CAMPUS RACIAL CLIMATE MATTERS, SENSE OF BELONGING MATTERS

MORE: MODELING PATHWAYS TO PERSISTENCE FOR STUDENTS IN

DEVELOPMENTAL MATHEMATICS

by

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A dissertation submitted to the Graduate Council of
Texas State University in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
with a Major in Developmental Mathematics
May 2018

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DEDICATION

Beginning this journey, and even before, I always pictured you attending my graduation with a smile plastered so wide everyone knew you were proud. I pictured you yelling "that's my baby" as I walked across the stage to be hooded. I pictured introducing you to my "work family" and showing you off after the ceremony. I pictured you telling everyone how "happy, happy, happy" you were that your oldest daughter was now Dr. Flaggs. To be completely transparent, I pictured your miracle, being my miracle.

~ To my mama, this is for you. I really pray I am making you proud. Love you always ~

Carolyn Annette (Jones) Flaggs

August 16, 1963 – December 31, 2017

I further dedicate this dissertation to my family who are resting in heaven. Each of you knew the importance of education and instilled those values in me. I made it this far by God's grace and through your unwavering commitment to my educational journey.

Grand-daddy (Eugene), Grandma (James-Etta), Grandpa (Alexander), Uncle Phil, and

Great-grandma (Earnestine)

ACKNOWLEDGEMENTS

To the only true God, the one who sits high and looks low, the one who laid out this pathway for me before I knew my name, the one who made it possible for me to add three letters to my name: ALL PRAISES BE UNTO YOU.

To Dr. Taylor W. Acee, thank you. Thank you for believing in me, encouraging me, supporting me, mentoring me… and, oh yeah, teaching me. I have learned so much under your wings and I am truly grateful for the opportunities I had to collaborate with you. There are so many great faculty members in our program, and yet, I feel like I won; I partnered with the best of the best.

To my committee members, Drs. Jodi Holschuh, Samuel Obara, and Eric Paulson, thank you for getting on this roller-coaster ride with me and making sure I did not fall off. Your open door polices and continuous feedback was much appreciated.

To my sisters and brother in academia, and also in Christ: Theresa, Tamara, and Keylan, thanks for being more than colleagues. This program was made better because I had y'all to laugh with - cry with, study with - grow with, and occasionally drink with.

To the Flaggs siblings, Daryl, Dominick, and Dennette, Y'ALL WE DID IT! Your loving support is unmatched by any, and for that, I am blessed.

To my parents, grandparents, and best friends, aka my biggest supporters, thanks for speaking life into this journey. To all my nieces, nephews, and cousins, I hope I inspire you to follow your calling as I did and embrace all that God has planned for you – which DEFINITELY includes attending college. To all my family, this degree is OURS!

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LIST OF ABBREVIATIONS

Abbreviation   **Description**

CRC .... Campus Racial Climate

DE .... Developmental Education

HBCU .... Historically Black College and University

HSI .... Hispanic-Serving Institution

INT .... Intent to Persist

PWI .... Predominately White Institution

RES .... Resilience

SB.. Sense of Belonging

PWI .... Predominately White Institution

ABSTRACT

To expand theoretical models concerning college student retention and emphasize factors that may be particularly important for underrepresented minorities enrolled in developmental education (DE) mathematics courses, the current study explored campus racial climate (CRC), sense of belonging (SB), and resilience as predictors of students' academic achievement and persistence intentions. The study was conducted at a Hispanic-Serving University with a plurality of the student body identifying as Caucasian and approximately one tenth as African American. Surveys were administered to students in DE mathematics courses at three points during the semester and data from 207 students were analyzed. Mean comparisons showed that students who identified as African American perceived the campus racial climate as significantly more negative than students who identified as Caucasian or Hispanic. Results from path analyses suggested that sense of belonging was a significant mediator of the relationships between campus racial climate and each outcome variable (i.e., negative for DE mathematics course grade and positive for intent to persist). A significant interaction effect (i.e., sense of belonging x African American) was found for the path model with persistence intentions. This interaction suggested that sense of belonging played a stronger role in influencing the persistence intentions of students who identified as African American, particularly those with low sense of belonging. Findings can help guide institutions to explore ways to help students feel a stronger sense of belonging and build a culturally supportive campus climate for all students.

I. INTRODUCTION

Though efforts have been expended to understand and implement best practices for improving success rates in developmental mathematics (Bonham & Boylan, 2011; Boylan, 2011; Zachry & Schneider, 2012), a primary challenge for all stakeholders remains the same: getting students to learn the appropriate content necessary to successfully complete developmental mathematics in as few attempts as possible. Historically, students of underrepresented groups are placed at higher rates in developmental education (DE) coursework (Crisp & Delgado, 2014), and completing this coursework can be a major obstacle to persistence. Research shows that prior academic preparedness of students (Boatman & Long, 2010; Engle & Tinto, 2008), long course sequencing of the developmental program (Burdman, 2013; Bryk & Treisman, 2010), and postponed enrollment in recommended developmental courses (Bailey, Jeong, & Cho, 2010) are among the top causes of low graduation success rates. Fike and Fike (2008) found that if students failed to successfully complete their first developmental mathematics course, they were less likely to persist in college to the next long semester or academic year than those students who successfully completed a developmental mathematics course.

In exploring research focused on underrepresented college students, three important psychosocial variables have the potential to account for a significant amount of variance in their academic achievement and persistence rates: campus racial climate (Chavous, 2005; Hurtado & Ponjuan, 2005), sense of belonging (Hoffman, Richmond, Morrow, & Salomone; 2003; O'Keeffe, 2013), and resilience (Hartley, 2013; Morales & Trotman, 2011). Given the associations that have been found between these variables for

students from historically underrepresented populations, it is plausible that these psychosocial variables could help to explain low DE mathematics success as well as low persistence rates. Considering the disproportionately high population of students from underrepresented groups placed into these courses (Chen, 2016), DE mathematics classes might be an important place to study these factors. Further, students who identify as racial minority, first-generation, or are from low socioeconomic backgrounds that place into DE mathematics courses may benefit from additional supports that address these psychosocial factors.

Much of current literature overlooks the psychosocial conditions and institutional characteristics that may help explain students' behaviors as influenced by their proximal environment or even by society as a whole, particularly for student enrolled in developmental courses; noteworthy exceptions include Bahr (2010) and Bailey, Jeong, and Cho (2010). Conditions such as negative campus cultures, may permeate into the classroom and make it more difficult for students from underrepresented groups to succeed, thus equating to a lack of equity. Persistence and retention studies and models place emphasis on the academic performance (ACT, 2013), student involvement (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008; Webber, Krylow, & Zhang, 2013), and acclimation and integration of students (Karp, Hughes, and O'Gara, 2008; Tinto, 1993), and consequently miss equally important psychosocial elements involved in students' decisions to persist (Hooker & Brand, 2009). These studies seem to suggest that if the student merely learned study skills or increased their involvement on campus, etc., then they would persist. Thus, when students fail to persist, causes related to the institutional climate, culture, or belongingness are overlooked, and attention is placed on what the

student did or did not do as a reason for their low success. Leaving psychosocial classroom- and campus-level factors separated from causes of retention may shift accountability solely onto the student. These studies also fail to acknowledge that campus climate impacts student academic experiences in college (Johnson et al., 2014; Swail, 2003). While the goal of these studies may not be to change the culture or climate of an institution, they often do not acknowledge or attempt to ameliorate forms of racism and insensitivity that can permeate an institution and lead students to want to leave college.

In spite of factors such as negative campus racial climates and low sense of belonging, research has shown that resilience demonstrated by diverse college students enables them to use negative incidents to push themselves toward their aspirations and persist toward degree attainment (Avery & Daly, 2010). In fact, resilience has been found to be one characteristic used by racial minorities to protect themselves against race related issues in higher education (Brown, 2008). Research has also identified factors such as self-control and self-affirmation that help students from underrepresented groups to adapt and persist under negative racial conditions (Goyer et al., 2017; Shechtman, DeBarger, Dornslife, Rosier, & Yarnall, 2013). Though helping students adapt to a negative campus racial climate is one part of the solution, it is far from sufficient – the institution must also adapt its campus climate so that it is more amenable and supportive of students from underrepresented groups. An important step in improving a campus racial climate may be to investigate students' perceptions of it, with the understanding that the perceptions of Caucasian students and those of minorities should be examined

separately as their perceptions of and experiences with the campus environment are often divergent (Rankin & Reason, 2005).

For students from underrepresented groups, their experiences of a negative campus racial climate may range from overtly hostile to covertly insensitive or unintentionally unsupportive (e.g., being asked to speak on the behalf of an entire racial group; serving stereotypical fried chicken at a "'Black History Program", but having no actual program acknowledging said histories). Examples may come in the form of microaggressions such as complimenting an U.S. born Asian American for speaking "good English" and going out of ones way to distance oneself in passing a African American or Latino male, or more blatant racism such as calling someone the "n-word" and writing racial slurs in dormitory community bathrooms. Further, what might be considered insensitivity or even lack of understanding about the needs of a particular racial group can contribute to a perception of a negative campus racial climate. One way to achieve a summative synopsis of the campus racial climate is by surveying the student body. Aggregating across different race/ethnic groups, a researcher can determine the extent to which students of different groups perceive the racial climate as negative, neutral, or positive. Such data could be used to inform the institution about the status of its campus racial climate.

In light of recent events in the United States such as student protest and demands regarding negative campus climates at Harvard and Yale University, and the Universities of Michigan, Missouri (Black Liberation, 2018; Tamaami, 2016), and Washington-Tacoma (Tamaami, 2016), some institutions are beginning to acknowledge and address the effects of campus racial climate on students' sense of belonging and associated

outcomes (e.g., persistence, GPA) (Johnson et al., 2007; Nuñez, 2009; Strayhorn, 2008).

