholar. When searching library databases the only qualifier used was peer-reviewed articles.

Results for searches for CCSSE only resulted in 35 articles dating back to 2000. In addition to these databases the CCSSE website also provided additional literature in giving information on the development, theory, creation, and utilization of CCSSE.

In order to limit and bound the breadth of this study, student engagement literature was limited to student engagement as defined by Kuh (2009). Seminal work that influenced the development of the concept of student engagement was included. This included Tinto's theory of student integration (1993), Bean and Metzner's model of nontraditional student attrition (1985), Astin's (1984) theory of student involvement, Bean and Easton's (2001) theory of psychological aspects of student attrition, and the theory and rationale behind the CCSSE engagement particularly as it relates to engagement for two-year colleges (McClenney, 2006).

Due to the paucity of current studies that have examined CCSSE results and student success, all relevant literature since the advent of the CCSSE (2000) was included in the examination of empirical research regarding CCSSE results and relation to academic success. Given the abundance of research related to empirical examinations

between Big Five personality traits and postsecondary student success, only the last five years were included in the literature regarding personality and academic outcomes. Exceptions were made in instances in which large meta-analysis were conducted.

Restatement of the Problem

Education has been shown to lead to a number of positive life outcomes. The National Bureau of Economic Research (n.d.) estimates that there is a 10% increase in income for every additional year of education received, and 0.18 years of life added to lifespan. Furthermore, realizing that the future prosperity of the nation relies on an educated workforce, the White House made increasing the number of college graduates in the United States a national priority (The White House, n.d.). In this regard, the White House realizes that community colleges can play a crucial role in producing competent workers with necessary skills needed for current and future economies. Yet, only 22% of community college students earn a degree within 150% of program length. The rate for nonselective public four-year institutions is 28% (National Center for Education Statistics [NCES], 2012b).

There are also large discrepancies in college attainment rates between ethnicities. Hispanics are one of the ethnic groups with the lowest educational attainment rates (NCES, 2012a). In efforts to meet the goal set by The President, it is essential that particular attention be given to increasing the rate at which community college students, and Hispanic community college students in particular, earn college degrees.

Traditionally, college and universities have relied heavily on achievement indicators to estimate students' potential for success. More current researchers have

demonstrated that other noncognitive factors provide incremental predictive validity to traditional achievement measures in predicting student success (Robbins, Lauver, Le, Davis, & Langley, 2004). Allen, Robbins, and Sawyer (2009) argued that colleges and universities might enhance students' success by examining the effect of psychosocial variables on as they relate to academic outcomes and tailoring services to meet these needs. Personality is one such factor that has been consistently linked to many academic success criteria (Furnham, 2012; Poropat, 2009; Trapmann et al., 2007). While there has been robust support for the relationship between personality and academic success (Poropat, 2009; Trapmann et al., 2007), knowledge of how personality affects success has more recently began to be examined (Corker, Oswald, & Donnellan, 2012). There is also empirical evidence that student engagement is related to many measures of academic performance (Marti, 2009). This study is thus intended to contribute to the scholarly work in this regard by examining the mediating role that student engagement—as defined by Kuh (2009)—has on the relationship between Big Five personality traits and student success.

The construct of student engagement has also been given considerable attention as colleges strive to provide the optimal environments that enable students to achieve (Kuh, 2009). The term student engagement refers to a set of behaviors that are related to student success. Student engagement for community college students is measured by the CCSSE and administered at many colleges across the United States and Canada. The CCSSE was designed for use by institutions of higher education to assess the engagement levels of their students, so that institutional action could be leveraged to increase engagement, and

by proxy also increasing success for students. Therefore, by using the IEO model, an examination of the mediating role that student engagement has on the relationship between personality and students' success was conducted. The purposes of this study were to:

- Examine the sample-specific engagement patterns at South Texas College.
- Examine the relationship between Big-Five personality traits and academic success for two-year, Hispanic students.
- Examine the mediating role that engagement plays in the relationship between personality and academic performance.

Student Engagement

Although the term engagement has been used loosely in educational literature, this investigation will use the term engagement as defined by Kuh (2009). Engagement, in this regard refers to educationally relevant behaviors that contribute to student success and learning specifically for students in postsecondary educational settings (Kuh, 2009). Kuh (2003) goes on to explain "engagement helps to develop habits of the mind and heart that enlarge the capacity for continuous learning and personal development" (p. 5).

Engagement is rooted in a long history of theories on the experiences students encounter in college and how this relates to learning (Wolf-Wendel, Ward, & Kinzie, 2009). While it is beyond the scope of this paper to document all the literature that contributed to this term, a few seminal scholars that have particular applicability to this study, its variables of interest, and specific population are discussed. Though all these theories differ somewhat in exactly how they conceptualize student learning practices, the

commonalities among them are that they all assume that student learning is the result

form the action and interaction of the student and the institution in which they are

enrolled.

Integration

One of the first theorists to develop a theoretical model on the manner in which

both students and the institutions interact to create meaningful educational experiences,

and how such experiences are responsible for students' decision to remain at the

institution, was Tinto's theory of student integration (1993). Tinto (1993) defined

integration as the degree to which students share the same values, beliefs, and norms as

the institution, peers, and faculty at the college. If students cannot find their place and

become integrated with a particular group at the college—socially, academically, or

intellectually—they then become at risk for leaving the college and thus not returning and

achieving at the college (Tinto, 1993). Tinto proposed that in order for students to

assimilate into the culture of the institution, they must first experience a separation of

their past cultures and norms as they transition to the new culture of the institution

(1975). However, in later revision to his theory, Tinto (1993) noted that integration might

not require full disconnect with the original culture and norms and complete assimilation

to the institutional culture, but only that student should at minimum feel a sense of

belonging at the institution.

Tinto's theory however focused on "dormcentric" views of student behavior, in

that it only applied to traditional students attending residential institutions (Wolf-Wendel

et al., 2009), and thus did not account for nontraditional students such as part-time, older,

ethnic minorities, or commuter institution students, whose experiences at the institutions differ than residential, four-year students. For one considering they are not fully integrated into the college such as residential institutions, it is not necessary for them to completely assimilate into the environment of the college campus.

While not applicable to nontraditional students, Tinto's theory did provide a novel method in examining student behavior and its applicability to success outcomes for students in that it was one of the first that pointed out the role that institutions could play in a student's decision to remain enrolled at the college.

Nontraditional Student Engagement

Realizing the lack of generalizability of Tinto's integration theory to various populations, such as nontraditional students, Bean and Metzner (1985) expanded on the work of Tinto to create a conceptual model of student attrition specifically for nontraditional students. As stated by Bean and Metzner, "it is necessary but not sufficient for a nontraditional student to have at least one of the three characteristics (part-time, commuter, older than 24)" (p. 488). By the nature of community colleges being almost universally commuter institutions, all community college students thus can be categorized as non-traditional.

Students attending two-year institutions are quite different from those attending four-year residential institutions. These students differ in many crucial aspects which fundamentally alter their experiences at the institution, their expectation from the institutions, and ultimately their purpose and goals in attending institutions. For example, community college students are more likely to be older, full-time working, ethnic

minorities, and have dependents. Nontraditional students' place within the landscape of higher education has become more prevalent and their presence more robust. Bean and Metzner (1985) thus proposed a model to account for the unique experiences of nontraditional students and the factors that influence their persistence.

The model includes four variable categories that will affect a non-traditional student's decision to remain enrolled (Bean & Metzner, 1985). They are (a) background variables such age, sex, enrollment status; (b) academic variables such as grades and study habits; (c) environmental variables such as finances, family responsibilities, and hours of employment; and (d) psychological outcomes such as stress, goal commitment and satisfaction. Unlike traditional students, however, nontraditional students are more likely to be influenced by environmental variables than by academic variables (Bean & Metzner, 1985). Therefore, if academic variables provide a positive influence, yet environmental variables do not, the environmental variables will supersede their influence and thus cause the student to drop out

Commuter students do not live on campus and therefore have fewer opportunities to engage, integrate, and involve themselves in the college (Bean & Metzner, 1985). While this model does incorporate the psychological outcomes and their influence in persistence decisions, it does not account for how psychological variables influence the decision to remain enrolled (Bean & Metzner, 2001).

Psychological Components to Engagement

Yet another critique of Tinto's work was his sole focus on the sociological aspects of student engagement and did not account the individual student and the psychological

forces that can hinder or foster integration or success (Bean & Eaton, 2001; Pascarella &

Terenzini, 2005; Wolf-Wendel et al., 2003). Other theorists sought to address this critical

gap in Tinto's theory by focusing and elaborating on the psychological components of

students' decision to interact or not with the college. Braxton, Hirschy, and McClendon

(2004), for example provided a model of student engagement that considered how pre

college characteristics affect a student's engagement and commitment to the institution.

However, other models have focused on not only demographics and pre college

characteristics, but on the specific impact that psychological dispositions can have on

student's engagement (Astin, 1984; Bean & Eaton, 2001).

Astin (1984), for example, developed the term involvement in order to account for

both the physical and psychological effort a student puts forth into educationally relevant

experiences. Involvement can range from reading, group study, and participation in

college clubs, tutoring, faculty interactions, and so on. This term not only accounts for the

time devoted, but the psychological energy associated with the behavior. The term

involvement draws parallels with the Freudian term *cathexia*—which represents the

orientation towards an object, and what in the educational literature has been termed

vigilance, effort, or time-on-task (Astin, 1984).

According to involvement theory, learning is a direct function to the amount and

quality of involvement the student puts forth (Astin, 1984). Reasons cited for the

developmental of this theory were to provide a simple framework from which the

extensive and multi-disciplinary research on student outcomes and behaviors could easily

be integrated and conceptualized. Based on the simple assumption that physical and

psychological energy devoted by student to educationally relevant practices will yield

returns on learning, the involvement concept provides a systematized approach from

which the transition from theory to action may be easily inferred. Thus any policy or

practice at the institutional, government, state, regional or national level to affect student

learning should be directed to increase student involvement (Astin, 1984).

Involvement theory is general and does not give specifics as to the underlying

psychological mechanisms at play—only postulates that psychological energy is required

for quality of learning. Bean and Eaton (2001) developed a more structured model that

incorporated and theorized on the specific components that such psychological constructs

played. The purpose of Bean and Easton's model was to develop a conceptual model to

understand student retention decision, which incorporated psychological dimensions and

variables. Their purpose was not only to identify which factors affect retention, but also

theoretically explain why they do.

This model is based on motivation towards an object—much like Astin's use of

cathexia—in that to be successful and persist in college, one must orient themselves to

accomplishing this goal (Bean & Eaton, 2001). In this model there are certain

dispositional pre-characteristics within the student at the time at which he/she enters

college that will affect their decision to persist. Such factors range from personality, self-

assessment, and prior academic preparation. Early experiences in the environment, shape

and are shaped by entry characteristics, based on interactions with faculty, staff, peers,

and feedback on assignments, grades, and bureaucratic obstacles such as registration,

financial aid, meeting deadlines, and so on. If all goes well the student will experience

gains in the psychological components that are critical to their success such as self-efficacy and coping style. Students will thus feel empowered and in control of the consequences of their decisions. These feelings, which can be considered synonymous with integration, are what Bean and Eaton (2001) referred to as intermediary outcomes. Gains in these intermediary outcomes further motivate the student to continue in their education pursuits. This engagement is a product of, and contributes to integration in a feedback loop process. However, this model places the strength in the social context as secondary only to the affect that it has on the psychology of the individual (Bean & Eaton, 2001). Retention is a behavior, and behavior is the result of psychological processes. However, these psychological processes are at least partially maintained by the environment. A student thus forms an attitude, and based on this attitude decides to pursue an object—the object being the college, and related student outcomes.

In sum, these theories assume that students' enroll in college with a set of psychological dispositions and their interactions with the environments, further shape their psychological processes and their ultimate decision to remain enrolled or engaged at the institution. As stated by Bean and Eaton, "institutional policies and practices do affect rates of student retention and institutions are far from helpless when it comes to creating programs and environment that attract or repel students" (p. 73).

Role of the Institution

The difference between engagement and involvement is that engagement is not to be seen as an extension of involvement, but rather a more direct link between student behaviors and institutional practice (Wolf-Wendel et al., 2009). This direct link provides

a practical usage of the term from which college administrators, faculty, and student

support staff can implement practices to encourage such behaviors. While engagement is

generally defined as student participating in "educationally purposeful activities", it also

takes into consideration the role that institutions play in providing conditions that

encourage student to behave in such ways (Kuh, 2001). As Astin (1984) states, the

"effectiveness of any educational practice is directly related to the capacity of that policy

or practice to increase involvement" (p. 298). In particular, Chickering and Gamson

(1987) provide 7 principles that are critical for student success. While the student is

primarily responsible for many of these principles, institutions can enact practices and

create supportive environments that foster engagement which is likely to increase these

behaviors. These principles are described below.

1. Encouraging student and faculty contact both in and out of the class will lead to
    increased integration and involvement by the student.

2. Reciprocity and cooperation among students deepens and widens learning by
    creating cooperative learning environments.

3. Active learning that is focused on practices that go beyond the traditional roles of
    passive ingestion of lectures by faculty. The student is placed and regarded as an
    active agent in his own learning.

4. Prompt feedback from faculty to the student is critical for scholarly improvement.

5. Time on Task this is related to involvement, in that students must put in both time
    and effort into their education.

6. High Expectations will motivate the students to achieve the level they are put up against. Faculty, staff, and the institution must maintain these expectations.

7. Respect Diverse Talents and ways of learning – not everyone learns the same, and these differences must be respected and leveraged not diminished.

While Chickering and Gamson (1987) agree "teachers and student hold the main responsibility for improving undergraduate education (p. 5)." They also concede that, "College and university leaders, state and federal official, and accrediting association have the power to shape an environment that is favorable to good practice in higher education (p. 5)." In order to achieve, create, and strengthen a campus environment that values and promotes these practices, institutions need support from administrators, faculty leaders, appropriate funding, appropriate policies, many opportunities for faculty professional development, and continued assessment of programs that are intended to meet such goals. This point is further expanded by Astin (1984) in that the involvement theory sheds light on what it is that faculty and college administrators must try to extract from their students in order for them to learn is psychological and physical involvement. In this view, curriculum, practices, and policies are only as effective as the amount to which they elicit involvement from the students.

Hispanic Student Engagement

There have been many reasons cited to lend support to the notion that Hispanics may experience college subjectively different than other ethnicities, especially in comparison to White counterparts. Research by Crisp and Nora (2009) examined a variety of factors that were related to Hispanic student success for community college

students. They found factors that contributed to successful completion of a degree, or successful transfer to a four-year university were related to enrollment intensity (increases in hours taken), and taking rigorous math courses in high school. This study also found evidence for the environmental pull factors that diminished the chances of success were the amount of hours worked per week, parental education level, and delaying enrollment from high school to college. Overall their study found that enrolling directly into college after high school, being full-time, parental education level, taking rigorous high school math courses, and working less all increased the chances of achieving success.

Another such factor that can influence student engagement is the cultural mismatch between the Hispanic culture and college culture—that in most part is a reflection of largely Eurocentric ideals, values, beliefs, and cultural norms. In fact there has been support that both acculturation and enculturation are significant predictors of many college success outcomes such as intentions to persist (Ojeda, Castillo, Meza, & Pina-Watson, 2014), college self-efficacy, college outcomes expectations, academic goal progress, and academic satisfaction (Ojeda, Flores, & Navarro, 2011). Furthermore, acculturation to White culture has also been shown to be positively related to college persistence, as was enculturation to Mexican culture. This shows that bilinear models of cultural adaptations are more appropriate when examining students' experiences on college settings.

Bilinear models of enculturation and acculturation examine acculturation and enculturation independently of one another (Castillo & Caver, 2009). These bilinear

models are in contrast to traditional models of acculturation that viewed acculturation as lying on one continuum. Implicit in this idea is that the more one acculturates to the new culture, the less one identifies with the dominant traditional culture. Bilinear models posit that acculturation does not necessitate a break with the dominant traditional culture—individuals can take on and identify with aspects of both cultures simultaneously (Castillo, & Caver, 2009).

These findings have large impacts on HSIs roles in socializing student of Latino descent. In this regard, colleges should not diminish or devalue Hispanic cultural heritage, but should seek to value their cultural heritage. This goes back to the process by which Hispanic students learn to engage at the college, and unlike Tinto's (1993) model of assimilation, shows that while students should learn to adapt to the new cultural norms of the college, they must also keep their traditional heritage as part of their identities.

Role of HSI's

The unique experiences of Hispanics at postsecondary institutions alter their experiences, subsequently influencing the type and amount of engagement they experience. The role of the HSIs thus have now become an important issue because they are in a unique position to respond to such nuanced differences, in which they can either enhance or encumber the opportunities for Latino students to engage with the institutions, faculty, and staff.

HSIs are in many respects the starting points to postsecondary education, and especially two-year HSIs for Hispanic students (Flores & Park, 2013). The formation of HSIs began in 1989 with the proposal of HR1561, with the help of Hispanic Association

of Community Colleges and Universities (HACU) (Calderon, Flores, & Moder, 2012). Currently HSIs are defined as accredited, degree-granting, public or private, nonprofit college or universities with 25% or more Hispanic undergraduate full-time equivalency (Flores & Park 2013). This designation was created because Hispanics enrollment in postsecondary institutions clustered in colleges that were affordable and in Latino communities. It became clear that enrollment decisions for the majority of Hispanics were based on affordability and proximity, as the 54% of all Hispanics in the nation are enrolled in HSIs. Of the 311 HSIs in the United States as of 2010, 152 (49%) were two-year colleges.

In Texas, Hispanics are more likely to refrain from enrolling in college directly after high school graduation (Flores & Park, 2013). Yet, when they do enroll they are most likely to enroll in HSIs, and more specifically, two-year HSIs. This shows that Hispanic community colleges provide a key entry point for Hispanics entering postsecondary institutions. Yet other researchers examined the characteristics of Hispanic students enrolling in HSI's vs. other Predominately White Institutions (PWIs) and found significant differences in characteristics of Hispanic students, revealing that in fact Hispanics attending HSIs are more likely to exhibit a greater number of risk factors (Laird, Williams, Bridges, & Morelon-Quainoo, 2007).

Hispanics attending HSIs have reported higher overall gains in development, and perceive their campus as more supportive compared to their Hispanic counterparts attending PWIs (Laird et al., 2007). These effects however, were considered small after controls were introduced. This may indicate that Hispanics, as a result of the institutional

culture at HSIs are more likely to engage at the institution. The small net effects of these findings may be due to the fact that HSI's are a fairly new designation, and they were only designated by the enrollment patterns of Hispanic students, not by institutional decision.

The major differences between HSIs and PWIs are related to the student demographics. HSIs are more likely to enroll students that are nonresidential, older, and Hispanic (Calderon et al., 2011). HSIs are also available to receive additional funding through Title V national funding, as well as other various grants that aim to provide services to Hispanics (Calderon et al., 2011). However, there are little other institutional factors that differentiate HSIs. Given the large growth of Hispanic college-aged population, the number of HSIs in the nation has grown. As a result, the degree to which institutions embrace their designation as an HSI will undoubtedly vary. Laird et al. (2007) explains, "HSIs are in the midst of a shift from White-oriented institutional culture to cultures inclusive of Hispanic students and their educational needs" (p. 51). They go on to state that it may be this shift is just beginning, and as a result the only differences for some HSIs may be demographics of students, not institutional climates or practices.

When students interpret the campus culture and environment as welcoming, they will thus more actively engage (Nuñez, 2009). García (2012) claims "HSIs must take a position to make long-term commitment to push colleges and universities to become transformative, all-inclusive institutions. HSIs have to move beyond being Hispanic-enrolling and become Hispanic-serving in a provocative sense of the word (p. 199)."

In summing up the literature of Hispanics and their postsecondary educational experiences, many factors within the Hispanic culture may render their experiences at college different than White counterparts. This will thus alter their engagement at the colleges. While HSIs have been federally declared and recognized as a vital component to increasing the educational level of this particular group, the research on the impact of HSIs shows largely that while HSIs are primary starting points for Hispanics, particularly two-year HSI's, graduation from these institutions is still lacking. Thus it is critical to empirically examine patterns of engagement of Hispanic students at HSIs, and more particularly two-year HSIs to determine how this particular group is engaging at the institution, and how services can be altered to shift from Hispanic-enrolling, to a true Hispanic-serving approach.

Community College Survey of Student Engagement

In order to effectively gauge engagement patterns at four-year institutions the National Student Survey of Student Engagement (NSSE) was created (Kuh, 2009). The purpose for the development of this survey was in response to a large absence in good learning metrics in postsecondary institutions at the time. The development of this survey placed student engagement within the context of the institution. The development of this survey was also in response to a growing demand for increased accountability for institutions that went beyond simply enrollment, or availability of resources.

Understanding that engagement patterns can be quite different for community college students than four-year university students, the CCSSE was created in 2001 as part of the Community College Leadership Program at University of Texas to measure

engagement specifically for community college students (CCSSE, n.d.). The goal was "to

provide member colleges with results that can be used to inform decision making and

target institutional improvement in the areas of student engagement, and by proxy,

student learning (McClenney, 2006, p. 47)." The NSSE and the CCSSE overlap

considerably in their mission, purpose, and even question items—in fact 67% of the items

on the CCSSE that measure the benchmarks of student engagement are identical to NSSE

items (Marti, 2009).

As of the year 2014, 350 community colleges across the country are member

colleges and have used the CCSSE. Such colleges use CCSSE largely for accountability,

performance measurement and institutional improvement (McClenney, 2006). The

CCSSE website allows colleges to create reports that compare their scores on each of the

five benchmarks to other comparable institutions. Uses of CCSSE results allow

institutions an "opportunity to obtain systematic evidence about their students'

educational experiences, examine differences among various students' experiences,

benchmark effective educational practice, establish targets for excellence, and use their

new understanding to focus and refine efforts to improve student success" (McClenney,

2006, p. 49). In sum, CCSSE was designed in order to create an instrument that could

lend itself easily to institutional improvement in terms of student learning (Marti, 2009).

Factors of Student Engagement

In efforts to organize and simplify survey results so that college personnel, faculty

and administrators can easily understand, CCSSE staff has created five benchmarks of

student engagement, they are: (a) Active and Collaborative Learning, (b) Academic

Challenge, (c) Student-Faculty Interaction, (d) Student Effort and (d) Support for Learners. The method to develop the benchmarks used national CCSSE administration data from 2003, 2004, and 2005. This included 299,762 total participants from community colleges across the country. The first phase of development was to develop the latent construct model of best fit to the data. Then in efforts to create a more intuitive engagement factor structure the factors were reconceptualizaed to five benchmarks of student engagement (Marti, 2004).

   Model of best fit. The goal for this phase was to "define the model of best fit (MBF), which is a theoretically meaningful model of the underlying dimensions of student engagement that provide the best statistical fit to the data as measured by fit indexes (Marti, 2004, p. 4)." Thus, the purpose was to group items into theoretically and empirically sound constructs. The factor structure was derived by two phases of research. First, exploratory factor analysis was conducted as a means to inform and develop factors that could later be tested via confirmatory factor analysis. Results from the exploratory factor analysis informed researchers which items correlated with each other and which items did not correlate with any factors. The initial exploratory analysis tested 49 items. After reviewing the results of factor analysis 39 items were retained and subjected to further analysis. Confirmatory factor analysis was then done to evaluate the nine factors and factor loadings identified from exploratory analysis. The factor loadings were tested and found to have good model fit and were consistent across administration years, gender, and enrollment status (part vs. full time). The nine factors are described below (see Appendix A for a list of CCSSE items contained within each factor):

- Faculty Interactions – composed of six items that ask about frequency of interactions with faculty in and out of class, such as asking questions in class, and discussing course material with instructor out of class.