Early research suggests that discriminatory acts within society, left unresolved, permeate

the environment on our college campuses (Burrell et al., 1997; Hurtado, 1992; Levin,

Van Laar, & Foote, 2006). In fact, throughout the 1980s, during the post-civil rights era,

over one hundred college campuses reported issues of racial conflict (Ehrlich, 1990).

These incidents ranged from verbal harassment to physical abuse (Farrell & Jones, 1988);

often times, students rallied together organizing protests to express their feelings about

racial injustices and belonging (Vellela, 1988). With the issues of overt racial conflict

tainting our nation, one could argue that history is indeed repeating itself now in the 21st

century. The spotlight on current racial injustices on college campuses, or students'

perceptions thereof, presents a dire need for researchers to explore gaps in retention

literature, specifically examining factors that may be common to college students who are

historically underrepresented.

Research Questions

In this study, I aimed to fill a gap in literature concerning the effects of

psychosocial variables – namely campus racial climate, sense of belonging, and resilience

– on students' academic achievement in developmental (DE) mathematics courses and

persistence intentions in college. I also aimed to introduce a path model and its related

interactions, as neither this path nor its interactions have been tested with existing

retention and persistence models. While literature supports an association between

campus racial climate and sense of belonging, this association has yet to be substantially

established within a developmental (DE) mathematics setting. Further, the causal

indirect path from campus racial climate to sense of belonging to academic achievement

and persistence outcomes has yet to be examined. Considering the disproportionate representation of historically underrepresented populations (e.g., low-income, first-generation, racial minority) in DE mathematics courses, it is surprising that there is a dearth of studies having explored campus racial climate and sense of belonging within these courses. Accordingly, I will also test how the relationships among study variables may vary depending on students' race/ethnicity. Since no studies beyond Flaggs (2016) have explored campus racial climate, sense of belonging, resilience, DE mathematics course grades, and persistence intentions together in one study, this study will examine these relationships through a series of analyses. This study addressed the gap in literature by examining the exploratory research questions that follow.

1. How do students enrolled in DE mathematics courses perceive the campus racial climate and their sense of belonging?

    a. Are students' perceptions of the campus racial climate and/or sense of belonging different in regards to their race/ethnicity?

2. What are the direct, indirect, and moderating effects of the study predictor variables on DE mathematics course grade and intent to persist?

    a. Are there direct effects of students' perceptions of campus racial climate and sense of belonging on DE mathematics course grade and intent to persist?

    b. Is there an indirect effect of campus racial climate through sense of belonging on DE mathematics course grade and intent to persist?

c. Does resilience moderate the relationships between sense of belonging and DE mathematics course grade and between sense of belonging and intent to persist?

d. Does race/ethnicity moderate the direct and indirect effects within the proposed indirect path model? If so, what are the two- and three-way interactions between study's predictor, outcome variables, and race/ethnicity?

Overview of Study

The purpose of this study was to build upon previous work (see Flaggs, 2016) investigating the influences of students' perceptions of campus racial climate, sense of belonging, and resilience on their developmental mathematics course grade and intent to persist, and also how these variables interacted to further influence the outcome variables. I began by revising scale items from a pilot study to target this specialized population and to satisfy the operationalized definitions used in the study. The revised instrument was administered to students via three online surveys during the beginning, middle, and end of their fall semester to measure their perceptions and their intentions. The illustrated proposed path diagram (see figure 1; Chapter 3) depicted the hypothesized relationships between sets of variables within the model, as supported by theory and research. This conditional indirect effects model (i.e., path analysis with a moderating variable) was used to investigate indirect effects from campus racial climate to sense of belonging to intent to persist and the moderating role of resilience within this indirect path model. Differences based on race/ethnicity were also examined.

This study acknowledged existing models in this area (e.g., Tinto's model of student departure and Astin's Input-Environment-Outcome model), and validated a new path model to bring attention to the widespread gaps in research that have been overlooked for academically underprepared and historically underrepresented college students. This research may help to inform approaches for helping students persist in the face of psychosocial obstacles, especially those related to racial conflict and issues of social belonging that stem from such conflict. Findings may be particularly useful for institutions aiming to identify factors hindering the persistence of students deemed underprepared and those from an underrepresented group. Further, findings may inform the implementation of research-based initiatives and interventions that help generate greater awareness of racial issues on campus and cultivate a more inclusive and supportive culture for all students.

Operational Definitions

Following, I present a comprehensive glossary of important terms used within this dissertation. Each includes a definition and/or description as operationalized to fit within the goals of the current study.

Campus Racial Climate: The overall racial environment of a college campus (Solorzano, Ceja, Yosso, 2000); includes attitudes, experiences, and behaviors related to race that affect the extent to which students perceive the institution positively, negatively, or neutrally.

Developmental Mathematics: Non-credit bearing, leveling mathematics courses for students identified as academically underprepared (Stigler, Givvin, & Thompson,

2010). For many institutions, developmental mathematics courses must be taken prior to, or concurrently with, a college-level algebra course.

Developmental Mathematics Course Grade: Grade earned in DE mathematics course.

First-Generation Status: A designation given to students for whom neither parent obtained a degree from an accredited postsecondary institution in the United States (Chen, 2005).

Path Analysis: An extension of multiple regression; specifies estimates of the magnitude and significance of a hypothesized causal connection between sets of variables within a model (Streiner, 2005).

Persistence: One's behavioral decision to re-enroll in college from fall semester to fall semester (Nora, Barlow, & Crisp, 2005).

Race/ethnicity: A socially-constructed classification of humans into groups often based on shared distinctive physical characteristics, cultures, and/or histories.

Resilience: The process of, and ability to, survive and thrive "despite the presence of potentially virulent risk factors" (Morales, 2014, p. 93) on campus.

Sense of Belonging: "the experience of personal involvement in a system or environment so that persons feel themselves to be an integral part of that system or environment" (Hagerty et al., 1992, p. 173).

Socioeconomic Status: A combination of parents' educational level, occupation, and family income (Kena et al., 2015).

Students from Underrepresented Groups: Those from populations historically underrepresented in higher education; includes those from racial/ethnic minority, first-

generation, and low socioeconomic groups. Often referred to in literature as underrepresented student (Tate et al., 2015).

Summary of Introduction

In the introduction, I situated my research study within the context of developmental mathematics in higher education. I then described the significance of this study for underprepared and historically underrepresented college students. I also introduced literature on race and persistence in postsecondary education and highlighted existing gaps in this literature surrounding understudied psychosocial factors – namely, campus racial climate, sense of belonging, and resilience – that may be uniquely influential on the persistence decisions of students from underrepresented racial and ethnic groups. Lastly, I provided an overview of my study and I provided the operational definitions of the key terms utilized in the study.

The remainder of this dissertation is as follows. In Chapter 2, I describe the theoretical frameworks used as a lens in guiding the study and in addressing the research questions. I also review and synthesize research on developmental mathematics, campus racial climate, sense of belonging, resilience, academic achievement, and persistence. In Chapter 3, I describe the methodology, which includes an introduction to the proposed model, the study context, and the research design, procedures, and analyses. Following, in Chapter 4, I present the results separated into preliminary and primary analyses. Lastly, in Chapter 5, I provide a comprehensive discussion of the finding from the study. I also discuss the study limitations, implications for practice, and directions for future research.

II. REVIEW OF LITERATURE

This study aims to test a process model that may help to explain the disproportionate postsecondary achievement and persistence of students who identify as being of an underrepresented race or ethnicity. The model centers on four factors (i.e., campus racial climate, sense of belonging, resiliency, and race/ethnicity) as predictors of academic achievement and persistence intentions. Here, I discuss the theoretical frameworks guiding the current study and review research literature on these factors, their interrelations, and their relationships with postsecondary student success. I conclude by summarizing these findings and pointing out gaps in the literature that my study will address.

Theoretical Frameworks

Graduation rates for undergraduate students have been drifting between 50 to 60 percent for the past 100 years (Swail, 2003; Chen, 2016). Differing models of college student retention and persistence have been developed to address this ongoing shortfall (Bean, 2005; Cabrera, Nora, & Castaneda, 1993; Tinto, 2006). Historically, however, many of these models were reactive in that they focused on students' failure to persist at the point of mortality (Demetriou & Schmitz-Sciborski, 2011). Studies examining persistence from this angle help inform this area by identifying traits of students who depart early. For most students, returning to college after dropping out is unlikely (Pervin, Reik, & Dalrymple, 2015), and thus understanding students' decisions for departure at that time can by useful in informing the supports an institution can provide to future students. From another angle, potential causes that may be leading students to consider leaving college prior to their departure is essential in understanding retention.

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This may help in identifying factors that may be predicting their decisions to not persist. Still, other studies have explored persistence from a lens that offered the perspective of students whom successfully persisted, yet had thoughts of an early departure. The combination of viewpoints offer a holistic look at student retention and paint a fuller picture of all aspects of students' persistence decisions. Tinto's model of student integration and Astin's model of student involvement are two noteworthy models used in understanding the complexities involved and in guiding the current study.

Tinto's Theory of Student Departure

Tinto's (1975) seminal student integration model and his model of institutional departure (1993) have long been a basis for subsequent studies on college student retention. In the latter model, students bring particular attributes with them to college (e.g., family background, skills and abilities, and prior knowledge), and these pre-entry attributes help them form goals and commitments. These in turn impact their formal (within the academic system) and informal (within the social system) institutional experiences. Each of these institutional experiences then lead to students' academic and social integration into college and thus influences the formation of new goals and commitments. Finally, students' newly formed goals and commitments impact their decisions to stay or leave an institution. Its theoretical underpinning posits that when students academically and socially integrate into communities of higher education, their commitment level to the institution increases, and in turn students are more likely to persist to graduation. The commitment level introduced in the model takes into consideration students' sense of belonging at a particular institution (Strauss & Vokwein, 2004). Studies using this model have found that when students possess a strong sense of

belonging, then they are more likely to be committed to the institution (Osterman, 2000; Strauss & Vokwein, 2004). Though not explicitly included in the model, students' perceptions of the campus racial climate may play a role in what the model describes as "students' overall satisfaction" – another part to institutional commitment.

The academic and social integration parts of Tinto's model are interwoven and equally important in analyzing the impact on college student outcomes. Tinto's model has notably shaped the direction of the field, including how researchers approach retention studies, how education practitioners develop initiatives, and how policy makers understand graduation rates. Tinto's model has been modified several times over the years; while Tinto's (1993) model of student retention is noteworthy and incorporates integrating experiences, its adaptability and generalizability to minority student populations has been opposed, criticized, and found to be arguably inappropriate (Cejda & Hoover, 2010; Hurtado & Carter, 1997; Rendón, Jalomo, & Nora, 2000). For example, critics state that the applicability of the model is solely around traditional students whom enroll in college directly after high school, live on campus, and have limited outside obligations (Demetriou & Schmitz-Sciborski, 2011; McCubbin, 2003). However, students typically placed in DE mathematics courses often have different experiences. The social integration piece to this model does not specifically account for factors affecting certain populations, such as race issues for minority students, though Tinto (1993) acknowledges their experiences are different. The current study acknowledges that all students have a sense of belonging unique to themselves, but campus racial climate can affect students differently specifically based on their race/ethnicity. This research will address the limitations of Tinto's model by analyzing

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the perceptions of historically underrepresented student groups and how these students may be affected differently by race-related constructs.

Astin's Input-Environment-Output Model

Tinto's work on college student retention has had an overwhelming contribution to the evolving research findings within the field. Therefore, using Tinto's Theory of Student Departure (1993) is a lens to which this study employed. However, the more fitting theoretical framework guiding this study is Astin's (1984) Theory of Involvement and its accompanying (1993) Input-Environment-Output model (I-E-O). Astin developed five postulates about students' involvement in college: (1) involvement requires the investment of psychosocial and physical energy, (2) involvement is continuous and varies between students, (3) involvement may be qualitative and quantitative, (4) there is proportionality between student gains and the intent of their involvement, and (5) academic performance is correlated with students' involvement. Each of these assumptions feed into the accompanying model (1984).

The I-E-O model was initially established to conduct assessments in higher education. It has since then been utilized as a predictive measure and to gain perspective on how educational policies and practice influence outcomes. Several studies have used Astin's I-E-O model the investigate relationships between inputs, environmental factors, and student outcomes (Kelly, 1996; Norwani, Yusof, & Adbullah, 2009; Pidgeon, 2008). First, input involves an understanding of student demographics and qualities that are brought with them to college such as their racial background and academic preparation. Next, the model acknowledges the culture of, and nature of, the academic environment in within which the student will interact. For example, this part of the model emphasizes

student experiences in the form of events attended, conversations held, opportunities presented, and the classroom environment. Lastly, Astin's model recognizes that student's qualities and characteristics (e.g., behaviors, beliefs, perceptions, knowledge, and personal growth) at departure are key in evaluating outcomes (Pascarella & Terenzini, 2005). The three core components (inputs, environments, and outcomes) incorporated in the I-E-O are discussed next in respect to their fit within the current study.

Input. Input data includes, but is not limited to, student's sex, age, socioeconomic status, race/ethnicity background, first-generation status, academic placement, and prior grades. These demographic inputs may directly influence students' perceptions of the environment as well as their persistence and graduation outcomes. Moreover, some of these student characteristics are found to indirectly influence academic outcomes through the campus environment (Cabrera, 2014; Zhou & Cole, 2016).

For instance, research establishes that historically underrepresented minority populations often face difficulty in the college transition, experience higher degrees of hostility and discrimination on campus, and are at greater risk for dropping out before degree completion (Hurtado & Carter, 1997; Locks et al., 2008; Snyder & Dillow, 2011). In fact, six-year graduation rates are significantly lower for African American (38.0%) and Hispanic students (45.8%) than the national average (54.8%) (Shapiro et al., 2017). Likewise, students who are the first in their families to attend college are less likely to persist toward degree completion than their continuing-generation peers (Engle & Tinto, 2008; DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011), and student with low

socioeconomic levels are less likely to complete college than their wealthier peers (The

Pell Institute, 2011). Taking a step further, students who come to college with academic

barriers (e.g., those placed into DE courses) are less likely to persist to earn a degree

(Crisp & Delgodo, 2014). Each of these variables is categorized under inputs within the

I-E-O model as they are characteristics and demographics that students bring with them

to college.

A major limitation in Astin's model is that it does not directly account for

psychosocial variables such as resilience and students' perceptions of factors influencing

their social and academic outcomes. In order to address this gap, the proposed model

aimed to expand the I-E-O model to be inclusive of psychosocial factors that have the

potential to mitigate the effect of negative environmental aspects of college. This may

help explain why some students choose to persist while others drop out. Research shows

resilience as a two-dimensional construct involving exposure to adversity and positive

adjustment succeeding that exposure (Masten & Tellegen, 2012). With low college

enrollment rates for the diverse students defined in this study, it is plausible for resilience

to be an attribute that has emerged over time pending their pre-college experiences. It is

also plausible that resilience is a product of students' perceptions of the college

environment and/or an outcome.

Environment. The environment piece in Astin's model incorporates any and

everything that occurs once a student is enrolled in college that may have influence on

the student (e.g., interactions with peers and faculty, campus climate, classroom

dynamics, specialized programs, student clubs, organizations, and activities). Some

evaluative research studies even consider instances in which environmental factors are intervening outcome variables (Thurmond & Popkess-Vawter, 2003).

Just as in Tinto's (1993) model, student integration into the college environment may impact outcomes. Astin's wide range of defining and evaluating environmental variables suggest that students' perceptions of the campus racial climate may be an indirect result of the inputs mentioned previously (e.g., an antecedent) or a direct result of interactions with parts of the campus environment. However, in either scenario, students' perceptions are shaped by their actual experiences at an institution. Similarly, students' sense of belonging is not a fixed variable and thus can be influenced by their experiences at college. Thus, the structure of the I-E-O model does not fully support the use of either of these study variables as environmental factors; however, there are environmental factors they could relate to (e.g., campus climate rather than perceptions of campus climate). Previous models also do not observe that the environment may be filtered through students' perceptions.

Outputs. Astin (1993) refers on outputs as "talents [students] are trying to develop in [their] educational program" (p. 18). In education research, the outputs are the often outcome variables such as grade point average, course performance, and degree completion. For the purpose of this study, the outputs are DE mathematics course grades and students' persistence intentions. While campus racial climate is a factor that students may experience as they adjust to college and the culture of the institution, the current study also observes this factor as an outcome because it is a students' perception which may be a influenced by campus environmental aspects. Likewise, students' sense of belonging can be seen as an outcome because it can be a result of their background

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characteristics (input). By definition, sense of belonging and resilience can also act as outputs influenced by the campus environment perceptions. In this instance, the proposed model extends Astin's model by allowing a chain effect of outcomes.

Extension of Theoretical Frameworks

Ultimately, this study was interested in analyzing effects on course grades and persistence intentions. The theoretical underpinnings of Tinto's and Astin's work recognize the importance of students' social integration as a critical aspect to persistence. Thus, Astin's I-E-O model and Tinto's theory of college student departure influenced the conceptualization of the proposed model and was used as a lens to investigate variables within the current study. The Inputs-Environment-Output model, in particular, provides a solid structure for framing the paths proposed in this study. The current study may help to further expand Astin's (1993) model to identify how some outputs may also influence other outputs in a chain-like manner. The proposed model aimed to capture how a students' interaction with the environment may act as a proxy that affects their behavior (i.e., intentions to persist). The model was used to explore distinct relationships between study constructs, but further, its complexity lies in accurately capturing the extensiveness of which campus racial climate and sense of belonging are contributing to the outcomes in the midst of many extraneous variances.

Given recent research, campus racial climate, sense of belonging, and resilience could be particularly salient variables for the persistence of students historically underrepresented in college (Alvarez et al., 2007; Jackson, 2014). While there is research exploring these particularly important variables in relation to students' decisions to persist and academic outcomes, the exploration is limited in reference to students from

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historically underrepresented populations. Thus, the following overview of research

focuses on campus racial climate, sense of belonging, and resilience, and how these

factors contribute to student outcomes. In particular, it acknowledges the work in this

area of research while also bringing attention to the widespread gaps in research that has

been overlooked for academically underprepared and traditionally underrepresented

college students.

Postsecondary Racial Achievement Gaps

Students are being admitted into colleges and universities at higher rates (Chen,

2016), yet persistence and retention rates remain a major challenge. Nationally, only

62.4% of all students entering four-year, public institutions in Fall 2010 earned a degree

with six years (Shapiro et al., 2017). For students from underrepresented groups (e.g.,

low-income, first-generation, and racial minority), persistence to degree attainment is

even more worrisome because these students graduate at lower rates than their White,

wealthier, and/or continuing-generation peers (Fox, Connolly & Snyder, 2005; Aud et al.,

2013; Kugelmass & Ready, 2011). In particular, African American students and

Hispanic students have graduation rates that are substantially lower (45.9% and 55.0%

respectively) than their Caucasian (67.2%) peers (Shapiro et al., 2017). These students

from historically underrepresented groups not only face academic barriers, but also non-

academic barriers to college completion. These barriers often begin prior to college

enrollment and remain present through students' collegiate experiences.