- Class Assignments – composed of three items that ask to indicate how often they completed class assignments such as made a presentation, and "prepared two or more drafts of a paper…" (p. 129).

- Exposure to Diversity – composed of three items that ask about interactions with peers with differing backgrounds than their own.

- Collaborative Learning – composed of four items that ask about the frequency of their participation in collaboration with other students.

- Information Technology – composed of two items that asks how often they have used technology such as internet and emails for course work.

- Mental Activities – composed of six items that ask the frequency with which students were required to expend cognitive resources on course assignments such as "analyzing the basic elements of an idea" and "applying theories or concepts to practical problems" (p. 130).

- Student Services – composed of five items that ask the frequency for which students have used various student services such as computer labs, skill labs, and career counseling.

- Academic Preparation – composed of four items that ask about the frequency of preparation they have completed for their courses such as "preparing for class" and number of "written reports" (pp. 130-131).

- School Opinions – has six items and ask questions about the students' opinions on various aspects about the institution such as the degree to which the institution helps students deal with nonacademic issues, and to "thrive socially".

Model of effective educational practice. The second goal was to provide a latent construct model that would be a "practically useful" set of small number of constructs. This model would be known as the "model of effective educational practices (MEEP) (Marti, 2004, p. 5)." Marti (2004) goes on to delineate the purposes and differences between the two models as "while the two models have similar purposes they are different in that the MBF seeks to find an optimal model fit, and thus requires a granular model of latent constructs whereas establishing benchmark measures is a molar endeavor that seeks to broadly classify items with less concern for the precision of model fit (p. 5)."

Benchmarks of student engagement. In order to bridge the gap between research and actionable data, CCSSE provides benchmarks of student engagement. These benchmarks were created as a way into the survey results that could easily be understood by all college stakeholders. They are "groups of conceptually related items that address key areas of student engagement, learning, and persistent that educational research has shown to be important in quality educational practice" (McClenney, 2006, p. 49).

The benchmarks were then rescaled and standardized so institutions can compare their scores on the benchmarks to other similar institutions, and also across student groups– e.g. developmental vs. nondevelopmental, part-time vs. full-time (McClenney, 2006). Though not a direct reflection, CCSSE benchmarks closely resemble Chickering

and Gamson's seven principles of good practices (Chickering and Gamson, 1987). The benchmarks are described below:

Active and collaborative learning. The benchmark of Active and Collaborative Learning is based on research that shows that learning is most efficiently achieved when there are opportunities to apply learning to a variety of settings, when learning is active, and when it is collaborative process (McClenney, 2006). The questions focus on participating in class discussions, working with other students, or working out of the classroom. More recent approaches to learning have put emphasis on active learning, as opposed to the previous models of passive learners sitting in a classroom and a passively digesting a lecture (Chickering & Gamson, 1987). Students learn when there are active learning strategies in place, and when student have the chance to learn collaboratively, such as group work, or community service learning projects.

Student effort. The Student Effort benchmark focuses on the student's behaviors related to academic pursuits, such as time on task, and how much of the time is invested in learning in and out of the classroom (McClenney, 2006). This can be studying for courses, visiting the computer lab, or using tutoring services. This measures how much effort and time is spent on academic related tasks, such as time on task, and utilization of academic support services (Chickering & Gamson, 1987).

Academic challenge. Academic Challenge benchmark focuses on the rigor of coursework, including the complexity of class assignments, and essentially the amount of academic challenge (McClenney, 2006). This is based on research that shows that true

learning requires deep processing of material, and goes beyond superficial, surface level processing of information such as rote memory.

Student-faculty interaction. The student-faculty benchmark represents the amount and degree of connections to the faculty that student has (McClenney, 2006). It also encompasses the amount of interaction in and out of the classroom about issues relevant to education such as discussing key concepts of assigned readings, assignment, and even academic and career planning. This has been shown to foster learning and persistence by building engagement, and social and academic connections to the college.

*Support for learners. S*upport for learner's benchmark measures how much students use support services, their perception of such services, and how well the college cultivates relationships between and amongst students (McClenney, 2006). Services can include advising, counseling, library, tutoring, and career exploration.

CCSSE and Academic Success

Overall CCSSE benchmarks have been shown to be empirically related with a variety of student outcomes such as GPA, course completion, retention, and persistence measures (Mandarino & Mattern, 2010; Marti, 2009; McClenney & Marti, 2006). The largest and most comprehensive studies that have examined the predictive validity of the benchmarks have come from original research by CCSSE staff (Marti, 2004; Marti, 2009; McClenney & Marti, 2006), though there have been a few more recent attempts by others to also replicate these findings (Nora, Crisp, & Mathews, 2011; Angell, 2009; Mandarino & Mattern, 2010).

CCSSE staff conducted the first study to investigate the relationship between CCSSE benchmarks and educational performance (Marti, 2004). In this study the researcher used 2003 CCSSE national sample with 53,358 students from 93 colleges from around the United States The study used self-reported GPA as the performance criteria. The first analysis was a regression with GPA and benchmarks individually. The second analysis used a multilevel structure in which responses were nested within schools in order to account for differences in engagement that were related to various institutional practices. The study showed that Active and Collaborative Learning, Student Effort, Academic Challenge, and Student Faculty Interaction, were all positively and significantly related to GPA. Support for Learners however, was not significantly related to GPA. The authors concluded that Support for Learners may be more directed at institutional practices that are targeted towards persistence and thus Support for Learners may be more related to retention.

In examining the relationship between CCSSE and student success for a varied population and across varied success criteria, McClenney and Marti (2006) examined data for three large data sets: state of Florida ($N = 4,823$), Achieving the Dream ($N = 1,623$), and the Hispanic Student Success (HSS) Consortium. Unlike Marti (2004), which used self-reported GPA, this study matched CCSSE results to actual educational records for success criteria. This study examined the relationship between levels of student engagement as measured by the CCSSE benchmarks and various measures of student outcome metrics such as GPA, credit completion ratios, success in gatekeeper courses, developmental course performance, retention, graduation, transfers, number of terms

enrolled, and total credit hours earned. Three separate analyses were conducted on each of the data sets. This allowed for comparisons to be made and an overall analysis as well. This study also examined the five benchmarks of student success, and the nine latent factors of engagement.

Overall, the study showed a consistent positive relationship between engagement and academic performance measures (McClenney & Marti, 2006). For the net effects of each benchmark, and after controlling for various control variables, Active and Collaborative Learning was a predictor of self-reported GPA, end of term GPA, and cumulative GPA. Academic Challenge was a positively related to end of term GPA, cumulative GPA, and credit completion ratio. While Student Effort, Student-Faculty Interaction and Support for Learners were not significant predictors of any criteria.

In a similar study with Canadian community college students, Mandarino & Mattern (2010) attempted to replicate these findings to a Canadian population. While this study provided some mixed findings in regards to the robustness and replication between the U.S. studies, the overall findings were consistent in that as in the U.S. population, Active and Collaborative Learning and Academic Challenge were related to all student success criteria. Student Effort was related to all criteria except for cumulative credit completion ratio, and Student Faculty Interaction and Support for Learners were not related to any criteria.

As Mandarino and Mattern (2010) point out, that while there were many differences between the Canadian and U.S. based analysis, the common findings were

that Active and Collaborative Learning and Academic Challenge were the strongest net predictors of GPA for both samples.

The results from the varied analyses related to benchmarks and student success conclude that Active and Collaborative Learning is the most powerful predictor of varied student success measures such as GPA, persistence, course completion criteria, and degree completion, and across varied populations (Mandarino & Mattern, 2010; Marti, 2004; McClenney & Marti, 2006). Academic Challenge was also a consistent predictor for performance such as GPA, but was not consistently related to persistence measures or degree completion (McClenney & Marti, 2006). Student Effort was a rather consistent predictor of GPA (Mandarino & Mattern, 2010; Marti, 2004; McClenney & Marti, 2006). However, Student Effort was also only related to persistence measures for the Hispanic group (McClenney & Marti, 2006) and not performance measures. Student Faculty Interaction had mixed findings in relation to student success measures. Overall across groups Student Faculty Interaction seems to be a more consistent finding in relation to academic performance as measured by GPA. Support for Learners benchmarks does not show to be a significant predictor of GPA across any groups. It is related more to persistence across groups such as the U.S. national sample, Florida, AtD and Hispanic groups, however this was not so for the Canadian group.

In sum, while the benchmarks have been shown to be repeatedly related to a variety of success measures across a wide population, certain benchmarks may be more related to specific criteria for certain populations. These findings on the predictive utility of the five benchmarks vary depending on the criteria selected to predict, and it may be

more powerful and accurate in predicting cumulative GPA and not as strong for predicting persistence. As expected however, Support for Learners is more related to persistence than performance.

Of these studies there has only been one (McClenney & Marti, 2006) that also examined the nine-factor solution of the MEEP. The nine factors are: Faculty Interaction, Class Assignments, Exposure to Diversity, Collaborative Learning, Information Technology, Mental Activities, School Opinions, Student Services, and Academic Preparation. The findings of these factors and their associated relation to success indicates that Academic Preparation, Mental Activities, Class assignments, and Faculty Interaction, had the most instances in which they were significant predictors of criteria related to GPA. However, when looking at retention measures, the factors most consistently related to this measure were Collaborative Learning, Student Services, and Class Assignments.

These studies largely validate the relationship between CCSSE benchmarks and student success, across a wide population (U.S. national sample, Florida, AtD, Hispanics, and Canadians). Though each benchmark may be uniquely associated with specific student success metrics, overall, student engagement as measured by CCSSE benchmarks do show a positive relationship between various student success measures and across a diverse group of students and institutions.

Sample specific benchmarks of student engagement. There have been a handful of studies that have attempted to validate these five factors of engagement and the results have provided mixed findings as to the underlying latent five-factor structure

(Angell, 2009, Marti 2009; Nora, Crisp, & Mathews, 2011). While there has been empirical and theoretical support for the validation of the engagement benchmarks provided by CCSSE, colleges may differ in their campus climate and student populations that may alter the engagement patterns at various institutions. Thus, Angell (2009) recommends that validation of CCSSE factors be conducted at a local level as results vary across institutions.

Nora, Crisp and Mathews (2011) also conducted factor analysis with the 38 items and also derived five factors, they were: Active Learning, Collaborative Learning, Academic Challenge, Support for Learners, and Student Effort. The major intent was to test the CCSSE's original five-factor structure. This study also used ethnicity and gender to control for differences in these factors. From their analysis

These results (Nora et al., 2011) were quite similar to the original CCSSE benchmarks. While the CCSSE benchmarks group active and collaborative learning into a single benchmark, based on this analysis it was revealed that active and collaborative learning represented, at least empirically, two distinct factors. For Collaborative Learning, four of the items were from the original Active and Collaborative learning benchmark, however three other items came from student-faculty interaction of the original benchmarks. Results suggest that for this particular population student faculty interaction may be a form of collaborative learning.

In the second phase of this study the researchers then tested to determine if these locally derived factors of engagement were related to student success. A stepwise regression revealed that after accounting for differences in student success that results

from gender and ethnicity, only academic challenge and active learning were positively related to GPA, while student effort was negatively related to GPA (Nora et al., 2011). In a similar analysis, Angell (2009) administered the CCSSE to 450 students at a southeastern community college. Using principal-axis factoring they found four factors which accounted 22.5% of the total variance was explained by these four factors. This research however, used all CCSSE items. The four factors were: (a) skill gains, (b) service importance, (c) school opinions and (d) mental activities. In sum the findings provide evidence for sample specific latent construct models that optimize factor loadings.

Critics of the CCSSE have argued that benchmarks are not a complete measure of engagement. Pace (2011) for example argues that student effort should contain intercultural effort. As defined by Kuh (2009) student engagement is defined as behavior, yet Nora et al. (2011) argues that CCSSE fails to capture attitudinal aspects of engagement, and a complete conceptualization of engagement should incorporate the interaction of attitudes, perceptions and behaviors. Similarly, Bean and Eaton (2001) state that a complete model should incorporate student entry characteristics that go beyond simple demographics but also include psychological dispositions of the individual such as personality. While Bean and Eaton elaborate on how self-efficacy, locus of control, attribution style, and coping affect student success, they concede that further work is needed to further expound on how other psychological variables can influence student success. One such factor is personality, while Bean and Eaton make a note of this in their model, they do not expand a hypothesized process by which this construct can influence

student success. In fact, Bean and Eaton encourage researchers to use the model to further

expand on the processes by which psychological factors influence student success.

Researchers have in fact documented a strong relationship between personality and

student success outcomes in a variety of settings (Corker et al., 2012; Kuncel et al., 2010;

McAbee & Oswald, 2013; Poropat, 2009; Ridgell & Lounsbury, 2004; Trapmann et al.,

2007).

Personality

Psychologists have long been interested in the concept of personality. The

American Psychological Association (2014) defines personality as a construct that "refers

to individual differences in characteristic pattern of thinking, feeling and behaving". The

FFM of personality as developed by McCrae and Costa (2003) falls under the umbrella of

the trait family of personality theories. McCrae and Costa define the area of personality

psychology as it being one that attempts to "provide a psychological account of the

person as a whole (p. 20)."

Five Factor Model (FFM) of Personality

While trait personality is a useful manner to account for individuals' psychology,

the weakness of this theory alone is in the sheer number of traits that are present, and can

be articulated by natural language (McCrae & Costa, 2003). The need for theories to

organize and systematize the multitude of traits was needed. The next step was to

combine various traits into dimensions. This was done by factor analysis, in which it was

determined among a large number of observable traits that are measured, which ones

typically occur together within an individual.

The model has its origins in the natural English language. Allport and Odbert (1936) identified 4,000 words from the English dictionary that were used to describe aspects of human personality. These various traits were then reduced by Cattell and categorized under 16 broad traits. These various traits were then used to develop the 16-factor personality model of personality and the corresponding Sixteen Personality Factor Questionnaire (Cattell, Eber, & Catosuka, 1970). Later Costa & McCrae (1976) used this same questionnaire but conducting further examination on a different sample of people in Boston, came up with a three-factor structure—Neuroticism, Extraversion, and Openness (NEO). Later, Costa & McCrae (1985-1987, as cited in McCrae and Costa, 2003) added to these three structures the factors of Conscientiousness and Agreeableness, and the FFM of personality was developed. The utility of the Five Factor model are the nature in which it is all encompassing. The FFM of personality assumes that most, if not all, human traits can be subsumed under these five broad domains (McCrae & Costa, 2003).

Neuroticism. Neuroticism is the opposite of emotional stability. This trait broadly refers to the ability, or lack thereof, to regulate emotions. People high on this trait have little ability to regulate their emotions and as a result may be prone to anxiety, depression, and other emotional disorders. The facets level traits subsumed under this trait are: anxiety, hostility, depression, self-conscious, impulsiveness, and vulnerability (McCrae & Costa, 2003).

Extraversion. Extraversion generally refers to the trait of social and outwardly focused. The six facet level traits of this trait are: warmth, gregarious, assertiveness, activity, excitement seeking, and positive emotions (McCrae & Costa, 2003).

Openness. Openness to new experiences represents the trait of being generally interested in new ideas and experiences. The six facets of this trait are: fantasy, aesthetics, feelings, actions, ideals, and values (McCrae & Costa, 2003).

Agreeableness. Agreeableness is a trait that basically means individual get along with others. The six facets of this trait are: trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness (McCrae & Costa, 2003).

Conscientiousness. Conscientiousness trait refers generally to being dutiful and mindful of responsibilities. The six traits subsumed under this trait are: competence, order, dutifulness, achievement striving, self-discipline, and deliberation (McCrae & Costa, 2003).

Cross-Cultural Validity of FFM

The five-factor structure of human personality has also been well established across many different cultures, ethnicities, and languages, which make it a well-suited measure for the population under investigation of this study—Hispanic students. There have been many translations of various Big-Five instruments that have been translated and validated in many languages such as German, Portuguese, Hebrew, Chinese, Korean Japanese, (McCrae & Costa, 1997), Filipino, French (Costa, Del Pilar, McCrae, Pakers, & Rollan, 1998) and Spanish (Benet-Martinez & Oliver, 1998). These findings lend support to the notion that the five-factor structure of personality may be a human universal and thus a valuable tool for cross-cultural research (McCrae & Costa, 1997)

Five-Factor instruments have also has been shown to have measurement invariance between Whites and Hispanics (Benet-Martinez, 1998; Jensen-Campbell,

Grazian, & Hair, 1996). For example, Benet-Martinez and Oliver (1998) conducted a study to test the validity of a Spanish version of the Big-Five Inventory (BFI). They did the study on college students in Spain and United States. The U.S. sample completed the English version and the Spanish received the Spanish assessment. The authors described the consistency in factor loading across both English and Spanish samples as "excellent" (p. 733), with a mean factor-loading coefficient of .90. In another similar study with a group of bilingual Hispanic college students in the U.S., participants completed English and Spanish version of the BFI and NEO-FFI (Benet-Martinez & Oliver, 1998). In the factor analysis of the bilingual participants, factors structures and associated factors loadings between factors in the English and Spanish NEO-FFI were very similar for the English and Spanish versions for the BFI and NEO-FFI. This study showed that for bilingual Hispanics, the instrument validly measured each factor, as factor loadings clearly indicated a five-factor solution and items correctly loaded on appropriate factors. This study also conducted confirmatory factors analysis and found good model fit of the five factors for both English and Spanish versions of the BFI and NEO-FFI.

These results, demonstrating similar factor structures for Hispanics, have also been demonstrated with Hispanic adolescents (Jensen-Campbell, Grazian, & Hair, 1996) and Hispanic working class populations (Benet-Martinez & Oliver, 1998). These studies demonstrate that the FFM of personality and various instruments used to assess it are valid across cultures, region, and ethnicity. Thus, making the FFM a valid construct to assess personality amongst Hispanics.

Personality and Academic Success

There has been considerable research into the impact that the Big Five factors of personality can have on a variety of life outcomes such as job success, mortality and academic success (Kuncel, Ones, & Sackett, 2010). Several studies have also been conducted on the relationship between personality and academic success outcomes at the postsecondary level. These studies are comprised of studies that focus on a variety of educational outcomes such as GPA, academic satisfaction, persistence, and course completion. There has been robust support for the positive relationship between Conscientiousness and academic outcomes; generally the more Conscientiousness the more likely one is to succeed in college (Corker et al., 2012; Furnham, 2012; Poropat, 2009; Trapmann et al., 2007). A number of large meta-analysis has shown that Conscientiousness is reliable predictor of GPA. In comparing the strength of associations between Big-Five factors and GPA, McAbee & Oswald (2013) who conducted a meta-analysis across 51 studies, found that across studies Conscientiousness was the strongest predictor. This result was found to be so even across the various measures of performance and across a variety of success criteria such as actual GPA, course GPA and self-reported GPA. However, the findings between other Big Five personality traits and academic success have been mixed.

Trapmann et al. (2007) conducted a meta-analysis on a total of 58 independent research studies across 15 different countries. The purpose was to examine the effect of Big-Five personality traits on grades, retention and satisfaction. They found that overall Conscientiousness was the only significant factor which positively predicted GPA.

Neuroticism was not related to GPA but was negatively related to academic satisfaction. While overall there was no significant effect for Extraversion and performance, only after introducing country of origin they found that only for East Asians was there a positive link between Extraversion and course grades. There was no relationship between Openness and Agreeableness for any success criteria. However, this study was liberal in their definition of Big-Five personality and included other surveys which were not intended to specially measure Big-Five factors.

In a similar meta-analysis, O'Connor and Paunonen (2007) found that Conscientiousness was the most robust factor related to success. This study also found that Openness was inconsistent in predicting performance, as was Extraversion, Neuroticism, and Agreeableness. Yet a more recent meta-analysis by McAbee and Oswald (2013) found a small negative relationship between Neuroticism academic success. This study also found small positive associations with academic performance for Agreeableness and Openness.

Overall these findings indicate that Conscientiousness is the most reliable predictor of academic criteria, while the relationship with other factors of personality may differ depending on the specific contexts, success criteria or population.

Incremental validity over ability factors. Research on the link between personality and academic performance has also shown that Big-Five Personality and other psychosocial factors can add incremental validity to traditional intelligence and academic ability variables such as intelligence, high school GPA, SAT, or ACT scores. For example, Kappe and Henk (2012) conducted a study on a sample of human resource

management undergraduate students in a university in the Netherlands ($N = 148$).

Measures of academic achievement were: classroom lectures, skill training, group

projects, internships training, written thesis, end of year cumulative GPA, and time to

graduation. Conscientiousness was significant with all measures of academic

achievement. Moreover Conscientiousness accounted for incremental predictive validity

over and above what could be accounted for by intelligence measures. Overall,

Conscientiousness accounted for 22% of the variance in GPA, and 17% of time to

graduation. Similarly, a meta-analysis of all psychological correlates found that for

studies that included high school GPA, SAT or ACT scores that Conscientiousness was

still a significant predictor over the variance that was accounted for by these ability

factors (Richardson, Abraham, & Bond 2012). In addition, Poropat (2009) found that

controlling for intelligence slightly improved the predictive ability of Conscientiousness.

Poropat also tested to examine if after controlling for secondary GPA, if personality

could predict postsecondary GPA and found that Conscientiousness ($r = .17$) was the

only factor among the Big Five that had a meaningful relationship with performance.

While intelligence ($r = .14$) also had a meaningful association with GPA, Poropat

concluded that after controlling for secondary GPA, Conscientiousness was a bigger

predictor of GPA than intelligence.

Mediating factors. Though this research is not as abundant there are more

emerging trends in the literature that have examined studies to investigate what factors

mediate the relationship between personality and academic outcomes. One study by

Corker et al. (2012) examined the relationship between Conscientiousness at the facet

level to determine which facet level traits of Conscientiousness were related to academic performance. The sample was based on 347 junior and senior level psychology students at a Midwestern U.S. university. The performance variables used were score of course grade, exam scores, homework, and course paper grade. All these variables were examined as a composite score as well as each independently. Conscientiousness was correlated with three outcomes of academic performance. This study measured all six facets of Conscientiousness and found that overall Conscientiousness was a significant predictor of academic performance. They also found that Self-Discipline was the strongest facet level predictor and significantly predicted all performance measures.

Corker et al. (2012) also conducted mediational analysis using structural equation modeling with self-reported student effort, achievement goal orientation, and study strategies. Overall the findings indicate that, if not all of the relationship between Conscientiousness and performance, at least for this specific context, can be attributed to student effort, approach goal orientation, and study strategies. Achievement goal orientation and student effort mediated the relationship between Conscientiousness and academic success. Self-Discipline facet of Conscientiousness was the most strongly associated with academic performance. Therefore, in examination of the effect of Conscientiousness on academic performance the authors conclude that student effort and approach goal orientation are important aspects of this link. This is in contrast to the findings on CCSSE by CCSSE (Marti & McClenney, 2006) which did not indicate a robust relationship with student effort and academic performance. This may be due to the differences in how each of these constructs are operationalized and assessed.

Generalizability of findings. Though there have been several studies on the relationship between academic success and personality using the Big-Five factors amongst college students, many have been with psychology students, and four-year institutions. In fact after a thorough review of searches I could not identify one single study that examined this relationship with two-year college students. Yet other research (Poropat, 2009) has shown the predictive validity of personality changes as function of educational setting and level. Poropat (2009) tested to see if education level moderated the relationship and found that overall, the predictive validity of personality decreases the higher the educational level. For every personality trait, the predictive power decreased in college populations as compared to secondary and primary educational settings except for Conscientiousness—which remained a stable and consistent predictor across educational levels.