Pre-College Factors

Traditional explanations for the academic achievement gaps between students

from underrepresented groups and their peers prior to college highly emphasize abilities

yet minimize the equally important role that systemic racism plays in education. For

example, minority students are often disadvantaged (e.g., socio-economically) as early as

kindergarten, and this trajectory impedes on their future academic success. Duncan and

Murnane (2011) offer analyses of how family resources, neighborhood characteristics,

labor markets, and secondary school conditions negatively affect students' academic

performance and overall educational achievement. Further, research has shown that

minority students' family background, geographic location, and high school experiences

continue to impact students' academic outcomes throughout their college years (Bailey &

Dynarski, 2011; Banerjee, 2016). These pre-college factors have the potential to

influence students' trajectory towards taking advanced placement courses, completing

high school, and enrolling in a postsecondary institution.

For example, racial minority students, particularly African Americans and

Hispanics, are less likely to grow up in economically prominent neighborhoods or attend

secondary schools with programmatic and social resources than both Asian and

Caucasian students (Duncan & Murnane, 2011; Lee & Burkam, 2002). Moreover,

research has cited that students who attended secondary schools with affluent students

had an increased chance of enrolling in four-year institutions rather than two-year

institutions (Engberg & Wolniak, 2010), and were more likely to earn a degree. Further,

in a study of 30,590 high school freshmen across 226 schools, Borman and Dowling

(2010) analyzed the effects of family background and schools on students' academic

achievement. They found that the racial and socio-economic compositions of secondary

schools were positively correlated with students' academic outcomes. In fact, 40% of the

variation in achievement was contributed to school characteristics, thus further contributing to the existing racial-achievement gap.

College Factors

By the time these minority students arrive in college, the systemic inequities faced in K-12 have already positioned them behind the academic curve (i.e., having to take developmental courses). For example, in a study of 63,147 first-time college students placed in developmental (DE) mathematics courses, results suggested that these students' mathematics "deficiencies" at college entry were carried with them into postsecondary DE mathematics courses. The study results further suggested that African American and Hispanics students had the lowest mathematics achievement rates among all race/ethnicity groups (Bahr, 2010). Bahr (2010) also notes that these minority students were 60% less likely to successfully pass DE mathematics than their Caucasian peers. Considering the disproportionate percentage of African American and Hispanic students who are placed into DE mathematics courses, this finding illustrates a possible explanation to why their overall graduation rates are much lower than that of the mainstream population.

In addition to inadequate academic preparation, racism, microagressions, cultural climate, and lack of support for transitioning and feeling welcomed into the academic context lead to postsecondary racial achievement gaps. Bonilla-Silva and Baiocchi (2001) note the extent to which researchers studied racial stratification while failing to thoroughly describe the racial realities faced by marginalized populations in higher education. Further, Harper (2012) explored how researchers disaggregated outcomes about racial differences in higher education and the extent to which researchers explained

the experiences of minority students. In another analysis, Bonilla-Silva (2009) argued

that abstract liberalism, naturalization, cultural racism, and the minimization of racism

are four central themes within color-blind racism used by Caucasian college students to

make sense of racial matters on campus. It has been suggested that African American

students, on the other hand, operate under a totally different ideological perspective

(Bonilla-Silva, 2017) and often have to navigate college dealing with the resulting

unconscious or conscious racism and microaggressions. These microaggressions can

come in the form of a microinsult (i.e., rude, insensitive, or demeaning comments directly

targeted at one's race or identity), microassault (e.g., explicit racial derogations intended

to harm another), and microinvalidation (e.g., exclusive comments or behaviors regarding

a one's experiential reality) (Sue et al., 2007). Navigating a campus climate tainted with

overt or covert racism has been suggested to be taxing on minority students and often

contributes to the racial academic achievement gap (Lopez, 2017).

Campus Racial Climate

Students' perceptions of how diversity is valued on campus, the presence of equal

power relationships among groups, and clearly defined program goals have been

suggested as conditions that affect the racial climate for students (Sedlacek, 1995).

Moreover, though programs have been initiated to promote positive campus racial

climates, perceptions of the climate are often different for students from historically

underrepresented racial/ethnic groups (Chang, Denson, Saenz & Misa, 2006). Further, in

a synthesis of campus racial climate research spanning 15 years, Harper and Hurtado

(2007) concluded, in spite of ongoing research "themes of exclusion, institutional rhetoric

rather than action, and marginality continue to emerge from student voices" (p. 21).

Hurtado, Clayton-Pedersen, Allen, and Milem (1998) define campus racial climate as the overall feel and structure of the campus environment; institutional policies and practices; and the collective perceptions, attitudes, and behaviors that accompany interactions with others on campus. For the current study, campus racial climate will be similarly defined as the overall racial environment of a college campus (Solorzano, Ceja, Yosso, 2000); this includes the extent to which students identify racial-related attitudes, experiences, and behaviors that affect their perceptions of the university's racial environment either positively, negatively, or neutrally.

Perceptions of the Campus Racial Climate

Hurtado's (1992) study on campus racial climate is the most widely cited publication in this area of research (Harper & Hurtado, 2007). Longitudinal data from this study were collected using a nationally representative sample of college students across 116 predominantly White institutions (PWIs). Results showed that African American and Hispanic students were more likely to perceive racial tensions on campus than their Caucasian peers. Further, most Caucasian students did not feel that racism was still an issue in society. Similarly, Rankin and Reason (2005) surveyed 7,347 undergraduates from 10 different institutions to determine if students' experiences of the campus climate varied by racial group. They found that racial minorities had higher perceptions of a racist campus climate than Caucasian students and were more likely to perceive the climate as less accepting.

Utilizing semi- structured interviews, Pittman (2012) conducted a qualitative study to examine the experiences of 29 African American students, faculty, and administrators with respect to the racial climate. Among other questions, students were

asked about their experiences with faculty and administrators, their rationale for choosing the institution, and their perceptions of the academic environment and promotion of an atmosphere that is welcoming for students from different racial backgrounds. Institutional reports, newsletters, and other historical documents were used as supplements to the interviews to provide a more holistic representation of student experiences. Pittman found that though African American students reported positive academic experiences, they possessed less affirming experiences with the campus racial climate. Furthermore, patterns of racial incidents (i.e., " a visible action, event, spoken or written word, etc., communicating a negative or offensive racial message toward a targeted person or group" p. 12) emerged from the interview exploration, which was found to contribute to students' negative experiences (Pittman, 2012). The experiences of African American students in Pittman's study acknowledged the impact of the campus racial climate on students from underrepresented populations, particularly at smaller and highly selective liberal acts colleges.

In another study of 51 African American undergraduate students, Swim and colleagues (2003) collected data from daily diaries kept over the course of a two-week period. Participants were asked to write about race-related issues they experienced on campus. Researchers found that 55% reported at least one incident of prejudice and 10% reported more than three incidents; these incidents included stereotypical or derogatory verbal remarks, unfriendly or skeptical looks from Caucasian peers and faculty, and differential treatment during service transactions at public establishments. Further, in a longitudinal study of 4,000 freshman students across 28 colleges and universities, researchers found that Caucasian students viewed the campus racial climate as the least

negative. African American students had the highest perceptions of a negative campus

environment followed by Hispanics and Asians (Fischer, 2007; 2010), and these negative

perceptions may lead students to leave an institution prior to earning a degree.

Considering the disproportionate percentage of racial minority students placed in

developmental mathematics, the campus racial climate perceptions of students in these

courses may also suggest varying degrees of racism on campus, similar to what was

found in the aforementioned studies (i.e., Fisher, 2007; 2010; Harper & Hurtado, 2007;

Pittman, 2012; Rankin & Reason, 2005).

Impact on Academic Outcomes

Simply stated, campus racial climate affects students' academic outcomes

(Armstrong & Carty, 2001; Hurtado, Carter, & Spuler, 1996; Hurtado & Guillermo-

Wann, 2013), particularly for diverse populations such as low-income, first-generation,

and racial minority students (Rankin & Reason, 2005; Whitt, Edison, Pascarella,

Terenzini, & Nora, 2011). Furthermore, longstanding research suggests that the campus

environment exerts a strong influence on student outcomes (Hurtado & Carter, 1997;

Museus, Nichols, & Lambert, 2008) and perceptions of the campus climate are pivotal in

addressing its effects on students (Astin, 1993; Armstrong & Carty, 2001; Flowers &

Pascarella, 1999; Reason, 2009). Research on campus climate have found statistically

significant correlations between campus racial climate and retention to degree completion

suggesting that when students perceive the campus climate as racially hostile,

marginalizing, or unsupportive of students of color, then students with these perceptions

of the campus climate are less likely to persist and earn degrees/certificates from that

institution (Johnson, Wasserman, Yildirim, & Yonai, 2014; Love, 2009). Research has

also shown that when minority students experience these types of discrimination, they create their own counterspaces as a defense mechanism against spaces in which they may feel academically and socially alienated (Solórzano, Ceja, & Yosso; 2000). For example, through focus group interview data collected from 34 students across three Research I institutions, Solorzano et al. (2000) examined the way African American students experience the campus racial climate. They found that racial microaggressions existed in the academic and social spaces of the campus environment. The sometimes subtle miniassaults had a negative impact on students' perceptions of the campus racial climate, leading to a decrease in students' academic performance and an increase of students' feelings of self-doubt and isolation (Solorzano, Ceja, & Yosso; 2000). Moreover, Yosso and colleagues (2009) extended this work with a focus on Latina/o college students. Their findings corroborate the previous study in those experiences of interpersonal and institutional level microaggressions on campus affected students' academic performance.

In another study of 1,491 first-year college students from a 4-year research institution in the United States, Johnson and colleagues (2014) examined the effects of students' stress and perceptions of campus racial climate on their decisions to persist. Of 37 variables included in their model, the authors found 17 significant direct effects and indirect effects on the persistence of students of color, with observing racism and feelings about the campus climate ranked among them. Specifically, Johnson et al. (2014) found an indirect effect of students' perceptions about the campus environment on retention and students' decisions to persist through institutional commitment. This particular finding aligns theoretically with the hypothesized path model presented in the current study. Providing further evidence of the relationship between campus racial climates and

students' intentions to persist in college, Strayhorn (2013) analyzed survey data from 391 undergraduates at a public research university. He found a statistically significant positive relationship between these factors for students who exceled academically, building support for the current proposed study. This suggested that these same constructs may have an opposite effect for students who are typically low-achieving in academics.

Love (2009), Fischer (2007; 2010), and Museus et al. (2008) all examined the relationships between campus racial climate and retention. They offered evidence on the correlation between these variables for minority students and rationale for exploring these factors for African Americans in particular. For example, Love (2009) surveyed 90 African American college students to examine the relationships between institutional barriers such as hostile campus climates and attrition rates and found a statistically positive correlation between students' perceptions of the campus climate and retention rates. Using a nationally representative sample of 8,482 first-year college students at two- and four-year institutions, Museus et al. (2008) sought to understand the racial differences in the effects of campus racial climate on students' persistence towards degree completion. Analysis revealed that while students of color in general were less satisfied with the campus climate than Caucasians, African American students were least satisfied. Moreover, for the effect of racial climate on degree completion, there was a positive indirect effect through social involvement for Hispanic students and a positive indirect effect through normative academic involvement for African American students. These findings give reason for further exploration in pinpointing factors influencing student persistence through their perceptions of the campus racial climate.

Researchers have found a strong correlation between campus climate and retention for minority populations (Johnson et al., 2014; Love, 2009; Love, Trammell, & Cartner, 2009; Strayhorn, 2013). While the role of campus climate in persistence seems intuitively clear, it is less obvious how campus racial climate may be directly affecting persistence and the extent to which other psychosocial factors may be contributing indirectly to influence students' decisions to persist. Given substantiated research on the relationship between sense of belonging and retention (Arana et al., 2011; Hausmann, Schofield, & Woods, 2007), students' sense of belonging may be one possible mediator in the indirect path from their perceptions of the campus racial climate to their intentions to stay or leave in institution.

Sense of Belonging

Sense of belonging has long been characterized as a basic human need (Deci & Ryan, 1991; Strayhorn, 2012). Deci and Ryan (1991) suggested that humans have an innate psychological need for relatedness, which involves feeling "a satisfying and coherent involvement with the social world more generally" (p. 243). They also posited that student development and success were thwarted when environmental conditions did not support this need. For the current study, sense of belonging is defined as "the experience of personal involvement in a system or environment so that persons feel themselves to be an integral part of that system or environment" (Hagerty et al., 1992, p. 173), where, in the current study, the system or environment is the postsecondary institution.

Precursors to Sense of Belonging

Research suggests a number of factors leading to students' feelings of belonging. For instance, Locks, Hurtado, Bowman, and Osegura (2008) examined antecedents to sense of belonging and found diverse peer interactions, perceived racial tension, and hours socializing per week each had significant effects. In another study, Zumbrunn, McKim, Buhs, and Hawley (2012) found that instructor academic and social support were influencers of students' perceived sense of belonging. Moreover, in a series of studies examining sense of belonging among different student groups (e.g., Latinos, gays, first-year students, STEM students of color, Black males, and graduate students), Strayhorn (2012) found that "students who were involved in campus clubs, organizations, and committees tended to have greater sense of belonging in college that their peers who were not involved" (p. 111). For students in developmental mathematics courses, Merseth (2011) makes the claim that these students have weaker ties to faculty and other peers. This lack of connection for students who may already have defeatist attitudes and personal perceptions that they are not math learners, may then further negatively influence involvement on campus and their sense of belonging at the classroom- and campus-levels. Though Hausmann et al. (2007) found that academic integration was not a predictor of students' sense of belonging at the beginning of the academic year, it was linked to students' development of sense of belonging over time. This suggests that students' academic integration may impact their sense of belonging and indirectly lead to them persevering in DE mathematics classes and ultimately in college.

Sense of Belonging as a Predictor

Though work has been done to identify precursors to sense of belonging, Hurtado and Carter (1997) posit that much of the work on student persistence neglects individual's subjective sense of belonging. For instance, two highly used models in research, Tinto's student integration model (1987, 1993) and Astin's model of student involvement (1984), both emphasize sense of belonging as behavioral involvement (e.g., social integration and student involvement) and disregard students' psychological sense of belonging as affected by the socialization of students (e.g., institutional fit and commitment) (Hausmann, Schofield, & Woods, 2009). In one study of two- and four-year institutions, Hausmann, Schofield, and Woods (2007) argue for the inclusion of sense of belonging in models of persistence. In doing so, the authors conducted an intervention designed to enhance students' sense of belonging and investigated the role of student's sense of belonging as a predictor for students' intentions to persist. All participants completed surveys that were administered to students at three time points within an academic year and included a measure of students' sense of belonging. The three groups were an enhanced sense of belonging group (i.e., students received written communication from university administrators emphasizing students' value to the university, an assurance that their survey responses could help improve campus life, and small logo-bearing paraphernalia), the gift control group (students received communication from the psychology department with no mention of campus community and small gifts with no university connection), and no-gift control (students only participated in the survey). It was hypothesized that these communications and gift would affects students' sense of belonging. As a result, the authors found sense of belonging was indeed a predictor of

students' intention to persist and though all students' sense of belonging declined over time, the decline was smaller for students assigned to the intervention groups. Moreover, the results gave implications that the start of students' freshman year was a particularly important time in which students' sense of belonging is influenced and decisions are made about persistence intentions.

Moreover, Walton and Cohen (2007) reported that uncertainty about belonging at an institution had associations with students' doubt in their academic skill and abilities. Strayhorn (2012) similarly proposed that feeling a sense of belonging to one's academic community was critical to feeling valued in college and developing a positive sense of self. Furthermore, Strayhorn reported students' feeling of belongingness as a major influence on their persistence and achievement in college.

Belonging Among Minority Students

Literature reveals that minority and first-generation students often feel less of a sense of belonging than their peers from the dominant culture (Huratado & Carter, 1997; Jacobs & Archie, 2008; Johnson et al., 2007), and thus are more inclined to have higher dropout rates. In a qualitative study of first-generation and Latino students, Arana and colleagues (2011) examined the role of the institutions context in their decisions to persist. The authors reported that students who re-counted a lack of connection with the institution were those who did not persist. Hurtado and Carter (1997) and Just (1999) argue that when marginalized students feel as if they do not fit in or that there is a hostile climate, then students' academic performance is negatively impacted. Further supporting this argument, in a sample of 305 first-year college students, Jacobs and Archie (2008) administered the Sense of Belonging Scale to establish a relationship between students'

sense of community and their intentions to persist. The researchers found that the relationship did exist and had a significant and positive impact on students' intent to persist; findings substantiated the work of Arana et al. (2011). Similarly, in a sample of 356 first-year college students, Hausmann and colleagues (2009) found sense of belonging directly affected institutional commitments for African American students. They also found institutional commitment mediated the relationship between sense of belonging and intentions to persist. These findings imply these students' sense of belonging impact their institutional commitment, and in turn influence their intentions to persist.

Maestas, Vaquer, and Zehr (2007) examined data from a longitudinal study on the unique experiences of students. Though data was initially collected as a part of a larger study across 10 institutions, the authors only explored the one Hispanic Serving Institution that was included in the Diverse Democracy Project. Using survey data from that sample of 421 students, the authors found that perceptions of faculty interest in students, financial stability, and living on campus were particularly important in garnering an increased sense of belonging. These findings parallel with Hurtado and Carter's (1997) results that showed that similar experiences of Hispanic students attending predominately White institutions significantly predicted students' sense of belonging. Building upon the seminal work of Hurtado and Carter (1997), which looked at the relationship between aspects of the college environment and sense of belonging, Alvarez et al. (2007) examined sense of belonging using a national sample of 2,967 first-year students. Their findings revealed that Caucasian students reported stronger feelings

of belonging than minority students, and students' perceptions of the campus racial climate were strongly related to their sense of belonging.

Campus Racial Climate and Sense of Belonging

Researchers have repeatedly made the claim that a more positive perception of campus racial climate is associated with a greater sense of belonging in students (Locks, 2008; Mendoza-Denton, 2002) and each factor is an essential component to positive academic outcomes (Hausmann et al., 2007; 2009), especially for marginalized populations such as low-income, first-generation, and racial minority students (Alvarez et al., 2007; Jackson, 2014). For African American students in particular, research has cited that their perceptions of the institutions' environment and their cultural congruity significantly influence their persistence (Museus et al., 2008; Museus & Quaye, 2009). In a study focused on the experiences of African American college students, Chavous (2005) found a positive association between negative perceptions of the campus racial climate and poor academic performance. This study also found that these negative perceptions were predictive of students' feelings of belonging. As a part of a larger, longitudinal research project comprised of 13,520 first-year students, Hurtado and Ponjuan (2005) found similar results to Chavous (2005) when they selected 370 Latino students from nine, four-year public institutions to examine the effects of the institutional climate on academic outcomes. The study showed that for students who perceived the campus climate in a negative light, their sense of belonging was significantly lower. In addition, this piece of students' college experience was shown to be a more powerful predictor for low sense of belonging than their positive interactions with diverse peers, participation in co-curricular diversity programs, and participation in academic support

programs. Furthermore, research has shown that perceptions of campus climate differ by race/ethnicity and first-generation status (Ancis, Sedlacek, & Mohr, 2000; Cabrera, Nora, Terenzini, Pascarella, & Hagedorn, 1999; Rankin & Reason, 2005). For example, Ancis, Sedlacek, and Mohr (2000) found that minority students perceived a more hostile or negative campus racial climate than students of the mainstream population.