Intelligence also shows inconsistent predictive validity across educational settings. For example, intelligence has been also shown to decrease in its power to predict academic performance in college students (Poropat, 2009). Some propose that this is due to the restriction in range of intelligence. This is due to the fact that selective universities, through their admissions selection criteria, select only students that are high on various ability factors such as intelligence and academic preparation (O'Connell & Sheikh, 2011).

O'Connell and Sheikh (2011) examined if the "personality link to educational outcome holds true for a broader population including those whose educational record is average or below average" (p. 829). This study coded educational attainment along a

continuum in which 1 were those that had no "academic qualifications" (p. 830) to 9 for those that had attained a higher degree of education. This study gathered data from a broader population in the UK. They used longitudinal British National Child Development Study, which is a cross-sectional population of people born in 1958 that have been surveyed at various intervals. A Big Five personality assessment (50 item IPIP) was administered to them in 2008 at age 50 ($N = 6509$).

Like Poropat (2009), the results showed that all personality factors were significant predictors of educational attainment though this was based on simple bivariate correlations (O'Connell & Sheikh, 2011). Results showed that based on multiple regression, in which each of the personality factors were tested while other remained in the model to determine which specific factors made a significant effect, Openness was the most powerful predictor of all Big-Five traits. There was a negative relationship between academic attainment and Extraversion, a small positive relationship with for Agreeableness, and a positive correlation for Emotional stability—the opposite of Neuroticism. There was also an interaction between emotional stability and gender, in which the positive effect of emotional stability was stronger for women than for men. Surprisingly there was no significant relationship between educational attainment and Conscientiousness.

There are many reasons as to why these findings are inconsistent in regards to what has been reported in the past, in particular in regards to the relationship between academic performance and Conscientiousness. The first is the population; this is what the authors were particularly examining if the findings would generalize to the general

population (O'Connell & Sheikh, 2011). As most studies in this area have been with elite four-year institutions which have restricted ranges, and are already those that are high on Conscientiousness and academic ability. The other that is not mentioned by the authors is their criteria value is a categorical variable not a continuous variable which is required for regression. The authors conclude that those that make it into higher education are less neurotic and more open and therefore, findings between success and these factors is due to missing low and middle ranges of scores on these factors seen in selective four-year college populations.

There is also evidence that the association between personality and success may differ for various ethnicities and races. Trapmann et al. (2007) did not find a significant finding overall for Extraversion and GPA however, there was a significant relationship between extraversion and success after introducing country of origin as a moderating factor. Steele-Johnson and Leas (2013) found that for females, agreeableness was a stronger predictor of GPA for African-Americans than for Whites. They also found that for males, extraversion and openness were more strongly associated with GPA for African-Americans than for Whites.

I have not identified any research that has specifically examined or reported on the findings on Big-Five traits and college level performance specifically for Hispanics, though one study specifically examined nontraditional students at a Hispanic-serving institution (Kaufman, Agars, & Lopez, 2008). This study took place at an that ethnically diverse four-year, nontraditional college with approximately 32% Hispanic college population, older student population (average age was 25.9), and coming from low SES.

This study used self-reported high school GPA and parents' educational level as control variables. As seen in other studies, the findings of Conscientiousness adding incremental predictive validity while accounting for the variance due to parents' educational level and high school GPA was replicated in this study.. This shows that despite the barriers that nontraditional students encounter, Conscientiousness can help them overcome such barriers.

Personality and Student Engagement

Yet another area in which there is a paucity of literature is in the relationship between personality and student engagement. Bean and Eaton (2001) theorize that a students' personality will affect how they interact with the institution, and that this interaction will further influence their decision to engage at the college. Yet, while there are many authors and scholars in the field of education and psychology that agree that learning is the result of both the individual and the educational context, there are very little studies that seek to partition the variance in student learning into individual and environmental factors (Donche, De Maeyer, Coertjens, Van Daal, & Petegem, 2013).

However, there have been a handful of studies that have examined redesigned college teaching strategies on students in relation to personality. The names of such teaching practices differ, but what they seem to have in common is abandoning older traditional teaching strategies that place student as passive recipients of knowledge that is transmitted to them by the expert faculty, to more student-centered teaching strategies that give more autonomy to student in their learning pursuits. These changes in pedagogy stress diversity in the educational process and in acknowledging and validating the

knowledge that student bring with them that may contribute to the learning experience

(Cela-Ranilla, Gisbert, & de Oliveira; 2011), which are consistent with the ideals of

Active Collaborative Learning of student engagement (McClenney, 2006). Cela-Ranilla

et al. (2013) goes on to state "knowing a student is a prior step to making them an active

part in the learning process (p. 175)." So while there are few studies that have examined

personality and engagement, as specifically defined by Kuh (2009), there are some

studies that have examined how these new curricular redesigns interact with personality

and their subsequent influences on academic performance.

Donche et al. (2013) sought to examine after controlling for personality and

academic motivation, how much teaching strategies affect the learning strategies student

adopt. This study was done on first-year undergraduates from a university in Belgium (N

$= 1,126$) in multivariable-multi-level analysis. This allowed for examination of the

independent effect that individual and contextual (teaching strategy) factors had on

learning strategy while controlling for variance between majors. This also allowed for the

unique and independent effect of teaching strategy to be determined while controlling for

age, gender, discipline, and individual factors of motivation and personality. Results of

the analysis suggested that Openness had a modest relationship to deep and concrete

processing as well as self-regulation.

Donche et al. (2013) also found that adding the teaching strategies variable

improved the predictive ability of the model over and above what could be accounted for

by individual student motivation and personality factors. Direct instruction, which relies

more on traditional lecture strategies, was negatively related to external regulation. The

discovery teaching strategy, however, which resembles more active learning strategies, was positively related to all processing learning strategies. This shows that while students' disposition may account for their approach to learning, the teaching strategies can also influence this approach.

However, this study only tested whether teaching strategy could have incremental predictive validity when personality and motivation were accounted for learning strategy not on actual student performance. So while it does provide some information as to how personality is related to learning strategies, it does not account for the mediating effects of such relationships on actual student outcomes. It does however lend evidence to the fact that students' behavior in courses is dictated to some extent by their own dispositions, personality and motivation, and contextual factors such as teaching style. This is consistent with the theory of student engagement being at the helm of both the individual and the institution. While students may be predisposed to act in certain ways, i.e. adopt one learning strategy over another, the environment also can influence the decision whether or not, and to what degree, the individual will engage in such behaviors.

In a Problem Based Learning Environment, which also focuses more on learner autonomy, it was also found that Conscientiousness was the only significant predictor of academic performance (de Koning, Loyens, Rikers, Smeets, & van der Molen, 2012). De Koning et al. (2012) goes on to explain that "in order to understand why students learn in one way or another, or what we can do to improve their learning experience, we have to understand who our student are and how they feel and think (p. 176)."

While these studies are similar to engagement as defined by Kuh (2009), I have only identified one study that has used Kuh's definition of engagement and examined its relationship to personality. Guess-Crites (2011) conducted a canonical correlation analysis personality and NSSE engagement benchmarks. Though personality was conceptualized using Jung's personality types, Guess-Crites found that there was significant overlap between having an extraverted personality orientation and Supportive Campus Environment. This lends support to the notion that there may be natural dispositions of the individual that naturally lead them to engage at the institution in a particular manner.

<div align="center">**Conclusion**</div>

Ensuring the success of every student that steps onto a college campus is critical given the goal President Obama has set forth in increasing the educational attainment rates of the nation (The White House, n.d.). Yet many community college students do not complete their degrees within a reasonable time frame. Moreover, though Hispanics are more likely to attend two-year colleges, they are also the ethnic group with the lowest educational attainment rates.

There is robust evidence that student engagement and personality are empirically related to student success. There is also evidence that the relationship between personality and academic success may differ for various ethnic groups. I could not identify any studies that have looked at the relationship between personality and academic success specifically for Hispanic student, or community college students. Furthermore, there have not been any studies that have looked at how community college

student engagement and Big-Five personality traits are related. By examining how personality and student engagement affect academic performance for this particular population—two-year Hispanic students—one can begin to understand what interventions, policies, and practices can facilitate degree completion for this population. The next chapter will discuss in detail the results for Phase I and Phase II of the analysis.

Chapter 3: Research Method

The analysis conducted will add to the literature in this area by examining the relationship between these variables for Hispanic students attending a community college. In addition, this study explored whether the concepts of engagement and personality are related, and if engagement can account for the intermediary processes between personality and academic performance.

This chapter, covers in detail the research methodology of the analysis I conducted. The first section describes the overall research designs for both phases of this study. Following that, a detailed operationalization of the independent, mediating and independent variables are described. Next, a detailed description of the population, sampling and recruitment procedures is provided. Then, the data analysis is discussed. Next, threats to validity and, finally, ethical considerations are documented.

Research Design

I used a cross-sectional, nonexperimental design. Cross-sectional design, refers to the fact that a sample will be drawn from the population that represents the total population in a given moment in time. This study did not use any experimental procedures; therefore, no intervention was conducted—data collection took place within the natural educational environment. With its a-priori theoretical model and prescribed mediation pathways, this research falls into what is commonly referred to as a causal design (Cohen, Cohen, West, & Aiken, 2003; Hayes, 2013; Jaccard & Jacoby, 2010; MacKinnon, 2008). However, without manipulated variables, any causal inference rests

on the logical soundness and strength of the theoretical model rather than a mere statistical result.

In the first phase of this research I conducted factor analysis I conducted factor analysis in order to extract factors of engagement from the CCSSE. These factors and associated factor scores were then incorporated as mediating variables in the second phase of this research. Phase II of this study is a mediational analysis that tested if for this specific population—Hispanic, STC students—the link between personality and academic performance is mediated by student engagement. Mediation goes beyond the testing of predictive validity between an independent and dependent variable and seeks to explain how, or through what intermediary processes, the independent variable(s) affect the dependent variable (Baron & Kenny, 1986). The three sets of variables are: (a) independent variables, which are the Big-Five personality traits, (b) mediating variables, which are the factors of student engagement, and (c) academic performance, as measured by academic year cumulative GPA.

Factor Analysis

The primary reason for conducting factor analysis is for "discovering which variables amongst a set of variables form coherent subsets that are relatively independent of one another" (Tabachnick & Fiddell, 2013, p. 612). Such variables are then grouped together to form factors. I used factor analysis in efforts to reduce items contained in the CCSSE into a smaller number of factors. There are many methods that can be used for both extracting and rotating factors. However, as Tabachnick and Fiddell (2013) mention, "the final choice among alternatives depends on the researchers' assessment of its

interpretability and scientific utility" (p. 613). I used principal axis to extract factors from the 39 CCSSE items, which Marti (2009) and Angell (2009) used in their creation of engagement factors. Also, similar to Angell and Marti, oblique rotation was used.

Rationale for factor analysis. It is recognized that engagement patterns may differ across institutions (Angell, 2009; McCormick & McClenney, 2012). Differences in institutional culture, practice, and policy all influence and shape the overall environment of the institution. It is precisely this overall environment that in turn shapes the manner and frequency that students engage at the institution. It is for these reason that I chose to conduct factor analysis—in order to derive locally produced and validated factors of engagement for STC students.

Mediation Analysis

Mediation analysis tests an assumption of causality (Frazier, Tix, & Baron, 2004). Mediating variables are described by MacKinnon, Fairchild, and Fritz (2007) as "behavioral, biological, psychological, or social constructs that transmit the effect of one variable to another variable. Mediation is one way that researchers can examine the processes or mechanisms by which one variable affects another" (p. 205). To establish this casual chain, Baron and Kenny (1986) gave three criteria that must be met: "(a) there is an association between the two variables, (b) the association is not spurious, and (c) the cause precedes the effect in time" (p. 1176). Additionally, Frazier et al. (2004) gave four criteria for establishing a mediating effect: "(a) variations in levels of independent variable significantly account for variations in the presumed mediator, (b) variations in the mediator significantly account for variations in the dependent variable, and (c) when

paths *a* and *b* are controlled, a previously significant relation between the independent

and dependent variables is no longer significant…" (p. 127). This is visually displayed in

Figure 3.
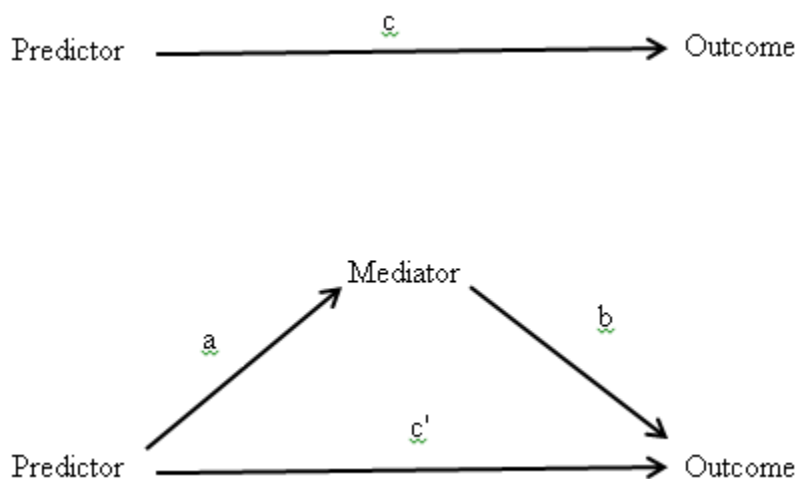
Figure 3. Mediational Model. Path a = bivariate relationship between predictor and
mediator. Path b = partial relationship between mediator and outcome controlling for
predictor. Path c = bivariate relationship between predictor and outcome. Path c' = partial
relationship between predictor and outcome controlling for mediator.

　　　　If after introducing the indirect paths from predictor variable to outcome variable

through the mediator (i.e., paths *a* and *b*), there is no longer a significant direct

relationship between predictor variable and outcome variable (i.e., path *c*), then there is

evidence of a full mediating effect (Frazier, et al., 2004). In such a case, it is believed that

the effect of the predictor to outcome can be solely attributed to the mediator. However,

in most social research, this is not the case as there may be multiple reasons for the

relationship between predictor and outcome. In such cases, if the effect is reduced but not

statistically significantly eliminated, there is evidence for partial mediation. In partial

mediation the mediator does explain some of the relationship, though there are other

factors assumed that also account for the relationship. Baron and Kenny (1986) concluded, "a significant reduction demonstrates that a given mediator is indeed potent, albeit not both a necessary and sufficient condition for an effect to occur" (p. 1176).

Rationale for mediation analysis. Previous research has demonstrated a consistent link between personality and postsecondary academic performance for many populations (Corker et al., 2012; Furnham, 2012; Poropat, 2009; Trapmann et al., 2007). However, what is lacking is determining the processes by which personality contributes to success. Only looking at personality and its relation to student success does little in translating to actionable recommendations for college stakeholders that are tasked with ensuring students' success. While personality can be defined many ways, many scholars in this area agree that personality refers to a set of traits that are relatively stable within the individual (Larsen & Buss, 2008; McCrae & Costa, 2003). Therefore, there is little institutions of higher education can do to influence and change students' personality in efforts to making them more successful.

While students' personality can influence the likelihood of them engaging in certain behaviors, institutions have the power to shape environments that encourage students to engage in educationally meaningful activities at the college (Chickering & Gamson, 1987; Kuh, 2001). In addition, it is useful to examine if students of various personalities by nature tend to engage in particular ways, and if these engagement patterns are related to success. For example, extraverted students may report higher levels of collaboration, or interaction with others on the campus, while introverts may prefer one-on-one interactions. In both cases it is critical that if individuals prefer such

environments—and if such environments are critical to their success—institutions

provide environments that accommodate both these preferences.

According to the theoretical frameworks of engagement and personality, the

mediation model is a valid model of analysis to explain how these variables jointly

influence student success. Personality is a construct that individuals begin to develop

early on in the lifespan and is relatively stable (McCrae & Costa, 2003). Therefore, it

occurs before engagement. Engagement is a construct that is more malleable, and

therefore more likely to fluctuate as a function of both the individual and the

environmental context (Kuh, 2009; McClenney, 2006).

Mediating variables should be chosen on a solid theoretical rationale (Frazier et

al., 2004). Mediator variables should also be something that can be manipulated, or

changed. This is in line with the concept of engagement (Kuh, 2009; McClenney, 2006).

In fact, one of the main reasons for the development of the CCSSE was so that colleges

could examine their engagement scores and alter their environment via practices, policy,

and interactions with students in their efforts to improve student engagement and

learning.

In addition, given the familiarity scholars and practitioners in postsecondary

settings already have with the concepts and measures of engagement, it is useful to frame

these processes through the lens of student engagement. As of 2014, 350 colleges have

administered the CCSSE around the country (CCSSE, n.d.). Furthermore, given that the

survey was designed for the exact purpose of providing actionable data for administrators

to make data-informed decisions concerning student success, framing such processes

through the lens of student engagement, eases the process of translating research to action (McClenney, 2006).

Population and Sampling

STC was the institution where the study took place. STC is located in south Texas along the U.S.-Mexico border and serves two counties within Texas—Hidalgo and Starr counties. STC was created in 1993 and is the only college in Texas to be created by a legislative mandate (STC, 2013). STC was created by Texas Senate Bill 251 to serve the educational needs of Hidalgo and Starr counties. From the time of its creation in 1993, STC's student enrollment has grown from 1,000 to over 31,000. Hidalgo County has a population of 806,552 of which 90.7% are Hispanic (United States Census Bureau, 2014). Starr County is a rural area that has a population of 61,615 and of which 95.7% are Hispanic.

STC's student population reflects that of the communities it serves, with a large portion (95%) being Hispanic (STC, 2013). Moreover, 75% of the students at STC receive some sort of federal financial assistance, and lastly, more than 70% are the first in their families to attend college. STC is one of the few colleges in Texas to offer four-year bachelor degrees. STC offers 112 certificate and associate degrees, as well as many adult continuing basic education such as English-as-a-second language courses.

Phase I Archival Sampling for Factor Analysis

I used two different samples for this study. The first sample included all Hispanic students that completed the CCSSE during spring 2015 at STC. I expected about 1,200 completed STC CCSSE surveys of which, based on 95% STC Hispanic enrollment, about

1,140 were expected to be used for factor analysis to establish student engagement factor structure and factor score coefficients for Hispanic students. Using the entire spring 2015 Hispanic CCSSE respondents to create the engagement factor structure guarded against potential sampling error.

The expected factor analysis sample size of 1,140 is more than adequate. Common rules of thumb such as minimum sample size and ratio of sample size to number of items are invalid (MacCallum, Widaman, Zhang, & Hong, 1999). Instead, MacCallum et al. demonstrated that with communalities at about .6 or higher, a sample of 100, or even less, is adequate to reliably estimate population parameters. A sample of 100 to 200 is adequate for communalities below .5 if there are not a large number of factors and are well-determined by 6 or 7 items, and 300 is adequate for a small number of factors with 3 or 4 items per factor (MacCallum et al., 1999). A worst case with low communalities and large number of weakly determined factors (2 or 3 items per factor), a sample size of 500 or more is needed to recover population parameters (MacCallum et al., 1999).

The CCSSE factor structure is based on 39 items for which Marti (2009) initially found 9 dimensions, with 3 determined by 6 items, 1 by 5, 2 by 4, 2 by 3, and 1 by 2. Marti did not report communalities, but the average standardized coefficient for all items on their primary factor was .60, meaning that each items primary factor, on average, contributed .36 towards the communality value. With the contribution of 8 additional correlated factors, average communalities at or above .50 seems a reasonable expectation. Such an expectation falls between MacCallum et al.'s (1999) scenario for a sample size

of 300 and scenario for a sample size of 500 or more. The expected sample size of 1,140

is double MacCallum et al.'s worst case scenario.

Prior to the beginning of the semester, CCSSE staff requests a list of all courses

that will be offered during the semester from the colleges. From this list, CCSSE stratifies

the course list by time of day the courses is offered—morning, afternoon, and evening—

to ensure proportional samples are drawn from the population depending on time of day

the course is offered (McClenney, 2006). CCSSE staff selects samples from the student

population by randomly selecting classes that are offered during the semester being

administered (CCSE, n.d.). CCSSE administration uses a stratified random cluster

sampling method in efforts to provide representative samples (McClenney, 2006). This

method does not randomly select individual participants, but clusters of participants

based on course enrollment. Only credit-bearing courses are selected. This method allows

large samples to be obtained, and the random selection allows for greater confidence in

generalizing to the population increasing the probability that samples are representative

of the student population in regards to gender, race, and other demographics (McClenney,

2006). While clustered sampling is prone to a larger standard error, this is reduced with

large samples. CCSSE targets a sample size in order to ensure generalizable results. This

target sample size varies based on the size of the institution and can range from 600-1200

(CCSSE, n.d.).

Considering STC has a large student population of over 31,000, it reasonable that

the sample size will be closer to the high end of the sample range. I estimated that the

sample would be around 1,200 for spring 2015. For the second phase of this study, I drew

from the total CCSSE Hispanic sample at STC.

Phase II Sampling and Sample Size

For Phase II—the mediational component—I used a smaller subsample of CCSSE

respondents. Mediational analysis looked specifically at patterns for a sample of Hispanic

students attending STC who completed the CCSSE. Sample size for a simple mediation

analysis (i.e., one predictor and one mediator) depends on the power to detect

significance of each path in the mediation model (McKinnon et al, 2007) calculated

required sample size to detect various magnitudes of path effect sizes. Target sample size

for this research is based on detecting a small-to-medium effect size ($r = .26$) between

predictor and mediator (path a) and between mediator and outcome (path b) that reduces

the relationship between predictor and outcome (path c') to a small effect ($r = .14$). With

alpha $= .05$ and power $= .80$ the target sample size, per Fritz et al., (2004), should be 224

for both paths a and b to be statistically significant, and 196 for a statistically significant

Sobel test of the mediating effect (i.e., the indirect effect of predictor on outcome through

the mediator). Thus, all eligible Hispanic students (approximate $N = 1,140$) were targeted

as potential participants, which required about a 17% response rate (a reasonable

expectation) to reach the Sobel test sample size.

Recruitment and Procedures

All data except for the personality assessment was archival data and was obtained from the institution. Personality assessments were the only additional data I collected. All eligible students—Hispanics with completed CCSSE data—were invited to complete the personality assessment.

I contacted each of the instructors that teach each of the courses in which the CCSSE was administered and emailed them to ask if they would allow me to visit their course to recruit participants form their courses for my study. This was done during the last five minutes of class. During this time I informed participants of my study and announced the time and place where the study would be conducted. Studies were conducted in classrooms at STC outside of regularly scheduled class times.

Before administration of the NEO-FFI-3, I explained my research to participants and completed the informed consent process. After students completed the informed consent process, I distributed the NEO-FFI-3 instruments to the group and allowed them to complete it. I read instructions for completing the NEO-FFI-3 verbatim as provided by the test publishers. The NEO-FFI-3 is a 60-item instrument that took between 10-15 minutes to complete (McCrae & Costa, 2010).

The NEO-FFI-3 also has a space on the NEO-FFI-3 for students to enter their name and ID number (McCrae & Costa, 2010). I asked students to enter their STC student ID number on the NEO-FFI-3—this allowed me to match records to institutional records and CCSSE data. By targeting these courses, I was able to capture the same sample. Then using student ID's provided by students on the NEO-FFI-3, I asked the

institutional research staff at STC to match the NEO-FFI-3 ID lists to institutional records. Institutional records requested included all CCSSE results, academic year GPA, ethnicity, gender, and age for each participant that was able to be matched. As incentive to participate, students also were allowed to self-score their assessment. An additional sheet that describes each of the Big-Five factors was given to participants to enable interpretation of their results.

Variables of the Study

Dependent Variable: Academic Year GPA

Institutional GPA for the academic year in which CCSSE was administered is the dependent variable. While CCSSE is administered in the spring term, it asks students to reflect upon their experiences within that institution for that particular academic year in which it is administered (McClenney & Marti, 2006). Academic year for the research site begins in the fall, and continues into the spring, and ends at the end of the summer. Grade point average is defined as the total grade points divided by earned credit hours and is on a continuous, ordinal scale from 0.0 through 4.0. In order to derive academic year cumulative GPA I requested both spring and fall term grade points, as well as total credit hours attempted. Academic year GPA was calculated by summing total grade points received for each semester, and dividing it by the total credit hours attempted earned during each semester. Additionally, only institutional GPA was used, I did not include any transfer grades in the calculation of GPA. The terms in the institutional Banner data are for the academic year in which the study took place were fall 2014 and spring 2015. The period was from September 2014 through June 2015.

According to the psychological model of student retention by Bean and Eaton (2001), academic performance is an intermediary outcome to persistence. I chose cumulative GPA because it represents overall performance for the academic year. Previous research (Furnham, 2012) has demonstrated that the relationship with personality can differ depending on specific criteria used such as single course outcomes, exam outcomes, or cumulative term GPA. Moreover, engagement is also more stable and consistent predictor of cumulative year GPA as opposed to narrow criteria such as course completions (McClenney & Marti, 2006). Lastly, using cumulative GPA will ensure a more normal distribution. Some courses and instructors may be more difficult and require more work than others. By including a larger number of courses, a wider net is drawn to capture more variability in course performance.

Richardson et al. (2012) reported that cumulative GPA over multiple semesters was a more reliable and valid measure of GPA than more immediate outcomes. In their meta-analysis they also found that course grades correlated with cumulative GPA with a correlation coefficient of .59. Since GPA was obtained by institutional records, it has perfect reliability (McAbee & Oswald, 2013). McAbee and Oswald (2013) explained that GPA can be conceptualized as the actual criterion to be predicted, or as a proxy for academic performance. When used as a proxy, as is the case for this analysis, reliability is perfect. Validity, however, can be compromised because GPA can be influenced by a variety of factors, such as the number of courses a student takes, rigor of chosen major, and the degree of difficulty that varies between courses.

Independent Variables: Big Five Personality Factors

Personality domains are the independent variables in this study. I used personality as conceptualized by McCrae and Costa (2010), commonly known as the Big-Five, or Five-Factor Model. Five domains of personality are Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness.

Neuroticism. Individuals high on neuroticism have trouble managing their emotions, and thus are easily distressed (McCrae & Costa, 2010). They may also have irrational thoughts, be impulsive and have poor coping strategies. Low scores on Neuroticism are typically relaxed and tend to have more control of their emotions. They are less likely to be distressed, and have better coping strategies when faced with stressful situations.

Extraversion. Those that score high on extraversion are social, assertive, cheerful, and enjoy large group settings (McCrae & Costa, 2010). Those low on extraversion, also called introverts, prefer to be alone. However, they are not necessarily shy, or unhappy. They are just more likely to prefer to be alone or in small groups, and not be as talkative. A more accurate conceptualization is the absence of extraversion, as opposed to the presence of shyness.

Openness to Experience. Openness to experience refers to those that are intellectually curious, seek new experiences, and appreciate beauty and art (McCrae & Costa, 2010). They experience emotions more strongly. They are in tune to their inner and outer surroundings and are curious about them. Some have also theorized that openness is related to intellect, however, intelligence is outside the domain of personality,

and represents cognitive functioning, not a personality domain. Those low on openness

are conventional and prefer what is familiar to them.

Agreeableness. Those high on this factor generally view others positively, they

are kind-hearted, warm, and tend to work well with others; they also trust others easily

(McCrae & Costa, 2010). While those low on Agreeableness, tend to be more narcissistic

and self-absorbed.

Conscientiousness. Those high on this factor are more deliberate in planning and

organizing their activities in order to accomplish tasks (McCrae & Costa, 2010). It is no

wonder it is related most strongly to academic achievement, especially in postsecondary

where academic performance is relegated to the individual. These individual are dutiful,

motivated, and represent a trait that has been described as a will-to-achieve.

Instrumentation: NEO-FFI-3

The NEO-FFI inventory comes from the NEO family of personality assessments

(McCrae & Costa, 2010). The purpose for developing the NEO family of inventories was

to create a multi-purpose instrument that could measure many facets of human behaviors.

While the more detailed NEO assessments, such as the NEO-PI-3, measure not only the

five broad traits, but also the facet traits contained within the broad traits, this analysis

only measured and examined broad traits using the NEO-FFI-3.

The NEO-FFI-3 is a shortened version of the NEO-PI-3 and contains 60 items

that measure the five domains of personality (McCrae & Costa, 2010). Brief measures

have been shown to be reliable and valid (Gosling, Rentfro, & Swann, 2003; Herzberg &

Brahler, 2006; Rammsted & John, 2005). Though it is not as reliable or valid as the full

scale 260-item NEO-PI-3, it is suitable for large-scale research studies (McCrae & Costa, 2010). The NEO-FFI-3 is also ideal for administering if there are time constraints.

The first of the NEO-FFI inventories was developed as a shortened version of the NEO-PI in 1985. In 2004, the NEO-FFI was also updated as a shortened version of the NEO-PI-R. The NEO-FFI-3 is the most recent version of the brief inventory for the NEO-PI-3. All 60 items from the NEO-FFI-3 come from the NEO-PI-3. The NEO-FFI-3 has two forms, the self-report (S) form and the observer (R) form. I used the S form, which asks respondents to answer questions about themselves (McCrae & Costa, 2007).

Validation for the NEO-FFI-3 was done with the same sample upon which the NEO-PI-3 was tested and developed. In this study participants were given the NEO-PI-R and an additional 96 items that were to be tested and considered for replacements (McCrae & Costa, 2007). Five hundred adolescents (aged 14-20) and 635 adults completed the inventory. The participants were sampled from 29 states across the U.S.

Norms for the NEO-PI-3 were based on samples from the validation study for adult and adolescent samples (McCrae & Costa, 2010). These norms were updated with the intention of creating norms that were more representative of the general population than previous norms. Previous norms were based on the Baltimore Longitudinal Study of Aging database, in which the samples were higher in education than the general U.S. population, and only represented individuals from the Baltimore area. The norms are categorized by age group and sex, though there are also combined norms for both sexes. Items in the NEO-FFI-3 are 60 likert scale items that ask respondents to indicate how much they agree with statements that describe themselves (McCrae & Costa, 2007).

Response options range from strongly disagree to strongly agree and responses are coded from a scale of 1 to 5, 1 representing the strongly disagree and five representing strongly agree. The items are both positively and negatively worded in regards to each trait; in instances in which they are negatively worded the scores are flipped in so that strongly disagree is equal to five. Scoring the NEO-FF-3 items requires simply summing up the responses' numerical values for each domain. This yields five domain scores, one for each Big Five factor: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness.

The NEO-FFI-3 inventory has four pages. The first page gives directions and the second page collects basic demographic information, including ID number (McCrae & Costa, 2010). It can be administered in groups and should be in a comfortable environment with no distractions. Therefore, a classroom is a suitable environment.

Reliability. Internal consistency coefficients (Cronbach's α) for NEO-FFI-3 factors for the adult sample are .86, .79, .78, .79, and .82 for the Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness domains respectively (McCrae & Costa, 2007). The values for the adolescent sample were similar with .82, .80, .78, .72, and .83 for the Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness scales respectively. The correlation coefficient between the domain score for each personality factor between NEO-FFI-3 and corresponding domain scale for NEO-PI-3 are .93, .90, .91, .91, and .90 for the Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness scales respectively. The results for the adolescent

sample are .91, .92, .93, .89, and .92 for the Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness scales respectively (McCrae & Costa, 2007).

Test-retest reliability for the NEO-FFI-3 has not been conducted (McCrae & Costa, 2010). However test-retest reliability has been established for the NEO-FFI; results for test-retest coefficients after a two-week time period between administrations were .89, .86, .88, .86, and .90 for Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness, respectively (Robins, Fraley, Roberts, & Trzesniewski, 2001). Correlation of the factor scores from the NEO-FFI-3 and the corresponding factors of the NEO-PI-3 were conducted for both the adolescent and adult samples, all correlations between the Big-Five factors from the NEO-FFI-3 to respective factors on the NEO-PI-3 were significant for all factors with correlation coefficients for the adult sample ranging from .49 for Conscientiousness, and .60 for Extraversion (McCrae & Costa, 2007).

Validity. There has been a handful of meta-analyses that have examined the relationship between Big Five and GPA for postsecondary students (McAbee & Oswald, 2013, O'Connor & Paunonen, 2007; Poropat, 2009; Richardson et al., 2012; Trapmann et al., 2007) and all have found significant effects for Conscientiousness and various educational outcomes. McAbee and Oswald (2013) for example, conducted a meta-analysis on 51 studies to examine the relationship between various Big-Five personality assessments and their ability to predict a variety of academic performance criteria such as self-reported GPA, actual and course grades. The purpose was to assess the validity and appropriateness of using various inventories of Big-Five personality measures. The personality inventories included were the NEO-OI-R, the Big Five Inventory, Goldberg's

unipolar markers, The International Personality Item Pool, and the NEO-FFI-R, to determine if each of the inventories have consistency in their ability to predict GPA based on personality domain—what the researchers referred to as operational validity. From these 51 studies, 19 used the NEO-FFI-R and 14 used the NEO-PI-R. No significant differences in operational validities were found for Extraversion, Agreeableness, Conscientiousness, nor Neuroticism; or between the measures used and the relationship to GPA. For each of these domains, the NEO-PI-3 and the NEO-FFI-R predictive abilities were equal across measures for predicting GPA. For openness the operational validity of the NEO-FFI-I scale was higher than for the NEO-PI-R scale and was significantly different ($p < .05$), but differences were small and effects were weak.

The operational validities ($r+$) represent the correlation coefficient corrected for sampling error variance and measurement error only for GPA (McAbee & Oswald, 2013). This allows one to assess the differences in the predictive validity between the inventories, since there is no correction for predictor error variance. Overall, the authors concluded that the various measures for personality included in this analysis generally show similar patterns in predicting GPA across samples. The operational validities for each of the personality factors, as measured by NEO-PI-R and NEO-FFI-3 are presented in Table 1.

Table 1

Big-Five Operational Validities

Big-Five Factor	NEO-PI-R r^+	NEO-FFI r^+
Neuroticism	-.04	-.04
Extraversion	-.01	-.03
Openness	.05	.12
Agreeableness	.06	.11
Conscientiousness	.26	.24

Note. r^+ = mean correlation corrected for measurement error in the criterion variable (operational validity).

Mediating Variables: Engagement Factors

I used locally derived factors of student engagement as the mediating variables identified from the first phase of this study. These factor scores were used as mediating variables to examine the intermediary behaviors that account for the relationship between personality and GPA.

Instrumentation: CCSSE. STC administers the CCSSE survey to its student population every other spring semester. STC uses the survey for many purposes such as program evaluation and accountability. The items vary from demographics such as gender, age, semester enrolled; to asking students about their participation in educationally meaningful activities at the college. While the survey contains many items, only 39 items are used to create the factors of student engagement contained within the Model of Best Fit (McClenney & Marti, 2006) (see Appendix A for items and associated factors of engagement).

CCSSE administrators used surveys that were administered in the years 2004, 2005, and 2006 to conduct reliability and validity analyses. The total completed sample size was 274,694 from community colleges across the country. The analysis was done in

three phases: confirmatory factor analysis for the factors of engagement, reliability analysis, and validity analysis.

CCSSE engagement factors. The nine-factor structure of the MBF was tested using confirmatory factor analysis (McClenney & Marti, 2006) (the factors and CCSSE items are presented in Appendix A). The average RMSEA for the factor solution across five imputations was .05, and the SRMR was .054 (McClenney & Marti, 2006). This indicated a good model fit. Results indicated that factor loadings of the factors of MBF did not differ on various demographics such as age, ethnicity, year administered, or part-time vs. full-time students. The nine factors were then further reduced into the MEEP into five benchmarks of engagement. The authors described the model fit for the MEEP as "reasonable" (Marti, 2009, p. 10), given the RMSEA was equal to .060, and SRMR was equal to .062. These results also showed measurement invariance across groups such as administration years, sex, and full time and part time students. Angell (2009), found only 4 factors, only two of which corresponded to the 9 by Marti (2009). There have been a handful of researchers that have critiqued the factor structure by Marti and its validity and reliability (see Nora et al., 2011). Thus, part of this analysis was to develop locally derived engagement factors to contribute to the literature in this regard and further the validation of the CCSSE and its appropriate use in two-year, postsecondary settings, and specifically for Hispanics attending STC.

Reliability was assessed for the factors of engagement by using Cronbach's alpha and showed that only four of the nine factors had a Cronbach's alpha level of .70 or higher (Marti, 2009). The reliability was also assessed using test-retest coefficients. In

such cases, there were 582 students who had taken the CCSSE more than once within the same year. Results from this sample showed that test-retest correlations were generally around .70. The results of both Cronbach's alpha levels and test-retest r are presented in Table 2. Given the low alpha levels for the constructs, which are considered too low to be considered factors, provides further justification for conducting sample-specific factor analysis.

Table 2

Reliability of MBF Engagement Factors

MBF engagement factor	Alpha	Test-retest (r)
Faculty Interaction	.73	.72
Class Assignments	.64	.68
Exposure to Diversity	.74	.70
Collaborative Learning	.61	.67
Information Technology	.54	.69
Mental Activities	.83	.73
School Opinions	.78	.73
Student Services	.67	.61
Academic Preparation	.56	.76

Validity of CCSSE. CCSSE validation was conducted by CCSSE staff and was conducted across a diverse group of students and across a wide group of academic performance related criterion variables (McClenney & Marti, 2006). The sample ranged from three separate data sets, the Florida Community College System (FCCA) data set, Achieving the Dream (AtD) cohorts, and for the Hispanic Consortium (HSS) (McClenney and Marti, 2006). Various student outcome measures ranged from performance, retention, and completion criteria such as self-reported GPA, official GPA, credit completion ratios, reenrollment across terms, fall-to-fall retention, graduation,

completion of gatekeeper courses, completion of developmental courses, and timely graduation.

Hierarchical linear regression analyses, which controlled for extraneous variables and determined the net effect of engagement on continuous outcome measures were used (McClenney & Marti, 2006). Control variables for the FCCS were gender, ethnicity, age at entry, time from high school graduation to first time enrollment in college, placement test scores, and number of hours enrolled in term. For the FCCS sample, CCSSE benchmarks and factors were more strongly related to cumulative GPA than measures of course completion measures. Persistence was more associated with Collaborative Learning and Student Services.

For the AtD sample, 24 colleges that participated in the ATD initiative were included. Total cases used for this sample were 1,623 that could be matched from the CCSSE and AtD institutional records (McClenney & Marti, 2006). Control variables for this group included, gender, age, ethnicity, math placement scores, and a risk index. The sample for this data was largely nonwhite (59%), and had a large Hispanic population (34.8%).

The HSS data consisted of colleges that were part of the Hispanic Association of College and Universities (HACU), or had a Hispanic student population of 25% or more. For this sample, 27% of respondents reported being Hispanic, and 23% stated that English was not their first language (McClenney and Marti, 2006). Of the 12,962 total samples, 3,279 matches were made from student ID's to institutional records and were used for validation analyses. Results showed that differences between Hispanics and non-

Hispanics were significant yet small. Hispanics reported higher levels of Student Effort

and Support for Learners benchmark, and less Student-Faculty Interaction. For

cumulative GPA, each student that was matched was gathered data for each term they

were enrolled up until spring 2005.

The semi-partial beta weight and significance of each semi-partial regression

coefficients for each factor and for each group are presented in Table 3.

Table 3

Semi-partial Regression Coefficients for Engagement Factors and Cumulative GPA

Engagement factor	FCCS sample		AtD sample		HSS sample	
	Beta	*p*	*Beta*	*p*	*Beta*	*p*
Faculty Interaction	.092	.000	.619	.004	.092	.000
Class Assignments	.282	.010	.316	.053	.043	.012
Exposure to Diversity	.027	.385	.301	.035	.039	.024
Collaborative Learning	.219	.040	.524	.010	.017	.309
Information Technology	.007	.791	.195	.142	.044	.011
Mental Activities	.085	.001	.357	.041	.082	.000
School Opinions	.063	.013	-.081	.638	.000	.991
Student Services	.011	.676	-.204	.224	-.038	.029
Academic Preparation	.064	.013	.873	.001	.093	.000

Note. Adapted from "Exploring Relationships between Student Engagement and Student
Outcomes in Community Colleges: Report on Validation Research" by K. M. McClenney and C.
N. Marti, 2006. *Center for Community College Student Engagement, The University of Texas at
Austin,* p.103. Copyright 2006 by the Center for Community College Student Engagement, The
University of Texas at Austin. Adapted with permission.

Most of the validity on CCSSE has been conducted by CCSSE staff (see

McClenney & Marti, 2006; Marti, 2009). There have only been a few studies by external

researchers that have examined CCSSE validity (see Angell, 2009; Mandarino & Mattern

2010; Nora et al., 2011). In sum, the findings on the number and nature of latent

engagement factors contained within the CCSSE, and their relationship to a variety of

student performance outcomes variables, has been mixed. This study will add to the literature by further validating the CCSSE instrument and the underlying factor structure and the relationship between such factors and GPA for a sample specific local population of those students attending a particular HSI in south Texas. Nora et al. states that the importance of examining the validity of CCSSE by stating "because so much importance is now placed on student engagement, it is just as important to establish the validity of constructs underlying the survey instrument and benchmarks" (p. 109).

<div align="center">**Data Analysis Plan**</div>

The purpose of this research was to examine and empirically test conceptual models rather than strict statistical hypotheses. In this regard, this analysis followed the model-building approach and strategies exemplified in Jaccard and Jacoby (2010).

For the first phase of analysis, I conducted factor analysis for CCSSE items from the entire STC Hispanic population. Although a smaller sample was used to collect NEO-FFI-3 data, sampling error is avoided and factor structure and coefficients are more stable and reliable. For the second phase of analysis, CCSSE factor scores were calculated for the subsample of NEO-FFI-3 participants based on factor score item coefficients from Phase I and a series of single CCSSE factor mediation models were examined with respect to the relationship between each of the five NEO-FFI-3 domain scores and GPA. Based on the results of the series of single mediation models, multiple mediator models were explored. Details of each phase of data analysis are provided in the sections that follow.

Phase I Factor Analysis

CCSSE contains 39 items that are included in the factors that make up the MBF extracted by Marti (2009). Prior to actual factor analysis, standard item screening was conducted to address, as appropriate, univariate and multivariate outliers, normality, linearity of item pairs, and multicollinearity. For this portion, all analysis was conducted using Social Science Statistical Package (SPSS) 23.

Factor extraction and rotation. The purpose of factor analysis is to reduce the items to coherent subsets (i.e., factors), and "decisions about number of factors and rotational scheme are based on pragmatic rather than theoretical criteria" (p. 616, Tabachnick & Fidell, 2013). Marti (2009) and Angell (2009) used principal axis extraction with oblique rotation in their examinations of CCSSE, so I did likewise to be consistent and to facilitate descriptive comparisons of results. Moreover, in the real world, CCSSE engagement dimensions are correlated. Oblique rotation, which allows factors to be correlated, represents reality better than orthogonal (i.e., uncorrelated) factors (Tabachnick & Fidell, 2013).

The number of factors extracted initially used the SPSS eigenvalue greater than 1 default process (i.e., Kaiser criterion). The final number of retained factors was based on standard reduction considerations that include: (a) Horn's (1965) parallel test that determines the number of factors that exceed chance extraction, (b) Cattell's (1966) scree test for visual examination of eigenvalue slope change, (c) Thurstone's (1947) simple structure criterion to minimize the number of factors highly correlated with each item, (d) factor reliability as determined by the number of items that load high on a factor

(depending on the pattern of correlations, if just two items load on a factor, its reliability is suspect and interpretation hazardous [Tabachnick & Fidell, 2013]), (e) proportion of variance accounting for by a factor, (f) internal consistency of each factor as indexed by the squared multiple correlation of factor scores as predicted by item scores (also indexed as the variance of each factor score), and (g) interpretability of a factor. Improvements in factor structure may include elimination of items that do not load high on any factor (as Angell [2009] found) or items with high anti-image correlations.

Phase II Mediation Analyses

A series of single and multiple mediation models were examined. For all mediation models, the outcome variable was STC academic year GPA as operationalized previously in this chapter. The predictor variables were each of the five domain scores from the NEO-FFI-3. The mediators were each of the CCSSE factors determined from Phase I FA. The number of mediation models to be examined were not specified in advance, but depended on Phase I factor analysis results. Specific steps for mediation model preparation, determining the number of viable models, and testing the mediation effect are described in the sections that follow. SPSS 23 was used for all regressions used to test mediation models.

Factor scores. Participants who agreed to participate in the NEO-FFI-3 data collection phase had their CCSSE factor scores calculated from the Phase I factor score coefficients. Factor scores were calculated as the sum of the cross-products of the raw score for each item and corresponding factor score coefficient for each factor.

Descriptive and, as appropriate, inferential comparison of the sample mean and standard deviation and population mean and standard deviation of CCSSE items were conducted to assess homogeneity of sample to population.

Prerequisite mediation screening. To proceed with formal mediation analysis, Baron and Kenny (1986) stipulated that the predictor must be correlated with both the outcome and the mediator; otherwise, they argued, there is nothing to mediate. Since Baron and Kenny, others have noted (see MacKinnon, 2008) that even when the predictor and outcome are not correlated, there can be a mediated effect (specifically, a suppression effect) in which the relationship between the predictor and outcome is significantly enhanced, rather than reduced, by the mediator. Such an effect could be of practical and theoretic importance, so prerequisite screening will allow discovery of such a phenomenon.

Correlations between each of the five NEO-FFI-3 domain scores and each of the CCSSE factor scores were examined. For any NEO-FFI-3 domain score that was statistically significantly correlated (alpha = .05) with any one of the CCSSE factor scores a correlation was examined between the domain and GPA and considered viable for mediation if statistically significant at alpha = .15 (this relaxed alpha level allowed for detection of a suppressor effect if such exists in the mediation analysis). Mediation models were then constructed for those NEO-FFI-3 domain scores and statistically significant CCSSE factor scores. Based on the results of the simple mediation models, multiple mediator models were examined.

Mediation analysis. For formal mediation analysis a series of regressions are needed to obtain significance levels of each path, standardized coefficients for each path (to calculate proportions of direct and indirect effects), and raw (unstandardized) coefficients and their standard errors (to conduct Sobel test of significant indirect effect). Specific steps for those models that meet prerequisite screening are outlined below.

The first step for each model was to run a simple regression of GPA on a qualifying NEO-FFI-3 domain score (path *c*). These regressions can be represented in the following generic raw and standardized forms that capture the total effect of the predictor on the outcome:

$$Y' = i + cX \, i \; ; \; Z_Y' = \beta_{cX}$$

Y' is predicted raw score GPA; *i* is the intercept, the value of predicted GPA when the predictor value equals 0 (meaningful only if 0 is a meaningful value for the predictor); *c* is the raw score slope of the effect, or the amount GPA is predicted to change with a one unit change in the predictor; and *X* is the raw score on the predictor (here, one of the NEO-FFI-3 factor scores). Similarly, Z_Y' is the predicted standardized GPA score; β_c is the standardized slope of the effect, or the amount of standard deviation change in GPA predicted by a one standard deviation change in the predictor (*X*), which is the same as the correlation between the predictor and the outcome. It is the value of the correlation (i.e., β_c) that is most important in mediation because it is this total effect that will be broken out into the direct effect of the predictor on the outcome and the indirect effect of the predictor on the outcome via the mediator.