Considering research has established a relationship between campus racial climate and sense of belonging (Locks, 2008; Chavous, 2005; Hurtado & Ponjuan, 2005; Mendoza-Denton, 2002), there remains a disparity in mediation models that examine these factors together in a path towards predicting achievement and persistence. Furthermore, race/ethnicity has not been examined as a possible moderator within this indirect path, or even the direct effects of each of these variables on academic achievement and persistence to see if the relationships may be more pronounced for some race/ethnic groups compared to others. Despite the barriers such as negative perceptions of the campus racial climate and low sense of belonging, 45.9% of African American students who begin at four-year public institution persist to graduation, and 55% Hispanic students persist to graduation (Shapiro et al., 2017). Research shows that in the face of negative experiences, both academic validation and general validation within academic settings may help reinforce students' self-worth and value (Hurtado, Alvarado, & Guillermo-Wann, 2012). Students who may be frustrated by their mere placement into developmental mathematics courses may have lower motivation to do well in class. Academic validation (e.g., acknowledging when students improve on test) and general validation (e.g., cultivating a community environment) may help foster students belongingness, which in turn may help them to remain resilient and persist in college.

Resilience

Research on resilience and persistence revealed that low-income (Cavazos Jr. et al., 2010), first-generation status (Cavazos Jr. et al., 2010; Ceja, 2004), and racial minority status (Watson, 2012), could each be experienced as a challenge, source of support, or both (Arana et al., 2011). Therefore, a possible explanation for why diverse students have intentions to persist, in spite of negative campus climates and low sense of belonging, may involve students' resilience.

Miller and MacIntosh (1999) defined resilience as the ability to "bounce back, recover, or successfully adapt in the face of obstacles and adversity." While Kitano and Lewis (2005) introduced four dynamics commonly used in theories of resilience: risk factors (e.g., inferior secondary schools and lack of parental support), protective factors (e.g., self-efficacy and self-regulation), vulnerability areas (e.g., race/ethnicity and socioeconomic status), and compensatory strategies (e.g., self-esteem and acceptance), Gordon (1995) encompassed each of these in a more comprehensive definition:

> Resilience is the ability to thrive, mature, and increase competence in the face of adverse circumstances. These circumstances may include biological abnormalities or environmental obstacles. Further, the adverse circumstances may be chronic and consistent or severe and infrequent. To thrive, mature, and increase competence, a person must draw upon all of his or her resources: biological, psychological, and environmental (Gordon, 1995, p. 7).

In conceptualizing resilience, some researchers view it as an outcome while others perceive it as a process (McCubbin, 2001). In this study, the term "resilience" will be examined as a process and defined as the ability to survive and thrive academically

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"despite the presence of potentially virulent risk factors" (Morales, 2014, p. 93).

Research has shown that resilience viewed as a process can help explain students'

aptitude, achievement, and academic persistence (Hartley, 2011).

Unpacking Resilience

According to the American Psychological Association (2014), resilience is not a

sole characteristic possessed by some and not by others. Instead, resilience is the

combination of behaviors, genetic influence, mindsets, and social skills. These protective

factors are divided into two dimensions: internal and external. Internal protective factors

that lead to ones resilience include personality traits (e.g., hardiness, see Maddi, 2007 and

Zolli & Healy, 2012), mindset beliefs (e.g., optimism, see Ong et al., 2010; stereotype

threat, see Owens & Lynch, 2012), and self-efficacy (Becker & Gable, 2009; Byrd &

McKinney, 2012). External protective factors that lead to ones strengthened resilience

include positive self-care (e.g., meditation, exercise, see Rutter et al., 2013; Skodol,

2010), a supportive and encouraging social network of individuals (Bronfenbrenner,

1979), and strong familial support (Luecken & Gress, 2010).

In a study of 605 undergraduate students, Hartley (2011) used hierarchal

regression analysis to examine the relationships between resilience, mental health, and

academic persistence. He found that intrapersonal resilience factors (e.g., tenacity,

tolerance of stress, and spirituality) contributed to students' cumulative grade point

average. In another study with a sample of over 200 community college students

enrolled in DE mathematics courses, Paunesku and colleagues (2012) evaluated an

intervention aimed at increasing students' resilience. The intervention required students

to read either an article on how intelligence is malleable or one on the brain but with no

mention of its potential to grow. Preliminary analysis showed that while 20% of the control group withdrew from the course, only 9% of students in the treatment group withdrew, implying that the intervention increased students' resilience and cut the withdrawal rate by more than half. These study supports the idea of using interventions to build resilience and in turn impact students' academic success in DE mathematics courses.

Minorities and Resilience

Though there are multiple general strategies for becoming resilient, there are also various racial obstacles that require students of color to be resilient in order to prevail and this study focuses on how students muster resilience in the face of a negative campus racial climate. In a seminal research study conducted by Allen (1992), 1,800 African American students across PWI's and HBCU's were surveyed to investigate how their background, campus experiences, and personality orientations were associated with academic achievement, social involvement, and career aspirations. Quantitative findings suggested that the achievement of students facing microaggressions at PWIs was lower in comparison to students who experienced a supportive environment at HBCUs. Further, in a more recent study, Harper (2012) examined the academic achievement of 219 African American males' across 43 higher educational institutions. Using a series of individual interviews and focus groups, Harper shared findings of resilient students in the navigation of racially charged campus climates. These students utilized coping strategies such as becoming engaged in campus leadership and reliance on familial and spiritual support to persist and achieve academically in spite of institutional impediments. Harper also reported that practicing prove-them-wrong behaviors, maintaining a high self-

efficacy, and forming meaningful and intentional peer relations enabled African American males to successfully navigate microaggressive campus environments (2006; 2009).

In a study of 98 undergraduate minority students, researchers investigated the psychological, social, and environmental constructs that may influence student persistence. The authors found that students' comfort with the campus environment was positively related to academic resilience (Gloria et al., 1999). Further, in a qualitative study of 11 Latina/o students at a Hispanic-serving institution, Cavazos Jr. et al. (2010) conducted interviews to understand how resilience was developed among these students. They found that high educational goals, parental support, intrinsic motivation, internal locus of control, and self-efficacy played a role in these students' high academic achievement. Similarly, in a study of 110 undocumented Latino students, Perez et al. (2009) examined academic resilience and found that students persisted in spite of elevated feelings of societal rejection. In addition, Strayhorn (2010) measured the relationship among resilience and academic outcomes for African American college students and found that in spite of reporting low to moderate levels of sense of belonging, these students had expectations of persisting to graduation. He also found that students with higher levels of academic resilience in turn earned higher GPAs during their freshman year in college.

With the demands of college (e.g., academic preparedness, integration into the college culture, etc.), learning how students from underrepresented groups succeed may inform more equitable practices that can be implemented. Thus, it was vital to incorporate resilience within the study to examine its role in mitigating the negative

effects of perceived campus racial climate on students' sense of belonging and persistence outcomes. Items measuring resilience (see Appendix A: Survey) were intentionally included in the survey to represent some of the unique strategies students of color might use to be resilience in spite of racially controversial campus environments.

Gaps in Literature

Though implying this review of literature is exhaustive would be in overstatement, it does provide a well-defined representation of persistence and retention research, particularly focusing on students from historically underrepresented populations. In this review of literature, research supports continued access and equity on college campuses through the examination of the relationship between campus racial climate and academic outcomes (Museus, Nichols, & Lambert, 2008; Yi, 2008), sense of belonging and retention (Morrow & Ackermann, 2012; O'Keefe, 2013), and differing perceptions of campus climate and their impact on students' sense of belonging and college experiences and outcomes (Museus et al., 2017; Rankin & Reason, 2005). Further, the research exploring resilience identifies ways in which it is used by students of color as a coping mechanism in the face of barriers such as negative, marginalizing, or unsupportive campus climates.

In particular, this review of literature highlights the extent to which each campus racial climate, sense of belonging, and resilience plays a role in students' academic achievement and success in college. A major finding in this review of literature is that the variables to be investigated in the current study have significant relationships in regards to the academic success of students from different race/ethnicity groups.

Knowing that students from underrepresented groups are less likely to persist though graduation (Thayer, 2000) and are more likely to be negatively affected by race-related issues on campus, it is imperative that research studies examine psychosocial variables, such as those of the current study, within settings these students frequent.

Looking across this research on student persistence and retention, campus racial climate, sense of belonging, and resilience are not all examined simultaneously in one study. Furthermore, there is a dearth of research on the interrelationships among these variables and the extent to which their relationships with persistence and DE mathematics achievement are moderated by race/ethnicity. Also, few studies have examined the causal paths through which these variable may work. Given Flaggs' (2016) pilot study is the extent of research examining this mediating moderation analysis in developmental mathematics courses, this study attempts to narrow a gap in persistence literature by exploring this under-researched student population. Only then can we further our understanding and appropriately address the magnitude these variables may have on students who are traditionally underrepresented in college.

III. METHODOLOGY

In this correlational study, quantitative data were collected using online surveys to investigate the relationships among psychosocial variables potentially effecting students enrolled in developmental (DE) mathematics courses. In chapter three of this dissertation, I start by describing the proposed conceptual model and introducing the research questions. I then describe the study context, data screening, participants, study design, instrumentation, procedures, and statistical analysis plan.