For each prerequisite qualifying model, a second simple regression was run predicting a CCSSE factor score by an NEO-FFI-3 domain score (path *a*). These regressions can be represented in the following generic raw and standardized forms that capture the total effect of the predictor on the mediator:

$$M' = i + aX \; ; \; Z_M' = \beta_a X$$

The raw score (unstandardized) coefficient (*a*) and its standard error (SE_a) were used as part of the input for the Sobel test of the indirect effect, and the standardized (β_a) coefficient were used as part of the calculation of the proportion of total effect that is indirect. Details on these are explained later.

For each prerequisite qualifying model, a third, and final, multiple regression was run predicting GPA simultaneously by the predictor (a NEO-FFI-3 domain score) and CCSSE factor score. These regressions can be represented in the following generic raw and standardized forms that capture the partial effects of each the predictor and the mediator on GPA:

$$Y' = i + c'X + bM \; ; \; Z_Y' = \beta_{c'} X + \beta_b M$$

Here, in classic mediation, we expect *c'*—the predictor raw score coefficient while controlling for the mediator—to decrease from its simple regression *c* value. The mediator's raw score (unstandardized) coefficient (*b*) and its standard error (SE_b) was used as part of the input for the Sobel test of the indirect effect, and the standardized (β_b) coefficient was used as part of the calculation of the proportion of total effect that is indirect.

The assessment of each model was based on (a) observed significance levels of paths *a*, *b, c* and *c'*, (b) proportions of indirect and direct effect, and (c) Sobel test of the proportion of indirect effect. Because statistical significance of path *a* is a prerequisite for building a model, the focus is on paths *b, c,* and *c'*. If *b* and *c* were statistically significant and *c'* was not, full mediation was concluded if the signs of *a* and *b* are the same (both positive, or both negative). If *b* and *c'* were both statistically significant, partial mediation was concluded if the signs of *a, b,* and *c'* are the same sign. Other patterns, including suppression patterns, may exist and were interpreted as appropriate.

For mediation, particularly partial, it is useful to calculate the proportion of direct and indirect effect, formulae for which are given below:

$$\text{Direct effect} = \beta c' \div \beta c$$
$$\text{Indirect effect} = \beta a(\beta b)$$

Regardless of the significance of relevant paths, partial indirect effects need to be statistically tested for significance. The Sobel test, available online (http://quantpsy.org/sobel/sobel.htm), uses the raw score coefficients and standard errors for paths *a* and *b* to test significance. For all qualifying models, whether fully or partially mediated, a Sobel test was conducted.

Threats to Validity

The largest threat to validity is the survey nature of this study. The conclusions made from this study are only as good as the extent that students answered the survey items accurately and honestly. NEO-FFI-3 is an instrument that has been extensively validated on its psychometric properties (McCrae & Costa, 2010). CCSSE on the other hand has been met with criticisms from other researchers and practitioners alike due to its

questionable psychometric properties. However, as CCSSE staff point out, CCSSE was

made only to measure behaviors that have been associated with student performance

(McCormick & McClenney, 2012). The weakness in CCSSE is also one of the key

strengths. CCSSE was created for pragmatic purposes to bridge the gap between research,

theory, and practice (McCormick & McClenney, 2012). Certain characteristics of these

surveys make them valuable tools for closing this gap. Results from the CCSSE provide

direct application to what is under the control of college administrators and policy

makers.

CCSSE staff does concede however that the survey is imperfect; they believe

however, that an instrument that yields imperfect information is better than having no

information. In addition, while it may not be a perfect instrument at capturing all aspects

of engagement, it does capture many factors that theoretically and empirically should be

significant in predicting a variety of educational outcomes (McCormick & McClenney,

2012). Finally, many including CCSSE staff (Angell, 2009; McCormick & McClenney,

2012) recommend and urge institutions to develop sample specific factor analysis to

understand their campus environment and student engagement practices at a local level.

Conclusions for this study were testing whether engagement, as measured by

CCSSE mediates the relationship between personality and success. However, mediational

analysis only lends support to the assumption that the variables cause one another (Baron

& Kenny, 1986; Frazier, Tix, & Baron, 2004). The validity of causal claims is considered

to lie on a continuum, and of course at best is only an assumption. One of the conditions

that must be met for mediation is that the independent variable must come before the

mediator, and the mediator before the outcome. Personality is a relatively stable

disposition, and thus thought to be developed throughout the lifespan (McCrae and Costa,

2003). Therefore, theoretically is assumed to come before engagement in the causal

sequence. As such the conceptual model by Bean and Eaton (2001) place personality as

an entry characteristic that students possess, along with other characteristics, when they

enter college. Engagement can be defined as the interaction of such predispositions and

the college environment (Bean & Eaton, 2001). Engagement, hence cannot occur until

the individual encounters the environment, and interacts with in it.

Ethical Considerations

I ensured that all aspects complied with both IRB's from Walden University

(approval # 02-10-15-0277200) and STC. Data for this study came from two sources. The

first source of data was archival data that was housed at STC. This data is CCSSE data

and student level institutional record data. Students were matched via student unique

identification number from their CCSSE data to their institutional records.

Confidentiality and Informed Consent

The other data source was students' results from the personality inventory—NEO-

FFI-3. I distributed the informed consent form prior to collecting any personality

assessments. This consent was distributed to all potential participants; I gave them a copy

to keep and kept a signed copy for my own records. The consent form informed

participants of the study and the plans to protect confidentiality. The consent form also

explained the voluntary nature of participation and that refusal to participate would not

influence their course grade or any other aspect of their experience at the college or

otherwise. No incentives were offered for participation. The consent form is included in the Appendix. I also asked that no students under the age of 18 participate; therefore, no parental consent was required. The consent form also contained my contact information, as well as my dissertation advisor, in case participants had any additional questions.

The risks for participating were minimal. Participation in the study only required individuals to complete the personality inventory—the NEO-FFI-3. However the benefits are that knowledge of how students of various personality dispositions engage at the college will provide information on what the institution can do in terms of practice and policy to enhance the student learning experience. The results from this study will be provided to administrators at the college along with recommendations for action. This will allow the college to make informed decision in their efforts to enhance the learning experience for their students. Results from this analysis will also be made available to the participants.

Data was stored on a password protected USB storage device. Personality assessments were stored in a locked file cabinet in my home. Being an employee of the focal institution at which the research took place, may have created a conflict of interest. Acknowledging that this may be the case, I ensured that the analysis was objective so that the results were as accurate as possible so that the information gleaned from the study would inform the nature of students' experiences and thus would benefit the students of STC.

Summary

This chapter presented the methodology of the study. Phase I of this study was an exploratory factor analysis to derive factors of engagement from the CCSSE for all Hispanic students at STC who take the CCSSE survey during the spring 2015 semester. Phase II used these factors of engagement to test several mediational models, to examine if Big-Five personality factors are related to GPA, and if engagement mediates this relationship. The last section discussed protection of participants and included protecting confidentiality of participants and the informed consent process. The next chapter will offer the results of the data analysis plan outlined in this chapter.

Chapter 4: Results

Introduction

This chapter presents the results of Phase I and Phase II of this study. Phase I will

present the results of factor analysis of 39 CCSSE items at South Texas College during

the Spring 2015 semester. The objective of factor analysis was to uncover latent factors

of engagement for this specific population—Hispanic, STC students. Phase II tested a

series of mediational models. Objectives for mediation analysis were to test which

personality domains are bivariately related to GPA, which personality factors are

bivariately related to factors of student engagement, and to identify which factors of

engagement mediate the relationship between personality domains and GPA. A total of

14 models were tested. The first 11 of these models were simple mediation testing of one

predictor, one mediator and one outcome. An additional three multiple mediation models

were tested in which all mediators were included to determine how much the combined

indirect effect had on the outcome, as well as the specific indirect effect for each

mediator while accounting for other mediators.

Phase I: Factor Analysis

The first part of this study sought to determine if there were underlying,

interpretable factors of student engagement. I conducted exploratory factor analysis on

the 39 items that were retained in the nine factor solution of student engagement by

CCSSE researchers (Marti, 2004). These factors are : Mental Activities, Faculty

Interaction, Collaborative Learning, Exposure to Diversity, School Opinions, Student

Services, Class Assignments, Information Technology, and Academic Preparation (Marti,

2004; see Appendix A to see items and corresponding factors). A total of 902 students completed the CCSSE during the Spring 2015 semester at STC. Out of these, 816 (90.5%) identified themselves as Hispanic. This is similar to the student population in which overall Hispanic population is 95% (STC, 2015).

Data Screening

Each of the 39 items that were I used for factor analysis independently had less than 5% of missing data points. Given this low percentage, missing data were estimated using multiple data imputation. Data were imputed using SPSS's multiple imputation procedure. After imputation none of the items had severe skewness or kurtosis values to warrant any data transformations, and all skewness and kurtosis values were less than 2 in absolute value. Only when skewness approaches 2 (absolute value) or kurtosis approaches 7 (absolute value) is there a concern (Curran, West, & Finch, 1996). No variables contained univariate outliers. However, using Mahalanobis distance in which χ^2 was equal to or greater than the critical value of 73 ($p < .001$), 22 cases were identified as multivariate outliers and were excluded from further analyses. Resulting in a total sample of 794.

To check for multicollinearity, bivariate correlations were run with each of the items and correlation coefficients were all below .70. Tolerance and variance inflation factor values were also examined. To accomplish this, all items were used as predictors in a regression with a random ID variable used as the dependent. None of the tolerance values associated with this regression approached .10 all the VIF values were below 3. This indicated that multicollinearity was not present among these items.

Due to the scale of how age is collected in the CCSSE, average age could not be calculated. The response option for the age variable groups age in a categorical range as is presented in Table 4. For this sample, 35.6% of the sample was between 18 and 19, and 23.6% were between 20 and 21. When compared to the STC total population, females were overrepresented. The total STC population is 55% female (STC, 2015) while the proportion for the sample was 60.7%.

Table 4

*Phase I Demographics (*N $=$ *794)*

Demographic	Characteristic	Frequency	%
Age	18-19	283	35.6
	20-21	187	23.6
	22-24	141	17.8
	25-29	94	11.8
	30-39	59	7.4
	40+	27	3.0
	Missing	3	0.4
Sex	Male	308	38.8
	Female	482	60.7
	Missing	4	0.5

Factor Extraction

Factor analysis was run with all 39 items using principal axis extraction and direct oblimin rotation. Oblique rotation assumes that factors are correlated which is consistent with the concept of engagement. In deciding which factors to retain, factors that loaded at least .320 on any factor were retained. As recommended by Tabachnick and Fidell (2013), anything below this was not used in interpretation of a factor. After several

attempts, a four-factor solution was selected as the final factor solution. The four-factor solution consisted of 21 items. I did not use 18 items.

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .902 ($p < .001$), indicating the existence of underlying factors. These four factors explained 57.1% of the total variance contained within the 21 items. The four factors were labeled Mental Activities, School Opinions, Collaborative Learning, and Student Services. Table 5 presents the pattern matrix for each of the factors and associated factor loadings.

Mental Activities factor contained items that focus on how much students' coursework emphasized various cognitive activities such as applying theories or concepts and synthesizing information in new ways. For this factor, all items retained for factor interpretation were also included in the original CCSSE factor of Mental Activities. However, one item that was included in the MBF was not included in the STC sample. That item asked, "Worked harder than you thought you could to meet instructors demands" (Marti, 2004).

School Opinions factor centered on students' perception of how supportive the institution is in a variety of areas such as helping them to thrive socially and helping with nonacademic responsibilities. This is similar to the School Opinions factor in CCSSE factors (Marti, 2004). The only item that did not load on this factor in this research that did load on CCSSE research was the item "Encourage contact among student from different economic, social and racial or ethnic backgrounds."

The central theme in the Collaborative Learning factor was concerned with students' interpersonal interactions in their educational pursuits such as participating in a

community-based project and working with instructors on activities. This factor consisted of a mixture of items that CCSSE identified as belonging to factors of Collaborative Learning, and Faculty Interaction. Based on these results, factor analysis indicated that collaborative learning and faculty interaction, at least for this population, represent one factor. This is similar to the finding of Nora et al. (2011) that also found that Collaborative Learning and Faculty Interaction factored together as a single factor of engagement.

Student Services factor focused on the quantity of usage of various resources available to students such as advising and skill labs. This is also very similar to the Student Services CCSSE factor. The only item that did not load on this factor that but did load in CCSSE research was related to usage of computer labs. The factors that CCSSE research uncovered that were not present in this research were: Class Assignments, Exposure to Diversity, Information Technology, and Academic Preparation—18 of the original CCSSE items that made up the factors were not retained in this factor structure resulting from this analysis.

Table 5 presents the factor score correlation matrix. The highest correlation coefficient was .508 between School Opinion and Student Services. There were also several other pairs of variables that had sizable correlation coefficients in the range of absolute value .40 such as Mental Activities and School Opinions, Mental Activities and Collaborative Learning, Mental Activities and Student Services, and Collaborative Learning and Student Services.

Table 5

Pattern Matrix for Engagement Factors, Items and Factor Loadings

Factors and survey items	Loading
Factor 1: Mental Activities	
How much has your coursework emphasized applying theories or concepts or practical problems in new situations	.875
How much has your coursework emphasized synthesizing and organizing ideas, information, or experiences in new ways	.795
How much has your coursework emphasized making judgments about the value or soundness of information, arguments, or methods	.779
How much has your coursework emphasized analyzing the basic elements of an idea, experience, or theory	.765
How much has your coursework emphasized using information you have read or heard to perform a new skill	.691
Factor 2: School Opinions	
How much does this college emphasize providing the support you need to thrive socially	.790
How much does this college emphasize encouraging contact among students from different economic, social and racial or ethnic backgrounds	.756
How much does this college emphasize helping you cope with you non-academic responsibilities (work, family, etc.)	.714
How much does this college emphasize providing you with the support you need to help you succeed at this college	.665
How much does this college emphasize providing the financial support you need to afford your education	.484
How much does this college emphasize encouraging you to spend significant amounts of time studying	.369
Factor 3: Collaborative Learning	
How often have you participated in a community-based project as a part of a regular course	.622
How often have you discussed ideas from your reading or classes with instructors outside of class	.574
How often have you worked with instructors on activities other than coursework	.568
How often have you tutored or taught other students	.556
How often have you talked about career plans with an instructor or advisor	.412
How often have you discussed grades or assignments with an instructor	.366
Factor 4: Student Services	
How often have you used academic advising/planning?	.704
How often have you used career counseling?	.677
How often have you used skill labs (writing, math, etc.)?	.467
How often have you used peer or other tutoring?	.395

Table 6

Factor Score Correlation Matrix

Factor	MA	SO	CL	SS
Mental Activities (MA)	1			
School Opinions (SO)	.410	1		
Collaborative Learning (CL)	.457	.292	1	
Student Services (SS)	.431	.508	.413	1

Phase II: Mediation

Original target size sample for mediation analysis was 224. While 240 total participants completed the NEO-FFI-3 during the designated time parameter—February 2015 through May 2015, only 201 could be matched to CCCSSE and institutional STC data. Of these, three cases were identified as multivariate outliers and were deleted from all subsequent analyses. This resulted in a total sample size of 198 for mediation testing. The demographic information is presented in Table 4 for this sample. The mean age for this sample was 23, and 66% were female. The female proportion was slightly higher in in this sample than in Phase I (60.7%), and compared to STC population (55%). A large majority (87%) of the sample were associate level students. This is also higher than the total STC population of which 74% are associate level students. Bachelor and certificate level students were equally represented in phase II sample as the total STC population— 4% and 11% respectively.

Factor Scores

Factor scores for the four engagement factors identified in Phase I were created by summing up the cross products of each item's raw score and the factor score coefficient for each factor. Table 7 present the results of factor scores from both samples

of Phase I and Phase II to assess homogeneity of scores across both samples. Results indicate the samples were similar in regards to factor means and standard deviations. Simple *t*-tests were conducted for means of samples and all tests were not significant.

Reliability for Personality Domains

Personality domains for each of the five domains were calculated by obtaining the average score for each of the items that responded to each personality domain. Each domain has twelve items that correspond. The reliability coefficients were .81 for Neuroticism, .71 for Extraversion, .65 for Openness, .65 for Agreeableness and .88 for Conscientiousness. Neuroticism, Extraversion, and Conscientiousness were equal to or greater than .70 which indicates good reliability and that the items factored together well. Agreeableness and Openness were close to .70 but still below and their results are questionable.

Table 7

CCSSE Factor Means and Standard Deviations for Factor Analysis and Mediation Samples

	Factor analysis sample (N = 794)		Mediation sample (N = 198)	
Factor	*M*	*SD*	*M*	*SD*
Mental Activities (MA)	3.43	0.86	3.37	0.88
School Opinions (SO)	3.31	0.91	3.32	0.95
Collaborative Learning (CL)	2.23	0.78	2.17	0.73
Student Services (SS)	2.65	0.76	2.62	0.79

Table 8 presents the descriptive statistics for the variables that were used in mediation. Along with means and standard deviations; normality statistics are given as

well. All values were within limits concerning skewness and kurtosis. Variables GPA,

Collaborative Learning, and Extraversion did show some nonnormality indicated by

Kolmogorov-statistic being significant ($p < .001$).

Table 8

*Descriptive Statistics of Variables Used in Mediation Analysis (*N *= 198)*

					Kolmogorov-Smirnov	
Variable	*M*	*SD*	Skewness	Kurtosis	Statistic	*p*
GPA	2.51	.98	-.730	.071	.098	<.001
Mental Activities	3.37	.88	-.184	-.601	.058	.098
School Opinions	3.32	.95	-.311	-.891	.061	.071
Collaborative Learning	2.17	.73	.872	.174	.114	<.001
Student Services	2.62	.79	-.027	-.241	.033	.200
Neuroticism	2.07	.70	.032	-.701	.066	.038
Extraversion	2.45	.52	-.270	-.377	.090	.001
Openness	2.50	.47	.202	-.356	.067	.033
Agreeableness	2.77	.49	-.085	-.443	.053	.200
Conscientiousness	2.64	.70	-.329	-.400	.060	.084

Bivariate Correlations

Table 9 presents the simple bivariate correlations between GPA, personality

domains, and engagement factors. In this table, values above the ones in the diagonals are

correlation coefficient, and the values below the ones in the diagonals are the significance

values based on two-tailed tests for each of the correlations. This was conducted to

determine which sets of variables qualified for mediation testing. Baron and Kenny's

(1986) method requires that the predictor and outcome be related, as well as the predictor

and the mediator. Based on these prerequisites and bivariate results, Agreeableness ($r =$

.222), Conscientiousness ($r = .196$) and Neuroticism ($r = -.132$) relationship to GPA met

the criteria for further mediation testing based on relaxed alpha level of $p < .15$. All four

factors of engagement were significantly related to GPA, the strongest being School

Opinions (*r* = .251).

Table 9

Means, Standard Deviations and Intercorrelations for Variables Used in Mediation

*Analysis (*N = *198)*

Var.	*M*	*SD*	GPA	N	E	A	O	C	MA	SO	CL	SS
GPA	2.51	.979	1	-.132	-.039	.222	.087	.196	.236	.251	.236	.231
N	2.07	.705	.063	1	-.306	-.348	.039	-.646	-.220	-.209	-.117	-.223
E	2.45	.521	.581	<.001	1	.185	.304	.494	.321	.245	.310	.297
A	2.77	.486	.002	<.001	.009	1	.102	.344	.149	.337	.149	.296
O	2.51	.480	.221	.584	<.001	.151	1	.145	.416	.138	.277	.087
C	2.64	.702	.006	<.001	<.001	<.001	.041	1	.447	.405	.373	.433
MA	3.37	.878	.001	.002	<.001	.036	<.001	<.001	1	.524	.668	.612
SO	3.32	.947	<.001	.003	.001	<.001	.053	<.001	<.001	1	.458	.587
CL	2.17	.729	.001	.101	<.001	.037	<.001	<.001	<.001	<.001	1	.645
SS	2.62	.792	.001	.002	<.001	<.001	.008	<.001	<.001	<.001	<.001	1

Note: Values in the top diagonal are correlation coefficients; values in the bottom diagonal are two-tailed *p* values for each of the correlation coefficients. N=Neuroticism, E = Extraversion, A=Agreeableness, O=Openness, C=Conscientiousness, MA=Mental Activities, SO=School Opinions, CL=Collaborative Learning, SS=Student Services. Highlighted items denote intercorrelations that qualified for mediation testing.

The coefficients of each of the paths that qualified for mediation testing are highlighted in Table 9. For the domain of Neuroticism, engagement factors Mental Activities, School Opinions and Student Services were significantly related and therefore qualified for mediation analysis. For Agreeableness, all four factors of engagement were significantly related and therefore qualified for mediation analysis. All four factors of engagement were also bivariately related to Conscientiousness and thus also met conditions for mediation analysis. Based on bivariate screening, 11 mediation models qualified for mediation testing.

Simple Mediation Model Testing

The next section of results assessed each of the 11 models identified as viable for mediation testing. Each model required 3 regression steps. Step 1 consisted of regression of the outcome (GPA) on the predictor (personality domain) and represented path c in the mediation model. This represents the total effect of the predictor to the outcome. Step 2 consisted of regressing each of the mediators (engagement factor) on each of the predictors and represents path a in the mediation model. Step 3 was to regress the outcome simultaneously on mediator and predictor and represents path b and c' in the mediation model. Path b tested whether the mediator is significantly related to the outcome while controlling for the effect of the predictor. This regression also estimates the direct effect the predictor is having on the outcome aside from the effect it is having via its relationship with the mediator.

The final component of each model was to present the coefficients for the indirect effect and for significance testing of mediation using Sobel's test of significance. The results of these tests and the values used to calculate these tests are presented in Table 10. Values include unstandardized path coefficient and standard errors for paths a and b, standardized path coefficients for a, b, and c', proportion of indirect effects and significance values based on Sobel test. The following sections cover each of the mediational models tested. Lastly multiple mediation models are presented.

Table 10

Mediation Results for 11 Simple Mediation Models, Path Coefficients, and p Values

			Unstandardized				Standardized				Indirect	
Model	Pred.	Med.	*a*	*SE* (*a*)	*b*	*SE* (*b*)	*a*	*b*	*c*	*c'*	Effect	*p*
1	N	MA	-.274	.087	.242	.079	-.220	.217	-.132	-.084	.364	.028
2	N	SO	-.281	.094	.241	.073	-.209	.234	-.132	-.083	.371	.027
3	N	SS	-.251	.078	.262	.088	-.233	.212	-.132	-.085	.356	.029
4	A	MA	.269	.128	.231	.077	.149	.208	.222	.191	.140	.085
5	A	SO	.657	.131	.206	.075	.337	.199	.222	.155	.302	.016
6	A	CL	.223	.106	.279	.093	.149	.207	.222	.191	.140	.085
7	A	SS	.482	.111	.224	.089	.296	.181	.222	.168	.243	.029
8	C	MA	.559	.080	.207	.086	.447	.186	.196	.113	.423	.023
9	C	SO	.547	.088	.212	.078	.405	.206	.196	.112	.429	.013
10	C	CL	.387	.069	.254	.100	.373	.189	.196	.125	.362	.021
11	C	SS	.489	.073	.222	.095	.433	.180	.196	.118	.398	.027

Note. Pred. = predictor, Med. = mediator, N = Neuroticism, A = Agreeableness, O = Openness, C = Conscientiousness, MA = Mental Activities, SO = School Opinions, CL = Collaborative Learning, SS = Student Services. *SE(a)* = standard error for unstandardized path coefficient *a*. *SE(b)* = standard error for unstandardized path coefficient *b*. Significance based on two-tailed tests.

Model 1: Neuroticism, Mental Activities, and GPA. Table 11 presents the

regression coefficients used to assess this mediation model. In Step 1, Neuroticism was

negatively related to GPA (B = -.184, p = .063) and met the p value criteria for mediation

testing. This path c represents the total effect of Neuroticism on GPA. Neuroticism was

also negatively related to Mental Activities (path a) (B = -.274, p = .002). In Step 3 the

regression in which GPA was regressed simultaneously on Neuroticism and Mental

Activities was significant, R^2 = .062, $F(2, 195)$ = 6.495, p = .002. The relationship

between Mental Activities and GPA (path b) was also significant (B = .242, p = .003).

The direct effect of Neuroticism on GPA (path c') when Mental Activities was included

was not significant (B = -.117, p = .236) and the effect did significantly decrease from the

total effect (B = -.184 to B = -117; z = 2.196, p = .028). Roughly 36% of the effect of

Neuroticism on GPA was mitigated by Mental Activities.

Table 11

Model 1 Mental Activities Mediation of Neuroticism and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (*c*)					
Outcome: GPA					
Predictor: Neuroticism	-.184	.098	-.132	[-.378, .101]	.063
Step 2 (Path *a*)					
Mediator: Mental Activities					
Predictor: Neuroticism	-.274	.087	-.220	[-.445, -.103]	.002
Step 3 (*b* and *c'*)					
Outcome: GPA					
Mediator: Mental Activities	.242	.079	.217	[.086, .399]	.003
Predictor: Neuroticism	-.117	.099	-.084	[-.312, .077]	.236

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 2: Neuroticism, School Opinions, and GPA. The results for this model

are presented in Table 12. Regression results showed Neuroticism to be negatively

related to GPA (B = -.184, p = .063) and School Opinions (B = -.281, p = .003) in Steps

1 and 2 respectively. In Step 3 the regression of GPA on both Neuroticism and School

Opinions was significant, R^2 = .070, $F(2, 195)$ = 7.304, p = .001. The relationship

between School Opinions and GPA while accounting for Neuroticism (path *b*) was also

significant (B = .241, p = .001). The direct effect of Neuroticism on GPA in step 3 was

not significant (B = -.116, p = .240), and there was a decrease in effect from the total

effect in step 1 (B = -.184). This change in effect was significant (z = -2.216, p = .027)

indicating that School Opinions mediated the negative relationship between Neuroticism

and GPA. For this model the direct effect was equal to .629, therefore about 37% of the effect was mitigated by the mediator School Opinions.

Table 12

Model 2 School Opinions Mediation of Neuroticism and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (*c*)					
Outcome: GPA					
Predictor: Neuroticism	-.184	.098	-.132	[-.378, .101]	.063
Step 2 (Path *a*)					
Mediator: School Opinions					
Predictor: Neuroticism	-.281	.094	-.209	[-.467, -.096]	.003
Step 3 (*b* and *c'*)					
Outcome: GPA					
Mediator: School Opinions	.241	.073	.234	[.097, .385]	.001
Predictor: Neuroticism	-.116	.098	-.083	[-.309, .078]	.240

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 3: Neuroticism, Student Services, and GPA. The regressions used to assess mediation for this model, in which Neuroticism served as the predictor and Student Services served as the mediator, are presented in Table 13. Neuroticism was negatively related to GPA. Step 2 demonstrated that Neuroticism was negatively related to Student Services (path *a*) (B = -.251, p = .002). The multiple regression model in step 3 was significant, R^2 = .060, $F(2, 195)$ = 6.232, p = .002. This regression also showed a significant positive relationship between Student Services and GPA (path *b*) (B = .262, p = .003). From this regression the relationship between Neuroticism and GPA while controlling for Student Services was not significant (B = -.118, p = .234). As in the previous two models, the addition of the engagement factor of Student Services significantly decreased the negative effect of Neuroticism on GPA (z = -2.185, p = .029)

indicating that the negative effects of Neuroticism on GPA were mitigated somewhat by

Student Services. The indirect effect of Student Services accounted for about 35% of the

relationship between Neuroticism and GPA.

Table 13

Model 3 Student Services Mediation of Neuroticism and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (*c*)					
Outcome: GPA					
Predictor: Neuroticism	-.184	.098	-.132	[-.378, 0.101]	.063
Step 2 (Path *a*)					
Mediator: Student Services					
Predictor: Neuroticism	-.251	.078	-0.223	[-.405, -0.097]	.002
Step 3 (*b* and *c'*)					
Outcome: GPA					
Mediator: Student Services	.262	.088	.212	[.088, .435]	.003
Predictor: Neuroticism	-.118	.099	-.085	[-.313, .077]	.234

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 4: Agreeableness, Mental Activities and GPA. Table 14 contains the

results of the regression used to assess this model. In Step 1 Agreeableness was positively

related to GPA (path *c*) (*B* = .447, *p* = .002). Path *a* was also significant in Step 2 (*B* =

.269, *p* = .036) indicating a positive relationship between Agreeableness and Mental

Activities. Regression results in Step 3 between Agreeableness and Mental Activities

effect on GPA was overall significant, R^2 = .091, $F(2, 195)$ = 9.789, $p < .001$. Mental

Activities was also significantly related to GPA while controlling for Agreeableness (*B* =

.231, *p* = .006). Results indicated that Agreeableness indirectly influenced GPA through

Mental Activities. The path of the total effect was statistically significant as was the

direct effect (*c'*) of Agreeableness to GPA while accounting for Mental Activities (*B* =

.385, $p = .006$). However, the significance Sobel test in Table 8 indicated that the indirect

effect was not significant. Therefore this model did not meet the criteria for establishing a

mediating effect.

Table 14

Model 4 Mental Activities Mediation of Agreeableness and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (*c*)					
Outcome: GPA					
Predictor: Agreeableness	.447	.140	.222	[.170, .724]	.002
Step 2 (Path *a*)					
Mediator: Mental Activities					
Predictor: Agreeableness	.269	.128	.149	[.017, .521]	.036
Step 3 (*b* and *c'*)					
Outcome: GPA					
Mediator: Mental Activities	.231	.077	.208	[.080, .383]	.003
Predictor: Agreeableness	.385	.139	.191	[.110, .659]	.006

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 5: Agreeableness, School Opinions and GPA. Results for the model in

which Agreeableness was the predictor and School Opinions served as the mediator are

presented in Table 15. For this model Agreeableness was related to GPA. Step 2

demonstrated that Agreeableness was positively related to School Opinions ($B = .657$, $p <$

.001), indicating a significant path *a*. In Step 3 GPA was regressed simultaneously on

Agreeableness and School Opinions and was overall significant, $R^2 = .084$, F(2, 195) =

8.968, $p < .001$. In addition, the effect of Agreeableness on GPA decreased in size when

School Opinions was accounted for (path *c'*) ($B = .312$, $p = .035$). This regression also

demonstrated that School Opinions was significantly related to GPA (path *b*) ($B = .206$, p

$= .007$). Path *c'* was significantly reduced from the total effect ($z = 2.409$, $p = .016$) but

still remained significant. This model therefore met all criteria set forth in establishing a

partial mediating effect in which about 30% of the total effect on GPA can be attributed

to School Opinions.

Table 15

Model 5 School Opinions Mediation of Agreeableness and GPA

Regression steps	*B*	*SE*	β	95% CI	*p*
Step 1 (*c*)					
Outcome: GPA					
Predictor: Agreeableness	.447	.140	.222	[.170, .724]	.002
Step 2 (Path *a*)					
Mediator: School Opinions					
Predictor: Agreeableness	.657	.131	.337	.[399, .916]	<.001
Step 3 (*b* and *c'*)					
Outcome: GPA					
Mediator: School Opinions	.206	.075	.199	[.057, .354]	.007
Predictor: Agreeableness	.312	.147	.155	[.022, .601]	.035

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 6: Agreeableness, Collaborative Learning, and GPA. The regression

results for the mediational model in which Agreeableness served as the predictor and

Collaborative Learning served as the mediator are presented in Table 16. For this model,

Agreeableness was significantly related to GPA in step 1. For Step 2, Agreeableness also

had a significant relationship to the mediator of Collaborative Learning ($B = 223, p =$

.037). In step 3 the overall regression model of Agreeableness and Collaborative

Learning effect on GPA was overall significant, $R^2 = .302, F(2, 195) = 9.784, p < .001.$

Collaborative Learning was also significantly related to GPA (path *b*) ($B = .279, p =$

.003) while accounting for the effect of Agreeableness. The effect of Agreeableness on

GPA while controlling for Collaborative Learning (path *c'*) was significant ($B = .385, p =$

was still significant ($p = .020$) yet the regression coefficient decreased from the path c ($B = .339$). Additionally the Sobel test indicated that the change from the total effect of path c to the direct effect of path c' was statistically significant ($z = 2.178$, $p = .029$). Thus this model met the criteria for establishing a partial mediating effect in which about 24% of the relationship between Agreeableness and GPA could be attributed to the indirect effect via Student Services.

Table 17

Model 7 Student Services Mediation of Agreeableness and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (*c*)					
Outcome: GPA					
Predictor: Agreeableness	.447	.140	.222	[.170, .724]	.002
Step 2 (Path *a*)					
Mediator: Student Services					
Predictor: Agreeableness	.482	.111	.296	[.263, .702]	<.001
Step 3 (*b* and *c'*)					
Outcome: GPA					
Mediator: Student Services	.224	.089	.181	[.048, .399]	.013
Predictor: Agreeableness	.339	.145	.168	[.053, .625]	.020

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 8: Conscientiousness, Mental Activities, and GPA. The next model tested whether Mental Activities mediated the relationship between Conscientiousness and GPA (See Table 18). In Step 1, Conscientiousness was significantly related to GPA ($B = .273$, $p = .006$) and Mental Activities ($B = .559$, $p < .001$) in Step 2. In step 3 the multiple regression with Conscientiousness and Mental Activities predicting GPA was overall significant, $R^2 = .066$, $F(2, 195) = 6.687$, $p < .001$ as was the relationship between Mental Activities and GPA (path *b*) ($B = .207$, $p = .017$). Lastly the effect of

Conscientiousness on GPA (path c') significantly decreased from path c ($z = 2.276$, $p =$ .023) and was no longer significant ($B = .157$, $p = .148$) when Mental Activities was added. The Sobel test (see Table 8) also shows that this indirect effect was statistically significant. This model thus met all criteria for establishing full mediational in which the relationship between Conscientiousness and GPA could be fully attributed to its influence via Mental Activities. Based on the indirect effect about 42% of the effect of Conscientiousness on GPA can be attributed to Mental Activities.

Table 18

Model 8 Mental Activities Mediation of Conscientiousness and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (c)					
Outcome: GPA					
Predictor: Conscientiousness	.273	.098	.196	[.080, .465]	.006
Step 2 (Path a)					
Mediator: Mental Activities					
Predictor: Conscientiousness	.559	.080	.447	[.402, .717]	<.001
Step 3 (b and c')					
Outcome: GPA					
Mediator: Mental Activities	.207	.086	.186	[.037, .377]	.017
Predictor: Conscientiousness	.157	.108	.113	[-.056, .370]	.148

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 9: Conscientiousness, School Opinions, and GPA. Table 19 presents the results for the 3 regressions used to assess this model in which Conscientiousness served as the predictor, School Opinions as the mediator, and GPA as the outcome. In steps 1 and 2 Conscientiousness was significantly related to GPA ($B = 273$, $p = .006$) and School Opinions ($B = .547$, $p < .001$). For step 3, regression results between Conscientiousness and School Opinions on GPA were overall significant, $R^2 = .074$, $F(2, 195) = 7.744$, $p =$

.001. In this model path *b* was also significant (*B* = 212, *p* = .007*)*. Path *c'* decreased in size from path *c* and was no longer significant (*B* = .156, *p* = .138). Thus, indicating a full mediation from Conscientiousness to GPA via School Opinions. Table 8 shows the change in value from path *c* to *c'* was significant (*z* = 2.49, *p* = .013). This means that the effect of Conscientiousness on GPA can be attributed fully through the effect it has via the School Opinions. Based on the indirect effect it is estimated that 43% of the effect of Conscientiousness on GPA can be attributed to School Opinions.

Table 19

Model 9 School Opinions Mediation of Conscientiousness and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (*c*)					
Outcome: GPA					
Predictor: Conscientiousness	.273	.098	.196	[.080, .465]	.006
Step 2 (Path *a*)					
Mediator: School Opinions					
Predictor: Conscientiousness	.547	.088	.405	[.373, .720]	<.001
Step 3 (*b* and *c'*)					
Outcome: GPA					
Mediator: School Opinions	.212	.078	.206	[.059, .366]	.007
Predictor: Conscientiousness	.156	.105	.112	[-.051, .364]	.138

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 10: Conscientiousness, Collaborative Learning, and GPA. Table 20 presents the results for the 3 regressions used to assess the model in which Conscientiousness served as the predictor and Collaborative Learning as the mediator. In steps 1 and 2 Conscientiousness was significantly related to GPA (*B* = 273, *p* = .006*)* and Collaborative Learning (*B* = .378, *p* < .001). For step 3, regression results between Conscientiousness and Collaborative Learning effect on GPA were overall statistically

significant, $R^2 = .069$, $F(2, 195) = 7.235$, $p = .001$. In this model path b was also

significant ($B = 254$, $p = .012$). Path c'—the direct effect of Conscientiousness to GPA

while controlling for Collaborative Learning—was not significant ($B = .174$, $p = .095$).

The change in value of the coefficients between paths c and c' were significant ($z = 2.314$, $p = .021$). This model shows that the relationship between Conscientiousness and

GPA can be solely attributed through its indirect effect via Collaborative Learning.

Therefore this model met the criteria for establishing a full mediated effect and showed

that about 36% of the effect of Conscientiousness on GPA can be attributed via its effect

on Collaborative Learning.

Table 20

Model 10 Collaborative Learning Mediation of Conscientiousness and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (c)					
Outcome: GPA					
Predictor: Conscientiousness	.273	.098	.196	[.080, .465]	.006
Step 2 (Path a)					
Mediator: Collaborative Learning					
Predictor: Conscientiousness	.378	.069	.373	[.251, .522]	<.001
Step 3 (b and c')					
Outcome: GPA					
Mediator: Collaborative Learning	.254	.100	.189	[.057, .451]	.012
Predictor: Conscientiousness	.174	.104	.125	[-.030, .379]	.095

Note: CI = Confidence Interval, *SE* = Standard Error.

Model 11: Conscientiousness, Student Services, and GPA. For this model,

Table 21 presents the results for the 3 regressions used to assess this model in which

Conscientiousness served as the predictor and Student Services as the mediator. In steps 1

and 2 Conscientiousness was significantly related to GPA ($B = 273$, $p = .006$) and

Student Services ($B = .489$, $p < .001$). For step 3, regression results between

Conscientiousness and Student Services effect on GPA were overall significant, $R^2 =$

.064, $F(2, 195) = 6.720$, $p = .002$. In this model path b, the relationship between Student

Services and GPA was also significant ($B = 222$, $p = .020$). Path c'—the direct effect of

Conscientiousness to GPA while controlling for Student Services—was not significant (B

$= .164$, $p = .127$). The indirect effect of Conscientiousness influence via the mediator was

also significant ($z = 2.206$, $p = .027$). This simple mediation model shows that the

relationship between Conscientiousness and GPA can be solely attributed through its

indirect effect via Student Services. Based on the indirect effect it is estimated that 40%

of the effect of Conscientiousness on GPA can be attributed to Student Services.

Table 21

Model 11 Student Services Mediation of Conscientiousness and GPA

Regression steps	B	SE	β	95% CI	p
Step 1 (*c*)					
Outcome: GPA					
Predictor: Conscientiousness	.273	.098	.196	[.080, .465]	.006
Step 2 (Path *a*)					
Mediator: Student Services					
Predictor: Conscientiousness	.489	.073	.433	[.345, .632]	<.001
Step 3 (*b* and *c'*)					
Outcome: GPA					
Mediator: Student Services	.222	.095	.180	[.035, .409]	.020
Predictor: Conscientiousness	.164	.107	.118	[-.047, .375]	.127

Note: CI = Confidence Interval, *SE* = Standard Error.

Multiple Mediation Models

As a follow up to the single mediation tests, multiple mediating models were examined. This was done to determine the combined effect of all engagement factors and to assess the relative strength of effect for each of the specific effects of each mediator compared to others when all mediating factors are accounted for. This allows examination of the relative importance of each engagement factor in the overall mediation model for each personality domain tested. Table 22 presents the results of the multiple mediational models tested. For each of the models, path a, b, c and c' are presented along with each of the respective standard errors. Also included are both the indirect effects for each specific mediator in the model as well as the combined indirect effect of all mediators. The indirect effects are also presented as a percentage of total effect, and percentage of mediated effect. Lastly the p values of each indirect effect and combined effect are included.

Table 22

Multiple Mediation Results on GPA: Path Coefficients, Indirect Effects, and p Values

Model	Pred.	Med.	Unstandardized Coefficients						Indirect Effects		
			a	*SE* (*a*)	*b*	*SE* (*b*)	*c* SE(c)	*c'* SE(c')	% Total	% Indirect	*p*
12	N	MA	-.274	.087	.118	.101			17.6	34.0	.273
		SO	-.281	.094	.147	.091			22.5	43.5	.155
		SS	-.251	.078	.084	.117			11.5	22.2	.412
		Combined					-.184 .098	-.089 .099	51.6		.007
13	A	MA	.269	.128	.096	.111			5.8	20.0	.424
		SO	.657	.131	.106	.093			15.6	54.0	.266
		CL	.223	.106	.142	.135			7.1	24.5	.347
		SS	.482	.111	.003	.127			0.3	1.1	.981
		Combined					.447 .140	.318 .148	28.8		.040
14	C	MA	.559	.080	.061	.114			12.5	19.4	.594
		SO	.547	.088	.140	.092			28.1	43.5	.139
		CL	.387	.069	.126	.136			17.9	27.7	.361
		SS	.489	.073	.033	.127			5.9	9.2	.795
		Combined					.273 .098	.097 .111	64.3		.003

Note. Pred. = predictor, Med. = mediator, N = Neuroticism, A = Agreeableness, O = Openness, C = Conscientiousness, MA = Mental Activities, SO = School Opinions, CL = Collaborative Learning, SS = Student Services. *SE (a)* = standard error for unstandardized path coefficient *a*. *SE (b)* = standard error for unstandardized path coefficient *b*. *c* = total direct effect of predictor on GPA, *c'* = residual direct effect. Significance based on two-tailed tests.

Model 12: Multiple Mediation Model for Neuroticism, Engagement, and

GPA. A multiple mediation model was run with Neuroticism serving as the predictor and

Mental Activities, School Opinions, and Student Services serving simultaneously as

mediators, and GPA as the outcome. For this model a multiple regression was run with

Neuroticism, Mental Activities, School Opinions, and Student Services predicting GPA.

The overall model was significant, R^2 = .085, $F(4, 193)$ = 4.473, p = .002. Each of the

regression coefficients for the mediators of Mental Activities, School Opinions, and Student Services represent the *b* path coefficients. The combined effect of all mediators was significant ($z = -2.725$, $p = .007$) and accounted for about 51.6% of the total effect of Neuroticism to GPA (See Table 22). School Opinions had the largest specific effect accounting for 43.5% of the total indirect effect, followed by Mental Activities accounting for 34%, and Student Services accounting for 22.2%. When all of the mediators were included in the model, none of the specific indirect effects for a single mediator were significant. This is not surprising given the intercorrelations among the mediators and lack of statistical power to detect a specific mediator effect.

Model 13: Multiple Mediation Model for Agreeableness, Engagement, and GPA. For this model Agreeableness served as the predictor and all four factors of engagement as mediating variables. The multiple regression of Agreeableness, Mental Activities, School Opinions, Collaborative Learning, and Student Services was significant in predicting GPA, $R^2 = .107$, $F(5, 192) = 4.586$, $p = .001$. In this regression model the partial regression coefficient of Agreeableness and GPA with all other engagement factors included was still significant ($B = .318$, $p = .033$) indicating a partial mediation even after accounting for all mediating factors. As can be seen in Table 22, the combined indirect effect was significant ($z = 2.059$, $p = .039$). The total mediated effect for all mediators included accounted for 28.9% of the relationship between Agreeableness and GPA. When examining the specific indirect effects for each mediator, the largest effect was for School Opinions accounting for 54% of the indirect effect, followed by Collaborative Learning accounting for 24.5%, Mental Activities accounting

for 20%, and Student Services accounting for 1.1%. However, none of the specific partial indirect effects were significant.

Model 14: Multiple Mediation Model for Conscientiousness, Engagement, and GPA. For this model, multiple mediation was conducted with Conscientiousness as the predictor, all four factors of engagement as mediators, and GPA as the outcome. The regression of Conscientiousness, Mental Activities, School Opinions, Collaborative Learning, and Student Services was significant in predicting GPA, $R^2 = .089$, $F(5, 192) = 3.746$, $p = .003$. As in the simple mediation models, the effect of Conscientiousness was no longer significant after the mediators were introduced into the regression model ($B = .097$, $p = .386$). This again represents a complete mediation. The total combined indirect effect for all mediators was significant ($z = 2.947$, $p = .003$) (See Table 22). The combined effect was equal to .643 meaning that about 64.3% of the effect of Conscientiousness to GPA can be attributed to its effect via all the mediators of student engagement. The mediator with the largest impact was School Opinions accounting for 43.5% of the indirect effect, followed by Collaborative Learning accounting for 27.7%, Mental Activities accounting for 19.4%, and Student Services accounting for 9.2%.

Conclusion

This chapter presented the findings of this research study. Exploratory factor analysis revealed four factors of engagement: Mental Activities, School Opinions, Collaborative Learning, and Student Services. These four factors were derived from 21 items contained within the CCSSE. These factors and their corresponding items were

similar to the original results from CCSSE researchers, but are in line with other researchers that have found differential results for particular populations.

Factors of engagement were then used to test various mediating models on the mediating effects these factors of engagement had on the relationship between personality and GPA. A total of 11 simple mediation models were tested using Baron and Kenny's (1987) regression steps approach. An additional three multiple mediation models were tested using step outlined by MacKinnon (2008).

For Neuroticism, engagement seems to mitigate the negative effect Neuroticism can have on GPA. The relationship between Agreeableness and GPA was partially mediated by School Opinions and Student Services. Agreeableness showed a partial mediation even when all engagement factors were included in the multiple mediation models. For Conscientiousness, a full mediating effect was observed for all engagement factors in simple mediation models. Similarly full mediation was observed in the multiple mediation models. For all mediation models, School Opinions had the largest effect on GPA.

The next chapter will discuss in detail how these results compare to other research regarding latent factor structures contained within the CCSSE. Mediation analysis also found evidence for the hypothesis that certain aspects of personality influence academic performance, and that engagement is a mediating variable for this relationship. The next chapter will also discuss implications of these findings, and how this can lead to positive social change for Hispanic, postsecondary educational outcomes.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

In this final chapter of this research I will provide an interpretation of findings for Phases I and Phase II of this study. First, an interpretation and summary of findings are provided including comparison to how these findings relate to other previous research. Next the implication of these findings will be discussed as they relate to FFM of personality and student engagement. A review of how these findings may contribute to social change will then be addressed along with recommendations for action. Lastly, limitations and future research recommendations will be provided.