Proposed Conceptual Model

The hypothesized model is based on a blended framework that draws upon current literature on social inequalities in higher education and previous scholarship on sense of belonging and student persistence models. Sense of belonging models consistently includes the integration of student involvement, background experiences, and institutional commitment (Hausmann, Schofield, & Woods, 2007). Traditional models of college student retention have long recognized the importance of social and academic integration (Tinto, 1993) and the influence of outside characteristics on outcomes (Astin, 1993), but the influence of the campus racial climate on students' sense of belonging and persistence has not been a major focus of these models, perhaps because much of the early research on college student retention was not focused on variables differentially influencing students from underrepresented populations (Swail, 2003). Furthermore, while traditional models incorporate the influence of students' background when predicting persistence, they fail to recognize how student perceptions of the environment may be different for different student populations. The proposed model acknowledges the influences of both the background traits that students bring with them to college and

also the psychosocial factors that impact students once in college. The integration of students' demographics with their experiences in educational settings, particularly during their transition phase into college, lends insight to students' persistence and retention to degree completion (Princiotta et al., 2014).

Theory and research substantiates an existing and strong relationship between campus racial climate and sense of belonging (Lock et al., 2008; Museus, Nichols, & Lambert, 2008; O'Keeffee, 2013), suggesting that students who have negative perceptions of the campus climate are more likely to have a low sense of belonging and students with positive perceptions of the campus climate are more likely to feel a strong sense of belonging to that institution (Hurtado & Carter, 1997). While not all students who experience a negative campus racial climate or have a low sense of belonging necessarily have negative academic outcomes, findings from this study could help colleges and universities identify important variables to target in interventions and institutional self-studies. Figure 1 below illustrates the proposed path model of associations. The model begins with students' perceptions of the campus racial climate and its direct effect on students' sense of belonging and academic outcomes. It then hypothesizes that students' perceptions of the campus racial climate may influence their sense of belonging and in turn impact their academic outcomes, in a chain-like manner. Further, the model includes the hypothesis that negative outcomes may be mitigated by students' resilience.
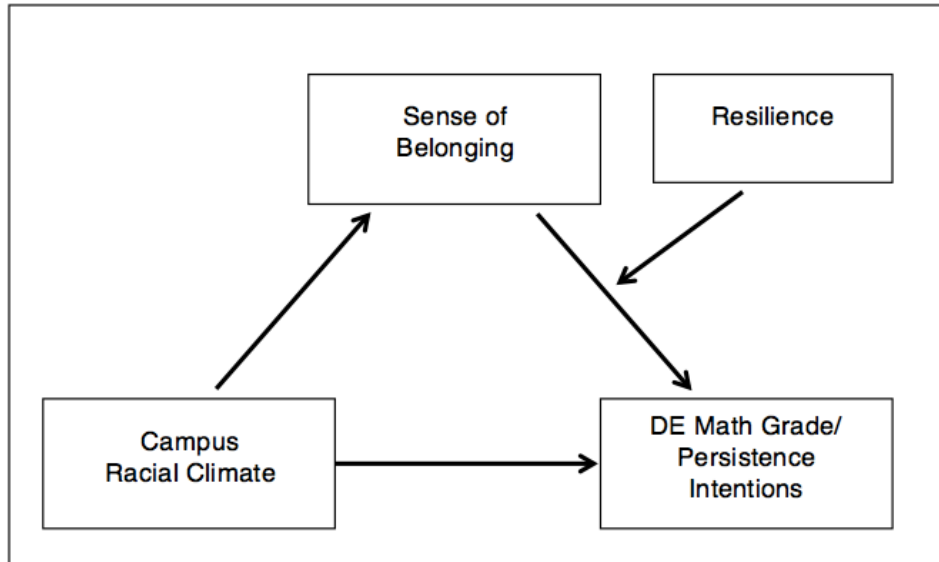
Figure 1: Proposed Mediation Model. The proposed path model was used to investigate the direct, indirect, and mediating effects of each of the variables on students' DE mathematics course grade and persistence intentions.

In a pilot study of 310 undergraduate students enrolled in DE mathematics courses at a four-year public institution, Flaggs (2016) found that campus racial climate had a positive indirect effect on persistence intentions through sense of belonging; and students who had a stronger sense of belonging at the institution were more likely to intend to persist to the next long semester than those with a weaker sense of belonging. The findings also suggested that African American students who perceived a negative campus racial climate were more likely to intend to drop out of college, whereas perceptions of the campus racial climate was not related to persistence intentions for Caucasian students. These pilot study findings helped to extend prior research by providing initial evidence of the mediating role of sense of belonging and the moderating role of race/ethnicity within this proposed model. The current study served to test the reproducibility of the results of the pilot study using improved methods (e.g., in the current study, I refined the survey, detailed in the Instrumentation section below and in

the EFA section of Chapter 4. I also revised the timing of the survey administration to meet assumptions of temporal precedence, discussed in more detail under the section on Procedures.)   Moreover, I included an additional research question used to gage students' overall perceptions of campus racial climate and feelings of belonging, then teased apart the data by race/ethnicity to more clearly understand and describe significant differences between groups.

Research Questions

This study aimed to answer confirmatory research questions. While literature supports an association between campus racial climate and sense of belonging, and the pilot study confirmed this association within a developmental (DE) mathematics setting, successful replication provides assurance of reliability and determination of generalizability. Considering the overrepresentation of historically underrepresented populations (e.g., low-income, first-generation, racial minority) in DE mathematics courses, it is surprising that there is a dearth of studies having explored perceptions of campus racial climate and sense of belonging for students enrolled in these courses. Furthermore, Flaggs (2016) is the only study having explored campus racial climate, sense of belonging, resilience, persistence intentions, and DE mathematics course grades together in one study. This leaves a gap in literature about potential variables and interactions between variables that may be at work in DE mathematics courses, which in turn may affect students' persistence intentions and/or DE mathematics course grades. The research questions follow (the questions below are identical to those provided in the introduction).

1. How do students enrolled in DE mathematics courses perceive the campus racial climate and their sense of belonging?

    a. Are students' perceptions of the campus racial climate and/or sense of belonging different in regards to their race/ethnicity?

2. What are the direct, indirect, and moderating effects of the study predictor variables on DE mathematics course grade and intent to persist?

    a. Are there direct effects of students' perceptions of campus racial climate and sense of belonging on intent to persist and DE mathematics course grade?

    b. Is there an indirect effect of campus racial climate through sense of belonging on intent to persist and DE mathematics course grade?

    c. Does resiliency moderate the relationships between sense of belonging and DE mathematics course grade and between sense of belonging and intent to persist?

    d. Does race/ethnicity moderate the direct and indirect effects within the proposed indirect path model? If so, what are the two- and three-way interactions between the study's predictor, outcome variables, and race/ethnicity?

Study Context

This study was conducted at a large, public institution in the South-Central United States. The institution is categorized as a Hispanic-Serving Institution, meaning at least 25% of undergraduate full-time students enrolled identify as Hispanic. Further,

approximately 52% of students identify as a racial or ethnic minority, 51% as first-generation, and 79% qualify for some sort of financial assistance.

In the fall of 2017, the institution offered developmental education courses in mathematics: 28 lab sections and 2 lecture sections. The purpose here is to provide characteristics of all students enrolled in these courses; characteristics of sample participants with valid data are provided in the participant's section below. A total of 670 students enrolled in one of two levels of DE mathematics offered at the institution: Elementary Algebra (n = 311; 46.4%) and Intermediate Algebra (n = 359; 53.6%). Data were collected from students in these DE mathematics courses, as these courses are nationally known to have a high percentage of low-income, first-generation, and racial minority students enrolled as well as high drop/fail/withdrawal (DFW) rates. The characteristics of students who enrolled in this course are particularly important for this study because these groups of students place at disproportionate rates into DE mathematics courses and research has identified these groups of students as those who are most affected by the psychosocial variables investigated in this study (Hausmann, Schofield, & Woods, 2007; Yosso et al., 2009; Spradlin, Rutkowski, Burroughs, & Lang, 2010; Pittman, 2012; Johnson et al., 2014).

Further, it is important to note that this study was conducted during the political atmosphere of the 2016 presidential election. This is especially noteworthy because the study results may have been influenced by the election results via a potential change in the overall campus climate. To be clear, Survey 1 and Survey 2 were separated by the election meaning Survey 1 was administered prior to the election and Survey 2 was administered after the election. Immediately after the election, student protest and rallies,

written and verbal communications, and more overt forms of racism seemed to taint the campus in which this study was conducted. For example, flyers of White supremacy, which included conditional threats to tar and feather diversity agents on campus, were posted on campus. It is important to note that the election and these provocations on campus occurred between the first and second survey because they could have affected students' responses to the survey items and the response rate to the survey. The potential implications of this will be discussed in the discussion section.

Inclusion Criteria

All data were screened for missing values and content nonresponsivity. Of the 535 students who consented to participate in this study, 150 did not have complete data on Survey 1 (campus racial climate), 104 did not have complete data on Survey 2 (sense of belonging and resilience), and 70 did not have complete data on Survey 3 (intent to persist). In order to examine the research questions, complete data were required at each time point. Thus, all of these cases ($N = 324$) were removed from further analysis. Four additional cases were removed due to content nonresponsivity, meaning the student responded without regard to item content (Nichols, Greene, & Schmolck, 1989). This identifier was employed when a student marked the same number for a full scale; all of these cases were deleted from further analyses. The data screening process resulted in a total sample size of 207 for further analyses.