Summary of Results

This study sought to explore the relationship between personality, engagement and academic performance for Hispanic, two-year postsecondary students. In the first phase of this study, I conducted factor analysis to derive factors of engagement for Hispanic students at STC. Results revealed four main factors of engagement contained within the CCSSE. They are Mental Activities, School Opinions, Collaborative Learning, and Student Services.

The subsequent phase of this research explored whether these factors of engagement mediated the relationship between personality and academic performance. Results showed that Agreeableness and Conscientiousness were positively related to academic performance. For Agreeableness, School Opinions and Student services met criteria for establishing partial mediating effects. However, School Opinions accounted

most of the unique variance and most of the indirect effect when multiple mediation was tested.

For Conscientiousness all factors of engagement showed evidence of full mediation. This was true for the simple mediation models as well as the multiple mediation models. School Opinions again was the largest engagement factor that accounted for the relationship between Conscientiousness and GPA. While Neuroticism was not statistically significant, it did have a negative relationship with academic performance that met the relaxed alpha criteria of .15. For Neuroticism, Mental Activities, School Opinions and Student Services partially mediated the relationship. In the multiple mediation model School Opinions was also the strongest mediating factor.

Interpretations

Phase I: Factor Analysis Interpretations

Factor analysis reveal four latent factors of engagement contained within the CCSSE. While 39 items were originally tested, only 21 items were retained in the final factor solution. Four factors were Mental Activities, School Opinions, Collaborative Learning, and Student Services. These four factors explained 57.1% of the total variance of the 21 items. The interpretation of the factors resembled factors that were present in the original CCSSE factor structure in the MBF (Marti, 2004) with some differences. In the MBF, nine factors were derived. These nine factors proved useful to interpreting engagement factors derived in the present analysis. For this reason, factor names were kept consistent to original factor names as labeled in original CCSSE factors.

Five items were included in the interpretation of Mental Activities factor (see Table 6). This factor is similar to the factor manifest in the work of Marti (2004) and Angell (2009) except for the item of "[w]orked hard than you thought you could to meet an instructor's standards or expectations," which is not included in this factor solution. As can be seen in Table 6, the item that loaded highest on this factor was "How much has your coursework emphasized applying theories or concepts or practical problems in new situation." This factor represents the amount of mental activity to which students apply to their coursework. In additional to the amount of activity, this factor also represents a deeper level of processing of information beyond simple memorization of course lectures. This is close to what others in the field refer to as *time-on-task* (see Chickering & Gamson, 1987; McClenney, 2006) and may also mirror academic challenge, as conceptualized by the CCSSE benchmark (Marti, 2004).

School Opinions factor consisted of five items and was also manifest in Marti (2004) and Angell (2009). One item that loaded on this factor in CCSSE research but not in this solution was "[e]ncourage contact among students from different economic, social and racial or ethnic backgrounds." It is interesting is that the top three items that loaded highest on the factor were not directly related to academics but related to helping students "thrive socially," "encouraging contact among students from different…backgrounds," and "helping you cope with non-academic responsibilities" (see Table 6). This factor is similar to the Support for Learners CCSSE benchmark (Marti, 2004). School Opinions factor centered on students' opinions on the level of support the institution provides them in a variety of dimensions.

Collaborative Learning consisted of five items that centered on the level of interaction students have with others on campus in an educationally meaningful manner. Collaborative Learning differed somewhat than the CCSSE factor and only contained two items in the original CCSSE factor (Marti, 2004). Additional three items that are contained in this factor are part of the Faculty Interaction factor in the MBF. Results are similar to Nora et al.'s (2011) finding that collaborative learning includes interaction with students and faculty as one factor. CCSSE researchers extracted interaction with students and faculty as two separate factors. The item with the highest factor loading (see Table 6) was "[h]ow often have you participated in a community-based project as a part of a regular course."

Student Services closely resembled the factor in the MBF (Marti, 2004) with the only exception being the item related to usage of computer labs—which was not retained in this factor solution. Student Services items focus on the amount of usage students reported with various services such as advising and tutoring services. The item that loaded highest on this factor was "[h]ow often have you used academic advising/planning." This factor shows that tutoring type services and advising type services factored together. Indicating that a student who is likely to utilize use tutoring academic support services is also likely to utilize advising type services.

Factors that are included in the nine-factor solution of the MBF but are not manifested in this research are: Academic Preparation, Class Assignments, Exposure to Diversity, and Information Technology. It is unclear whether the differences in the factor structure resulted from the particular population used or the methodology. Angell (2009)

used principal axis factoring with oblique rotation but used all CCSSE items. Marti
(2004) used a variety of methods to extract factors including principal factor analysis and
oblique rotation but confirmed factor structure with confirmatory factor analysis.

One of the main criteria that I used to establish factor structure for this analysis
relied in part on Horn's parallel test, which determines if the factors extracted and their
corresponding eigenvalues are the results of chance. This is what led to many factors and
items not meeting the cut-off for inclusion in factor structure. Other researchers in this
area (see Angel, 2009; Marti, 2009; Nora et al., 2011) did not report using Horns parallel
test for factor confirmation. Given the large sample of cases in CCSSE factor extraction,
a larger sample size may yield more of these factors as qualifying via Horn's test of
chance extraction. Or, it may be that for this population these factors do not exist and
represent the uniqueness of the institution.

CCSSE has received some critical feedback from researchers particularly in
regards to the factor structure (Angell, 2009; Nora et al., 2011). While this analysis did
show some variations in factor structure, factors extracted were similar to the original
factors in CCSSE research (Marti, 2004). While other researchers have critiqued the
factor structure because they have not been able to reproduce these findings, this may
have been due to their methodology. For example, Angell (2009) attempted to replicate
factor structure but used all CCSSE items while the original factor analysis contained
only 39 items. Nora et al. (2011) also conducted factor analysis, but attempted to
replicate the benchmarks of student engagement contained within the MEEP. CCSSE
researchers however point out that benchmarks are not factors and should not be

considered as such (McCormick & McClenney, 2011). This is the reason two models of student engagement are provided. The MBF represents the best statistical fit to the data and resemble factors (Marti, 2004). While the MEEP was informed by the MBF, the benchmarks contained in the MEEP do not represent factors but represent conceptually related items that are grouped together. The benchmarks were created for quick summary of results that can be communicated to administrators.

Phase II: Interpretations for Mediation

For interpreting the various mediation models tested, Table 23 presents each of the personality domains and mediators tested and two superordinate columns. Each column presents the percentage of total effect and the rank order in terms of the size of each effect of the mediators for both simple and multiple mediation models. Rank ordering allows for easy comparison of the relative effects of the simple and multiple mediating models to assess amount of change each mediator had in terms of its effect from simple to multiple mediation.

Neuroticism models. Neuroticism was negatively related to GPA ($r = -.132$) and while not statistically significant, did meet criteria for further mediation testing. Those high on this trait have limited ability to control and regulate their negative emotions such as hostility, depression, and anxiety (McCrae & Costa, 2003). This is consistent with most other researchers who have not found any significant effects to GPA (Richardson et al., 2012; Trapmann et al, 2007) and when effects are found, the effects are typically small negative effects (O'Connell & Sheikh, 2011; McAbee & Oswald, 2013). In this case, Neuroticism is having a negative effect on GPA, yet engagement mitigates these

negative effects. While neither the total effect nor the direct effect (path *c* and *c'*

respectively) in the simple or multiple mediation models were significantly related to

GPA, the change in paths *c* to *c'* were significant for all models tested. Therefore one can

conclude that the negative relationship between Neuroticism and GPA is significantly

reduced via Mental Activities, School Opinions, and Student Services.

Table 23

Percentage of Total Effect and Rank Order of Mediators for Simple and Multiple

Mediation

Predictor	Mediator	Simple mediation model		Multiple mediation model	
		% Total Effect	Rank	% Total Effect	Rank
N	MA	36.4	2	17.6	2
	SO	37.1	1	22.5	1
	SS	35.6	3	11.5	3
A	MA	14.0	3 tie	5.8	3
	SO	30.2	1	15.6	1
	CL	14.0	3 tie	7.1	2
	SS	24.3	2	0.3	4
C	MA	42.3	2	12.5	3
	SO	42.9	1	28.1	1
	CL	36.2	4	17.9	2
	SS	39.8	3	5.9	4

Note. N=Neuroticism, A=Agreeableness, O=Openness, C=Conscientiousness, MA=Mental
Activities, SO=School Opinions, CL=Collaborative Learning, SS=Student Services.

Examination of the relative size of effects of each mediator one can conclude

from Table 23 that School Opinions has the largest mediating effect in both simple and

multiple mediation models. School Opinions accounted for 37.1% of the total effect and

all other simple mediators were about equal in size. However, when all factors of

engagement were included, the total indirect effect increased to 51.6%. In the multiple

mediator models, School Opinions accounted for most of the mediated effect (43.5%) and the largest percentage of total effect (22.5%), followed by Mental Activities which accounted for 34.0% of the indirect effect, and Student Services accounting for about 22.2% of the indirect effect. This indicates that School Opinions is accounting for more unique variance.

Results indicate that while Neuroticism may be negatively related to GPA, engagement may serve as a process through which individuals may overcome the negative aspects of pursuing their degree. This is also similar to other findings that Neuroticism has been linked with low levels of academic satisfaction (Trapmann et al., 2007). From this analysis it seems that part of this dissatisfaction may be synonymous with negative school opinions. Furthermore, negative School Opinions may dissuade students high on this trait from seeking out needed services—ironically being those that may need them the most.

Agreeableness models. Agreeableness was significantly related to GPA and had the largest relationship on GPA ($r = .222$) than other personality traits. In the simple regression between Agreeableness and GPA R^2 was equal to .049 which means that about 5% of the variance in GPA can be explained by Agreeableness. Therefore, while significant, this was still a relatively small effect. The six facets of this trait are: trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness. While the results from other researchers have provided mixed findings on the relationship between Agreeableness and academic performance, some have found positive effects (Furnham, 2012; McAbee & Oswald, 2013, O'Connell & Sheikh, 2011, Poropat, 2009; Trapmann et

al., 2007) though these effects are typically small and detected with large meta-analytical samples that render such small effects of little practical significance.

The fact that Agreeableness had a larger effect on GPA than other traits may represent something unique about the population under investigation. Though it is unclear whether this relationship is generalizable to other community college students or is something unique for Hispanics. There is some evidence that this relationship can change as a function of educational level. For example, Trapmann et al. (2007) detected differences in level of study and the relationship with Agreeableness and grades such that the positive relationship was stronger for basic studies than for main studies students, and the relationship was actually negative for masters' students. The effects were small and the authors concluded that while significant, these findings were not substantial. However, they only included studies conducted at universities. This two-year community college population may more truly represent a different level of education and explain why this effect was more robust and had a larger effect.

For the Agreeableness simple mediation models and multiple mediation models, there was only partial mediating effects indicating that some other factor may be present that is influencing this effect that is not accounted for by engagement. Another alternative explanation may be with noise contained within the data given that the Cronbach's alpha for this trait was equal to .65. Also interesting in the simple mediation models was that only School Opinions and Student Services had a significant mediating effect. While Mental Activities ($p = .085$) and Collaborative Learning ($p = .085$) were close, they did

not make the cut-off value of $p < .05$. Since the effects were small, a larger sample size may have allowed for detection of this small effect.

As was with the Neuroticism models, School Opinions was the largest mediating effect and accounted for 30.2% of the total effect in the simple mediation model. In the multiple mediation models the total indirect effect was reduced to 28.8%, again pointing to some possible measurement error of this trait. School Opinions accounted for 54% of the indirect effect, yet Student Services only accounted for 1% of the indirect effect after accounting for School Opinions—dropping from 24.3% in the simple mediation model (see Table 23). In this model it is presumed that most, if not all, the variance associated with Student Services can be accounted for by School Opinions. This again lends support to the notion that by increasing School Opinions one would expect a consequent increase in Student Services. It may also be that Agreeable students are more likely to develop positive School Opinions which acts as an active force in them pursuing needed services that enable them to succeed academically.

Conscientiousness models. Conscientiousness was significantly related to GPA ($r = .196$). Yet again, the effect was small and accounted for about 4% of the variance in GPA. The six facets of this trait are: competence, order, dutifulness, achievement striving, self-discipline, and deliberation. Many other researchers have documented this relationship with positive student outcomes (Corker et al. 2012; Furnham, 2012; McAbee & Oswald, 2013; O'Connor & Paunonen, 2007; Poropat, 2009; Trapmann et al., 2007) and has been shown to be the most robust predictor of all FFM personality traits across populations and student success criteria.

In all simple and multiple mediation models with Conscientiousness the effect on GPA was fully mediated by engagement factors. In the simple mediation models the effect was largest for School Opinions resulting in 42.9% of the total effect, all other factors were similar in size in the simple mediation models followed by Mental Activities accounting for 42.3%, Student Services accounting for 39.8% and Collaborative Learning accounting for 36.2% (see Table 23). When all engagement factors were included in the model the total indirect effect increased to 64.3%. Again School Opinions had the largest proportion indirect effect (43.5%) followed by Collaborative Learning (23.7%), Mental Activities (19.4%) and Student Services (9.2%). As was with Neuroticism and Agreeableness, when all mediators were included, the power of all other mediators dropped—with the largest drop being for Student Services. This again shows that School Opinions is accounting for the majority of the unique variance, and that the majority of the relationship between Student Services and GPA can be explained by its relationship to School Opinions.

Given that all four factors of engagement demonstrated full mediation and the proportion of indirect effect via engagement was the largest for this trait amongst other traits tested, it may be that Conscientiousness link to academic performance is due to willingness to engage with the institution and do whatever it takes to be successful. This is consistent with other findings that show the behaviors that contribute to this relationship were related to various aspects of student effort and goal orientation (Corker et al., 2012; Noftle & Robins, 2007; Richardson et al., 2012). Engagement in such cases

may resonate or be similar to these constructs of student effort and future research should explore the similarity between effort-like constructs, motivation and engagement.

Implication for Five-Factor Model of Personality

Given there have been consistent findings on the effect of Conscientiousness and GPA and other personality traits have yielded mixed results, O'Connor and Paunonen (2007) recommend that further research in the area of personality and academic performance should move beyond simple bivariate relationships and, amongst other recommendations, explore mediating and moderating processes. This present analysis follows such recommendations in testing mediation. And, while not directly focused on analysis of moderation, it does show that a possible moderating effect in the relationship between Agreeableness and GPA exists for this population of Hispanic, two-year college students. Other research has shown that while there were no effects for Agreeableness and GPA for White women, there was a positive effect for African-American women (Steel-Johnson & Leas, 2013). More research should seek to replicate these findings to determine if in fact these results similarly do present a moderating influence for Hispanic two-year college students, or only spurious results. While most of the other research on the relationship between personality and academic performance had been done with four-year university students, this is the first to look at this relationship with two-year community college students and the first with an exclusively Hispanic population.

Extraversion and Openness were not significantly related to GPA which is consistent to other researchers that have found mixed findings on the relationship between these traits and academic performance (Trapmann et al., 2007).

This study begins to show how personality can affect student performance. While School Opinions was the largest mediator across all personality types, we can conclude some universal factors that lead to student success across personality. A common pattern that did arise across personality traits was that School Opinions had the largest mediating effect on GPA and School Opinions could account for most of the variance associated with Student Services. Mediating models also pointed to differential size of mediating effects for different personality traits. Conscientiousness had the largest effect that was due to mediating factors, followed by Neuroticism and Agreeableness. It may be that while engagement may help students of all personality types, it is a bigger factor for Conscientiousness than other traits.

Lastly, as has been found in other research, the amount of variance explained by personality traits was relatively low. In both the bivariate correlations and all regressions, all factors of engagement had a larger impact on GPA than did any of the personality traits. This is consistent with research that has found that educational specific constructs such as academic self-efficacy and academic goal setting are stronger predictors of performance than broad general personality traits (Richardson et al., 2012; Robbins et al., 2004). While broad personality traits are useful in gaining an understanding of student experiences, specific traits and educationally relevant constructs such as student effort, academic motivation, and task-specific goal setting may be more powerful in explaining these relationships.

Implications for Theory of Student Engagement

Since this analysis used localized factors it is not directly comparable to other

research that has examined engagement and student outcomes. These results however do

show a consistent general positive relationship between engagement and student

performance (Mandarino & Mattern, 2010; Marti, 2009; McClenney & Marti, 2006).

Mental Activities was a significant mediator in relation to the models of

Neuroticism and Conscientiousness. Similarly, McClenney and Marti (2006) found that

of all engagement factors, Mental Activities was the most robust predictor of GPA.

However, Mental Activities in this analysis did not present itself as the largest effect

relative to other engagement factors. The present study found School Opinion to have the

largest effect on GPA both in bivariate correlations ($r = .251$) and in the amount of

indirect effect associated with this factor across personality traits. When examining the

factors of engagement McClenney and Marti (2006) did not find very many instances of

School Opinions being significantly related to student success measures. This may be due

to the fact that they included multiple regressions with control variables as well as

looking at the net effects of all engagement factors. However, even when using multiple

mediation, the effects were largest for School Opinions across all personality traits and

accounted for much of the unique variance in the models tested.

Positive School Opinions may be a manifestation of the institution as an HSI.

Other researchers have found that Hispanic student attending HSI's saw their campus as

more supportive than those attending PWI's (Laird et al., 2007). It may be that Hispanic

students and possibly other minorities may initially feel a sense of distrust with college

settings. This may be due to what others claim is a cultural mismatch between their upbringings and the European ideals of institution (Ojeda et al., 2011). Subsequently when students move past this distrust and develop positive School Opinions they thus begin to further engage at the institution. It may also be due to the fact that many Hispanics and two-year college students are first-generation students. Without the guidance and preparation as they venture out into a novel environment, such students may feel lost at the college and not seek out services due to this isolation. In such cases, developing positive School Opinions is a precursor to seeking out services and engaging at the college. This may be why School Opinions is a larger factor for Hispanics. Further research is needed to determine if findings are reliable for other Hispanic student populations.

Student Services factor did show a small positive effect on GPA accounting for 11.5% for total effect in the Neuroticism models, .3% for the Agreeableness models and 5.9% for the Conscientiousness models. Other research by McClenney and Marti (2006) showed that Student Services as a factor was more strongly related to persistence measures and not consistently linked to GPA. Further research should examine if Student Services is more related to long-term outcomes such as persistence and degree completion for Hispanic populations.

School Opinions had the largest effect on GPA in all mediation models and Student Services' power decreased in the multiple mediation models. Student Services is as effective as School Opinions are and that one can similarly leverage the benefit that student services has on student outcomes by influencing student opinions. It may be that

students must first develop favorable opinions about the school, which then leads them to seek out services they need, which then leads to increased academic performance. Though further research is needed to gain support for this idea and will be discussed later in this chapter.

This study lends support to the notion that certain characteristics of a student, the inputs in the IEO model, influence the manner in which students engage and interact with the institution. For example, some students just may be more inclined to seek out services from the institution. From the findings it showed that the processes between personalities and GPA were different. While there were universal findings, such as School Opinions having the largest effect for all personality models, other models differed on which engagement factors were significant, the relative size of the mediators, and the size of the total mediating effects.

Findings such as this lend support to the notion described by Nora et. al. (2011) that behaviors and attitudes need to be incorporated for a true holistic concept of student engagement. Behaviors that contribute to engagement differ depending on the individual on both a qualitative and quantitative nature. Such behaviors may thus take on different meaning and lead to different outcomes. Some individuals may go through the motions of engagement and subsequently receive little benefit. While others may apply more effort in their engagement behaviors and consequently receive more benefit. This is consistent with other theories of involvement proposed by Astin (1984) which state psychological energy or "cathexia" is what is needed to produce meaningful student outcomes. This was made evident by the fact that full mediation was found for Conscientiousness but not for

Agreeableness, leading one to believe that Conscientious students may engage more frequently and with more effort.

Social Change Implications

STC serves an area of the United States that has high poverty rates and low educational attainment rates (U.S. Census Bureau, n.d.). STC thus serves as a driving force in the betterment of the area it serves. STC is also an HSI with a 95% Hispanic population (STC, 2015). HSI's are a crucial component to providing rich, relevant and culturally sensitive educational experiences to students who may be underserved. This study informs part of the puzzle in what institutions can do to in order to create environments where their students can thrive and achieve to their full potential.

This study can have an effect in this mission by informing policy, practice and interventions aimed at ensuring the success of the student population. Furthermore, this study begins a dialogue on what aspects of personality and engagement are significant for Hispanics and community college students—both of which have typically been shown to be underserved groups. Implications from this and other similar studies can be used to inform what type of services most benefit these underserved populations as the nation, state, and community strive to increase educational attainment rates.

Personality is a relatively stable characteristic which makes it a useful construct in examining how human universals are related to various outcomes but do little in informing practitioners in education how to facilitate academic performance and degree attainment. Strengths of using personality and the FFM are that they are well-established and universal (McCrae & Costa, 1997). These factors are stable and have been

documented since 1936 and refined up until the present. Engagement on the other hand, while a more elusive concept, lends itself to developing recommendations for change. Engagement is a result of the institutional environment, the individual, and the interaction between the two (Chickering & Gamson, 1987; Kuh, 2009). The goal then is not to change a students' personality, but to examine the methods by which students of various personalities achieve success in efforts to provide and modify educational environments so that they may achieve at their full potential.

By examining the crossroads between the two constructs under the conceptual framework of the IEO model (Astin & Antonio, 2012), we can begin to understand this interaction and how interactions between the Inputs and the Environments influence the Outputs. These findings can be leveraged to facilitate student success outcomes. By furthering the knowledge in these areas we can begin to design educational environments that nurture learning and success for individuals of all personality types.

<div align="center">**Recommendations for Action**</div>

For STC and other institutions, knowledge of the relationship between personality and academic success should not be used as admission or placement criteria (Poropat, 2009; Trapmann et al., 2007). First, the relationship between personality factors and GPA, while significant, explained a relatively small portion of the variance in GPA. Also, as this study shows, certain behaviors can change this relationship. Moreover, as other authors have noted (Poropat, 2009; Trapmann et al., 2007) it would undoubtedly lead to faking and practicing effects on personality assessment as students become aware that such assessments are considered for admission criteria or placement.

Knowledge of how students of various personalities achieve success can help college staff recommend action plans for students of various personality dispositions on how they can be successful and what strategies they may utilize to ensure their success. What others have recommended (Poropat, 2009; Trapmann et al., 2007) is for this knowledge to be used to develop recommendations for students on how to navigate through the college to achieve success by overcoming some of the risk factors associated with such traits.

Obstacles such as registration deadlines, financial aid forms, waiting in long lines, college orientations, advising and so on—what Bean and Eaton (2001) refer to as "bureaucratic interactions" (p. 75)—can deter students from achieving. Bean and Eaton go on to state that "emotional reactions to college environments motivate students to engage in adaptive strategies" (p. 75). What is not stated in this statement but inferred is that the student may not develop adaptive strategies due to poor emotional regulation and thus fail to engage further at the college—particularly for those high on Neuroticism.

Based on these findings one can provide training workshops that can be delivered through various points of contact with students such as college orientations, advising sessions, counseling sessions, freshmen seminar courses, or student workshops that focus on emotion regulation. What is interesting is that the less neurotic or emotionally stable one is, the more likely one is to have positive school opinions, and thus more likely to succeed. Therefore, emotion regulation can be incorporated into counseling sessions with students, college orientation, skills training workshops, and freshmen courses that teach college skills. Such trainings can focus on how emotion regulation can apply specifically

to barriers and negative encounters at the institution in their pursuits to a college degree. Similarly goal setting has been shown to increase performance when direct and proximal goals are set (Latham & Brown, 2006). This could also be handled by creating a training or orientation where students are taught goal setting, and in that process brainstorm possible barriers that they may encounter and how they will deal with those problems.

Agreeable students are more likely to have favorable opinions, and these opinions are resilient to negative experiences. However, looking at non-agreeable students, it may be that such students may be eliciting aversive reactions from others such as faculty, staff, and peers. Training can focus on building assertiveness skills to teach student how to effectively deal with others and obstacles they face and to assert themselves in asking for what they need without coming across as hostile. Similarly, college staff and faculty can be trained to effectively deal with individuals that are not agreeable in their efforts to help them succeed.

For Conscientiousness, while there was a small positive effect, this effect was fully mediated by engagement. Other research has shown that the main mediating factors from Conscientiousness to performance are related to goal motivation, effort, and self-discipline (Corker et al., 2012; Noftle and Robins, 2007; Richardson et al., 2012). It seems that conscientious students have the motivation needed to achieve their degree, which in turn may drive them to apply more effort and the ability to regulate their behavior to keep applying effort to achieving such goals. This analysis showed that engagement is part of this process as well. Therefore, the important aspects of this

relationship should be included in training and workshops given to students. Training can focus on developing time-on-task, goal setting, and motivation.

Goal setting would undoubtedly also help those who may be low on Conscientiousness. It may help students low on Conscientiousness to maintain their drive, and would help those high on Neuroticism to become resilient to the negative aspects of achieving a college education and the negative emotions it may elicit in order to fulfill their educational goals.

While it is important to consider personality in developing recommendations, more efforts should be directed at the implications engagement has. For one, engagement has a larger impact on success. Additionally, change in this area is at the helm of the institution more so than personality. This analysis shows that while some engagement factors have similar effects across personality domains, others are more nuanced in this effect. Given the findings of this study, increasing School Opinions may have the largest return on student success outcomes. Every point of contact a student has with the college from website visits, college recruiters, advisors, registrar staff, to faculty, has the ability to develop favorable or unfavorable School Opinions. In the model proposed by Bean and Eaton (2001), a student forms an attitude about the college early on in their interactions with the college, these interactions combined with their personality lead them to develop attitudes and opinions about how supportive the college is. From these findings it seems that such favorable School Opinions will translate into the student seeking out services when needed.

While the college already does much for creating these favorable school opinions, the college can be mindful of these findings in redesigning and developing new interventions for students that span all points of contact with students such as school web design, registration, advising, college orientations, tutoring labs and into the classroom. Given most of the relationship between Student Services and GPA can be accounted for by School Opinions, in ensuring students seek out and use student services when they are needed, while it is important for college support staff to make students informed of student services available to them, it is also critical for the student to believe the environment is supportive.

The item that loaded the highest on School Opinions was concerned with the social support student believes the institution provides. This can have far reaching implication for college interventions and is consistent with the ideas of engagement and the reasoning behind developing extra-curricular activities on campus. This also lends support and confidence that investment of resources towards such activities are well spent and provide a return in terms of student performance. While the items of encouraging contact among students of various backgrounds, may not be particularly relevant to a student body that is 95% Hispanic, this can be interpreted in a general sense that encouraging contact among students is critical and is similar to helping students thrive socially.

The degree to which Mental Activities influenced GPA was a substantial effect for Neuroticism and Conscientiousness. Mental Activities are students' perception of the degree to which their coursework emphasizes deep processing of material and is similar

to academic challenge benchmark. Therefore, in making the school a supportive environment it is important not to diminish learning and deep processing in lieu for a supportive environment.

Collaborative Learning did not meet criteria to be tested as a mediator for Neuroticism models. Nor did it show to be a significant mediating effect in the single mediator models for Agreeableness. However, for the Conscientiousness models it rose to rank number two in terms of size of effect of mediators (See Table 23). Collaborative Learning is in line with many new interventions that focus on active learning strategies (Chickering & Gamson, 1987). Given the findings showing a relatively large effect for Conscientiousness, colleges should continue to develop such curriculum. It is also reasonable to believe that active learning classroom may affect all areas of engagement. For instance, such curriculum redesign focus on group interaction and group work which should increase the amount of Collaborative Learning, but also School Opinions and the degree to which students believe the institution fosters them to thrive socially. Also, considering the emphasis that active learning has on deep processing of coursework beyond rote memorization and lectures, this should also increase Mental Activities. However, given Collaborative Learning was only a significant mediator with Conscientiousness, the implementation of such redesigns should be limited as students with differing traits may not particularly find this redesign helpful. In fact, future research should examine how personality and engagement manifest on outcomes within these active learning classrooms to determine if such environments are conducive to learning across personality traits.

Limitations

Exploratory factor analysis yielded factors that only explained 57.1% of the variance. While the factors met Horn's parallel test, there was still a substantial proportion of the variance not explained by factors extracted. Even though there is evidence that there may be latent factors of engagement, even the factor scores are only an estimation of the scores if they would have been actually measured. Replication is necessary for these factors to be given more weight and further research should seek to replicate these factors. Others have shown similar findings but more work is needed in developing theoretically and empirically sound factors of engagement.

More importantly, one of the main limitations of the factors of engagement is what is not included in the factors. Many factors included in the original CCSSE factors (Marti, 2004) did not manifest in this research. Additionally, there are undoubtedly other behaviors that are contributing to student success that were not included in these factors or in CCSSE instrument. But as the CCSSE researchers mention (McCormick & McClenney, 2011), the instrument is not perfect but the knowledge gained from the survey is better than not having any information.

Factors of engagement, and the CCSSE instrument, are a start to begin exploring mediating effects. However, there are many other constructs that could be examined for mediating influences on the relationship between personality and student performance. Future research and theoretical investigation should also seek to uncover how much engagement overlaps with other constructs that may represent similar educationally relevant behaviors.

This was an exploratory analysis given the little research that exists in the cross section meeting point between engagement and personality. Mediation analysis only tests an assumption of causality (Frazier et al., 2004). The strength and validity of the models depend not only on statistical tests but also on the soundness of the model and the appropriateness of the steps in the process. All conceptual models are only a heuristic for understanding real-world complex processes (Jaccard & Jacoby, 2010). Given the dynamic nature of student experiences, the causal assumption implicit within the IEO model, and the manner it has been applied to this analysis, the validity of the model is at best an assumption—albeit an assumption with theoretical and empirical support. However, it may be that GPA influences engagement and negative personality traits such as Neuroticism only exacerbate this influence. In fact, Bean and Eaton's (2001) model, while does account for personality as a pre-characteristic, also incorporates feedback loop processes under which outcomes such as grades influence certain psychological processes which in turn influence educational behaviors. Therefore, while the analyses present an indication and support of a causal model, it only applies to a given moment in time and therefore it is still unclear where or how these processes develop and are maintained across time. This would require further testing.

Sample size for this study was slightly lower than expected. While the college under study has many technical workforce programs, they were underrepresented in this study. The majority were academic majors. This may limit generalizability to only academic students, and more research can be conducted to determine if this is generalizable to technical workforce students. Lastly, the population is unique and a

student body of 95% Hispanic (STC, 2015) is rare, and while it brings to light new findings on this particular population, also limits generalizability to other institutions.

Recommendations for Future Research

Conducting other localized factor analysis at other institutions will bring more understanding to this elusive construct of student engagement. Replicating these findings at this institution with all students would also help the institution determine if these factors are stable across time and cohorts of students. While engagement has been proven to be a useful concept at the postsecondary level, more work is needed to identify what exactly it is and how best to capture it. Unlike personality, which is a stable characteristic that has been documented across population and time, engagement is more dynamic and changes across settings along with changes in the educational landscape and populations.

Nevertheless it is equally important to identify any universals of engagement that may transcend space and time, such as those stipulated by researchers and theories alike and getting to the essence of what engagement is as opposed to the specifics about what behaviors they encompass—which will change from time and place. While it is not possible or likely for other researchers to utilize the same constructs or factors of student engagement, since they are locally derived, this research can inform other researchers of other areas or similar constructs to examine. Statistical approaches could use path analysis or structural equation modeling in testing whether there exists a path in that students first develop a school opinion and based upon their school opinion seek out services. Another approach could be to further examine school opinions in a qualitative manner to determine how and when such opinions are formed and how they are

maintained. I believe this research would be best suited to a grounded theory in which a theory is developed as to how students develop school opinions and through which processes are they maintained. Do they begin to develop before the students enter the institutions, in registration lines, financial aid processes, and are they encouraged in the classroom, tutoring sessions and other student services? This would allow the institution to develop strategies and prioritize where and how to develop the message of a supportive environment at different points along the educational pathway.

One of the main limitations is that GPA is only an intermediary outcome to degree completion, therefore future analysis can examine these variables relation to long-term outcomes, such as time to completion, cumulative GPA, hours earned, and persistence across semesters.

Personality factors contributed little to explaining the total variance; therefore there are undoubtedly other factors that influence performance. Future analysis should continue to test various variables to determine which ones are important predictors of success for this population. Replication of these results are also important for establishing moderating effects and to determine if the link between Agreeableness and GPA was an error or a moderating factor related particularly to (a) community colleges, (b) Hispanics, (c) two-year Hispanic students, or (d) only students at STC.

Additional analysis can be a hierarchical regression analysis with this particular population to see which factors of personality are significantly related to GPA while controlling for other facets of personality. This study showed that engagement contributed more to the prediction of GPA than did personality. Thus future analyses can

be conducted to partition the total amount of variance explained by personality and engagement variables using step-wise regression.

Findings of the CCSSE engagement patterns show that some aspects of engagement may be more specifically related to certain outcomes, therefore future research can examine these factors of engagement and other persistence measures of students' success such as retention.

CCSSE does provide many benefits as explained by survey developers, however, and while both factors of engagement and benchmarks have been shown to be significant predictors of many success criteria, colleges can gain additional benefit from digging deeper into their results as opposed to only examining descriptive results. Conducting such localized analysis can show how unique institution are and how they differ from national samples. Colleges, including the focal institution, should continue to analyze CCSSE findings to determine engagement patterns at their school as they strive to create conducive learning environments.

Conclusion

The future enrichment of the United States relies on an educated workforce. Two-year colleges' place within the postsecondary setting has become critical to meet the growing educational needs of an advanced workforce. However, many community college students and Hispanic students do not complete their degrees within reasonable time frames. Knowledge of the processes in terms of institutional practice, policy and interventions that benefit such students is critical in times of increased accountability for community colleges and shrinking budgets. Institutions are forced to develop student

services and classroom experiences which provide optimal learning environments. This study demonstrates that there are multiple paths to attaining success for various individuals and that while engagement is a critical component of meaningful experiences in postsecondary institutions, personality plays a role in which strategies are employed to ensure success. Social change is the result of informed action. This study has the potential to inform action to affect social change in enhancing knowledge of what factors lead to the academic performance for this particular population. Increasing the educational attainment of this group of students can lead to better quality of life for this population and for the United States.

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Appendix A: CCSSE Items and Engagement Factors

Engagement factor	CCSSE item
Faculty Interactions	• Asked questions in class or contributed to class discussions • Discussed ideas from your readings or classes with instructors outside of class • Discussed grades or assignment with an instructor • Talked about career plans with an instructor or advisor • Received prompt feedback (written or oral) from instructors on our performance • Worked with instructors on activities other than coursework
Class Assignments	• Made a class presentation • Prepared two or more drafts of a paper or assignment before turning it in • Worked on a paper or project that required integrating ideas or information from various sources
Exposure to Diversity	• Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.) • Had serious conversations with students of a different race or ethnicity other than your own • Had serious conversations with students who differ from you in terms of their religious beliefs, political opinions, or personal values
Collaborative Learning	• Worked with other students on projects during class • Worked with other classmates outside of class to prepare class assignments • Tutored or taught other students (paid or voluntary) • Participated in a community-based project as a part of a regular course
Information Technology	• Used the internet or instant messaging to work on an assignment • Used email to communicate with an instructor
Mental Activities	• Worked harder than you thought you could to meet an instructor's standards or expectations • Analyzing the basic elements of an idea, experience, or theory • Synthesizing and organizing ideas, information, or experience in new ways • Making judgments about the value or soundness of information, argument, or methods • Applying theories or concepts to practical problems or in new situations • Using information you have read or heard to perform a new skill

(table continues)

Engagement factor	CCSSE item
School Opinions	• Encouraging you to spend significant amounts of time studying
	• Providing the support you need to help you succeed at this college
	• Encouraging contact among students from different economic, social, and racial or ethnic backgrounds
	• Helping you cope with your non-academic responsibilities (work, family, etc.)
	• Providing the support you need to thrive socially
	• Providing the financial support you need to afford your education
Student Services	• Frequency: Academic advising/planning
	• Frequency: Career Counseling
	• Frequency: Peer or other tutoring
	• Frequency: Skill labs (writing, math, etc.)
	• Frequency: Computer Lab
Academic Preparation	• Number of assigned textbooks, manual, books, or book-length packs of course readings
	• Number of written papers or reports of any length
	• Mark the box that best represents the extent to which your examinations during the current school year have challenged you to do your best work at this college
	• Preparing for class (studying, reading, writing, rehearsing, doing homework, or other activities related to your program)

Note: Reproduced with permission from the Center for Community College Student Engagement, The University of Texas at Austin.

Appendix B: Permission for CCSSE Use

Fernando Chapa

From: Mike Bohlig < ▮▮▮▮▮▮ >
Sent: Tuesday, January 06, 2015 11:27 AM
To: Fernando Chapa
Subject: RE: Dissertation Research
Attachments: CCSSE_SampleSurvey_2005to2015.pdf

Hi Fernando,

From this email, it sounds like you are working with South Texas College to obtain access to their CCSSE data to use in your dissertation. Is that correct? If it is, the data themselves belong to South Texas College and you do not need Center permission to use the data – that is between you and the college.

In your email from December 30th you said something about reproducing the survey – or part of the survey in the appendix of your dissertation. You have permission to include a copy of the survey (attached) in the appendix of your dissertation provided you include the following citation: "Reproduced with permission from the Center for Community College Student Engagement, The University of Texas at Austin."

Please let me know if you have any additional questions.

Thanks,
Mike.

E. Michael Bohlig, Ph.D. | Senior Research Associate
Center for Community College Student Engagement
Program in Higher Education Leadership | College of Education
The University of Texas at Austin
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www.cccse.org

From: Fernando Chapa ▮▮▮▮▮▮▮▮▮▮
Sent: Tuesday, January 06, 2015 10:13 AM
To: Mike Bohlig
Subject: Dissertation Research

Hello, I am inquiring about getting permission to use CCSSE for my dissertation. I am in the process of obtaining a data use sharing agreement to use South Texas College's CCSSE data for my research. I however, wanted also to seek permission from the publisher of the CCSSE. I am attaching a brief abstract that briefly explains how I plan to use CCSSE data. Please let me know if more information is required.

Thank you,

Fernando Chapa
▮▮▮▮▮▮▮▮▮▮

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Appendix C: Consent Form

CONSENT FORM

You are invited to take part in a research study of how personality and behavior affect student learning and academic performance. The researcher is inviting Hispanic students attending South Texas College who are 18 and over, and who have previously completed the Community College Survey of Student Engagement (CCSSE) to be in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Fernando Chapa, who is a doctoral student at Walden University. You may also know the researcher as an Institutional Research Analyst at this college, but this study is separate from that role.

Background Information:
The purpose of this study is to understand how Hispanic students of various personalities engage in two-year college settings, and how this engagement contributes to their success.

Procedures:
If you agree to be in this study, you will be asked to complete a survey which will ask various questions about yourself. This should take anywhere from 5-10 minutes and you will only be asked to complete the survey once. The questions will ask you to state how much you agree with various statements such as:
- I am not a worrier
- I am a very active person

If you agree to participate in this study you will also be allowing the researcher to access to your following educational records from South Texas College:
- Community College Survey of Student Engagement results
- Gender
- Ethnicity
- Age
- Fall 2014 and Spring 2015 cumulative grade point average

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at South Texas College will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as fatigue and stress from filling out questionares. Being in this study would not pose risk to your safety or wellbeing.

However, by participating you will be helping create an understanding of Hispanics and their experiences at colleges, and how colleges can create environments that help students learn and achieve to their full potential.

Payment:
No payments or incentives will be provided by the researcher. You will be able to keep you score and keep a copy of your personality assesement.

Privacy:

Any information you provide will be kept confidential. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure by being locked in a file cabinet and stored on a password protected USB. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via email at ████████████████████ or you may contanct Dr. Charles Diebold via email at ████████████████ If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is ██████████ Walden University's approval number for this study is **02-10-15-0277200** and it expires on **February 9, 2016.**

The researcher will give you a copy of this form to keep.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By signing below, I understand that I am agreeing to the terms described above.

Printed Name of Participant

_____

Date of consent

_____

Participant's Signature

_____

Researcher's Signature

_____

This has been approved by the Institutional Review Board of
WALDEN UNIVERSITY
as acceptable documentation of the informed consent process and is valid for one year after the stamped date.

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Appendix D: IRB Approval from Research Site

SOUTH TEXAS COLLEGE

Research & Analytical Services

P. O. Box 9701   (956) 872-5592
McAllen, Texas 78502-9701   Fax: (956) 872-5594

Memo

To: Fernando Chapa

From: Mónica Jean Alaniz-McGinnis, PhD – IRB Liaison

RE: EXAMINATION OF THE MEDIATING ROLE OF STUDENT ENGAGEMENT ON
THE RELATIONSHIP BETWEEN PERSONALITY AND ACADEMIC SUCCESS
FOR HISPANIC COLLEGE STUDENTS

Date: February 25, 2015

After reviewing all pertinent information regarding your research proposal entitled *Examination of the Mediating Role of Student Engagement on the Relationship between Personality and Academic Success for Hispanic College Students*, South Texas College's Institutional Review Board has determined that this project qualifies for expedited review as per stipulations set forth in the *Handbook for Conducting Research at South Texas College* and under Federal Regulation 45 CFR 46.110.

This project has been approved through the STC-IRB expedited review process. The approval of this project is granted for a one year time-frame. Should the project need to be extended or changes are found to be necessary, an STC-IRB Continuation/Change Form must be filled out, filed and approved before you may continue. This document is available online at the STC Research & Analytical Services (RAS) website which can be found at http://ras.southtexascollege.edu/. It is also available in hardcopy upon request. Please keep us posted on any developments and let us know how we can be of further assistance to you.

At the completion of your study, you are required to submit a final copy of your findings to our offices.

If you should have any questions, comments or concerns regarding this letter or your proposal please feel free to contact me, Mónica Jean Alaniz-McGinnis, PhD, STC-IRB Liaison, via e-mail at ███████████████████████████████████████ You can also contact RAS Director Serkan Celtek at████████████████████████████████████ Best of luck in your current academic endeavors, and we look forward to hearing from you in the future.

Appendix E: Permission for NEO-FFI-3 Use

Fernando Chapa

From:	cssupport@parinc.com
Sent:	Tuesday, December 30, 2014 3:33 PM
To:	Fernando Chapa
Subject:	PAR Support Request ID: 120088 (~~Ref: 120088~~)

Good Afternoon Fernando,

Thank you for contacting us.

If you have purchased the measure, you have our permission to use the number of protocols you have purchased for your study.

If you require a formal letter regarding this we can supply it, please let me know.

Have a great day!

Best regards,

Tamara S. Dwoskin, MA
CS Quality Assurance Manager
Proudly serving PAR Customers for 20+ years.
==================================
PAR, Inc.

Your Request:
==
I have recently purchased the NEO-FFI-3 instrument. I am interested in using the instrument (as is, no modifications) for use in my dissertation. Can you please let me know how I can obtain permission to use NEO-FFI-3 for use in my dissertation.

Thank you,

Fernando Chapa
==

######################### Please do not delete the section below #########################
~~Ref: 120088~~
######################### Please do not delete thie section above #########################

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Appendix F: Permission to Reproduce IEO Figure

Fernando Chapa

From:	Macdonald, Lindsay < ▓▓▓▓▓▓▓▓▓▓
Sent:	Tuesday, October 14, 2014 4:33 PM
To:	Fernando Chapa
Cc:	▓▓▓▓▓▓▓▓
Subject:	RE: Permission to Reproduce Figure
Attachments:	image003.wmz
Follow Up Flag:	Follow up
Flag Status:	Completed

Hi Fernando,

Thanks for your email. Since you are using this for a dissertation, proper citation should be fine; however, if this is intended for publication you'll need permission from our publisher, Rowman & Littlefield. I have copied Patricia Zline from R&L on this message so that she is aware—please feel free to chime in if permission is needed at this stage, Tricia. Thanks!

All best,
Lindsay

Lindsay Macdonald
Publishing Associate
Publishing
American Council on Education

▓▓▓▓▓▓▓▓

www.acenet.edu

From: Fernando Chapa ▓▓▓▓▓▓▓▓▓▓
Sent: Wednesday, October 08, 2014 5:21 PM
To: Macdonald, Lindsay
Subject: Permission to Reproduce Figure

Hello, Lindsy (forgive me if I misspelled),
We spoke briefly yesterday concerning securing permission to reproduce a figure from a ACE publication. The publication is:

- **Series:** The ACE Series on Higher Education
- **Paperback:** 380 pages
- **Publisher:** Rowman & Littlefield Publishers; 2nd Edition edition (July 13, 2012)
- **Language:** English
- **ISBN-10:** 1442213620
- **ISBN-13:** 978-1442213623

Appendix G: Permission to Adapt Table

Fernando Chapa

From:	Kay McClenney ██████████████
Sent:	Monday, October 20, 2014 7:26 PM
To:	Fernando Chapa
Subject:	Re: Permission to Adapt Table

This is okay.

Kay McClenney

Sent from my iPhone

On Oct 21, 2014, at 2:02 AM, Fernando Chapa ██████████████████ wrote:

> Dr. McClenney,
> Thank you for your response. I am hoping to adapt the table as follows:
>
> Table 3
> *Semi-partial regression coefficients for engagement factors and cumulative GPA.*
>
> | Engagement Factor | FCCS GPA | | AtD Sample | | HSS Sample | |
> |---|---|---|---|---|---|---|
> | | *Beta* | *Sig.* | *Beta* | *Sig.* | *Beta* | *Sig.* |
> | Faculty Interaction | .092 | .000 | .619 | .004 | .092 | .000 |
> | Class Assignments | .282 | .010 | .316 | .053 | .043 | .012 |
> | Exposure to Diversity | .027 | .385 | .301 | .035 | .039 | .024 |
> | Collaborative Learning | .219 | .040 | .524 | .010 | .017 | .309 |
> | Information Technology | .007 | .791 | .195 | .142 | .044 | .011 |
> | Mental Activities | .085 | .001 | .357 | .041 | .082 | .000 |
> | School Opinions | .063 | .013 | -.081 | .638 | .000 | .991 |
> | Student Services | .011 | .676 | -.204 | .224 | -.038 | .029 |
> | Academic Preparation | .064 | .013 | .873 | .001 | .093 | .000 |
>
> Information for this table comes from McClenney and Marti (2006). Seeking permission.
>
> This table is being adapted from a number of tables provided in the appendices.
>
> Thank you for your consideration.
>
> Fernando Chapa
>
> ██████████████████████
>
> **From:** Kay McClenney ██████████████
> **Sent:** Friday, October 17, 2014 8:55 AM
> **To:** Fernando Chapa
> **Subject:** Re: Per
>
> Thank you for you inquiry. You are asking to adapt the table rather than use as is; so I would need to see the adaptation.