Participants

As mentioned in the data screening section above, of the students enrolled, 535 students consented to participate in this study; 328 did not have complete data on all three surveys or had a pattern of content nonresponsivity – each of these students were

removed from the sample. The final sample of students used in the analysis consisted of 207 undergraduates enrolled in DE mathematics courses at a large public university in the South-Central United States. Similar in percentages to the total DE mathematics population, there were 43.5% ($n = 90$) student participants enrolled in Elementary Algebra and 56.5% ($n = 117$) student participants enrolled in Intermediate Algebra. The sample consisted of 15% males ($n = 31$) and 85% females ($n = 176$); this ratio is different than that of the institution (male = 42%, female = 58%), but the overrepresentation of female students in DE mathematics courses is common (Hagedorn et al., 1999; Topper, 2008). The race/ethnicity composition of the participants included 43 African Americans (20.8%), 73 Caucasians (35.3%), 81 Hispanics (39.1%), and 10 reporting multiple races or other (4.8%) (see Table 2 below for the race/ethnicity comparison with the institution's actual student enrollment). Students' ages ranged from 18 to 45 with an average age of 18 ($sd. = 2.604$). The majority of students were Freshmen ($n = 166$; 80.2%) or Sophomores ($n = 32$; 15.5%), but there were a few upperclassmen (Juniors: $n = 5$, 2.4%; Seniors: $n = 4$, 1.9%). The majority of students self-identified as continuing-generation ($n = 163$; 78.7%); less than a quarter of students self-identified as first-generation ($n = 44$; 21.3%). These participant characteristics are presented in Table 1.

Table 1

Student Characteristics

	Frequency (*f*)	Percent (%)
Course		
Elementary Algebra	90	43.5
Intermediate Algebra	117	56.5
Gender		
Male	31	15.0
Female	176	85.0
Student Classification		
Freshman	166	80.2
Sophomore	32	15.5
Junior	5	2.4
Senior	4	1.9
Generation Status		
First-generation	44	21.3
Continuing-generation	163	78.7

Note. The table show the characteristics of students within this sample of DE mathematics students.

Table 2

Comparison of Race/Ethnicity Breakdown by Percentage

	DE Mathematics Study Sample	DE Mathematics Total Enrolled	Institution
African American	20.8%	22.34%	10.68%
Caucasian	35.3%	33.13%	48.09%
Hispanic	39.1%	41.95	34.66%
Other (Asian, Hawaiian/Pacific Islander, International & Multi-Racial)	4.8%	2.58	6.57%

Note. The table shows evidence of the disproportionately high representation of African American and Hispanic students enrolled in DE mathematics courses as compared to the overall enrollment at this institution. It further shows that this study's sample is representative of the overall enrollment in DE mathematics courses at this institution.

Participation in the study was voluntary, though extra credit was extended to those who completed surveys. For students under the age of 18 and those not interested

in participating but still wanting to earn extra credit, they were offered three, one-page alternative essay assignments that took approximately the same time to complete as the surveys. There were two teachers of record, one for each level of DE mathematics; these instructors decided on the extra credit point system for their respective courses. For Elementary Algebra, Math 1300, students received five points of extra credit on their second exam for completing Survey 1, five points extra of credit on their fourth exam for completing Survey 2, and five points of extra credit on their final exam for completing Survey 3. Thus, students in Math 1300 could earn up to a total of 15 weighted points or 2.75 overall course percentage points. Likewise, for Intermediate Algebra, Math 1311, students received two points on these respective tests, which totaled to six weighted points or 1.1 overall course percentage points.

Kline (1998) suggested a minimum of ten participants per parameter, Green (1991) recommended a minimum of 200 participants total, and others have suggested 20 subjects per model parameter (Tabachnick & Fidell, 2013). Consistent with the body of research on the appropriateness of subjects for path analysis, this study meets the minimum number of students needed in the sample with a total of 207 students.

Research Design

A correlational research design was employed to investigate relationships among variables. The independent variables were not manipulated and instead simply measured and then used to predict the study outcomes. The proposed model included three predictor variables (i.e., campus racial climate, sense of belonging, and resilience) and two outcome variables (i.e., developmental mathematics course grade and intent to persist). Sense of belonging was also specified to act as a mediator variable between

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campus racial climate and the outcome variables. In addition, race/ethnicity was controlled for and resilience was measured to determine if they moderated relationships within the proposed model.

For this study, online surveys were used to measure the study variables; mathematics course grades were obtained from students' course instructors. Online surveys were administered at three time points – weeks 7, 12, and 16 of the fall semester. While, theory and research have established campus racial climate as an antecedent to sense of belonging and both as antecedents to persistence intentions (Hausmann et al., 2009; Locks, 2008; Mendoza-Denton, 2002), research studies, including the aforementioned pilot study (Flaggs, 2016), often measure these variables simultaneously and therefore violate assumptions of temporal precedence (i.e., evidence that a cause occurred prior to an effect), which is a necessary condition for providing evidence of causal order and for conducting path analysis. Since literature and the proposed model suggests that campus racial climate influences sense of belonging and that sense of belonging in turn influences intentions to persist, campus racial climate was measured at time one using Survey 1, sense of belonging was measured at time two using Survey 2, and students' persistence intentions were measured at time three using Survey 3. The timing of these measures helps to establish greater support for temporal precedence relative to the methods used in the pilot study, however, it should be noted that this alone does not provide certainty of temporal precedence (experimental manipulation would provide stronger evidence).

Instrumentation

I begin this section with a broad overview of the surveys administered to students at each time point followed by a more-detailed description of each instrument used to measure a specific construct. To see a complete listing of all survey items see Appendix B: Survey.

Surveys 1 and 2 consisted of 38 Likert-type items and measured students' perceptions of campus racial climate (17 items), sense of belonging (9 items), and resilience (12 items); Survey 1 also included eight self-reported demographic items. Survey 3 consisted of three Likert-type items that measured intentions to persist. See Appendix B: Survey for a comprehensive list of items. A 7-point Likert-type scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree" was used. A 7-point scale was chosen over a 5-point scale to give students more options to adequately and accurately respond to each item (Finstad, 2010).

Items used in this study were adapted from a pilot study of 310 undergraduate students enrolled in DE mathematics courses at the same public university in the South Central United States (Flaggs, 2016). The instrument was developed to measure students' perceptions of the campus racial climate, sense of belonging, and resilience. The items used in the pilot study were selected by the researcher from several existing instruments (described in following three subsections) because no single instrument was found that fully represented the constructs while adequately measuring the constructs as defined by this study. In the selection process, scales were compared to other scales measuring the same and/or similar constructs. Some items were used directly without modification, while other items were modified to better fit the operational definitions

within that study (i.e., adapted to refer to students' perceptions regarding their college experiences at the target institution). For example, the item "I can deal with whatever comes my direction" from the Connor Davison Resilience Scale (2003) was modified to state "I think I am good at dealing with the pressures/challenges of college." Each of the scales utilized are individually described in the subsequent sections. Preliminary exploratory factor analysis results from the pilot study suggested three constructs: campus racial climate, sense of belonging, and resilience. Each of these three constructs had Cronbach's alpha reliability coefficients above .80. More specific details on each scale can be found in the subsequent sections.

Campus Racial Climate

For this research study, campus racial climate was broadly defined as students' overall perceptions of the racial environment on a college campus (Solorzano, Ceja, & Yosso, 2000). The campus racial climate scale, derived from other scales and tested in Flaggs' (2016) pilot study, was used in the current study. This scale measures the degree to which students perceived the university's racial environment positively, negatively, and/or neutrally. The makeup of the 17-item campus racial climate scale included six items from the Diverse Learning Environments (DLE) Survey, three items from the University Environment Scale (UES), four items from the Cultural Attitudes and Climate Questionnaire (CACQ), one item from the National Study of Living-Learning Programs (NSLLP) Instrument, and the remaining three items were created using literature and personal experiences of the researcher.

The survey instructions asked students to consider their observations and personal experiences on campus and select the number, on a 7-point Likert type scale, that best

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described their perceptions of the campus environment. Two example items from the scale are "Racism is a problem at this college" and "This college seems to value minority students."

Flaggs' (2016) pilot study reported on the psychometric properties of this scale using students in developmental mathematics courses. Exploratory factor analysis results showed two factors explained 56% of the variance; positively- and negatively-worded items loaded on two separate factors, which were later collapsed into one scale. Though the distinct yet highly correlated appearance of two factors was a result of reverse-coded items, the factors were collapsed because it was determined that artifactual factors appeared based on the response patterns to these items. Specifically, the separately loaded factors reflected the "greater magnitude of correlation within versus across item type based on the distributions of responses to items rather than multiple constructs (Spector, Katwyk, Brannick, 1997, p. 664). Reliability analysis showed a Cronbach's alpha of .899; the campus racial climate scale developed in the pilot was used for the current study. High intercorrelations between items demonstrated the scale items were related to the same construct. Further, concurrent validity showed the scale measured what it was intended to measure, as evidenced in the correlation between campus racial climate and sense of belonging.

Sense of Belonging

For the purposes of this study, sense of belonging was defined as "the experience of personal involvement in a system or environment so that persons feel themselves to be an integral part of that system or environment" (Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992, p. 173). Nine items were used to measure students' sense of

belonging and were derived from other scales and tested in Flaggs' (2016) pilot study. Included were four items were taken from the Sense of Belonging Instrument (SOBI-P) and five items from the National Study of Living-Learning Programs (NSLLP) Instrument.

For each item, students were asked to consider their personal experiences on campus and respond on a 7-point Likert type scale the degree to which they agreed or disagreed with the statement. "I wonder if I really fit in with others on campus" and "I feel a sense of belonging to this campus" are two examples of items from the scale.

The results of an exploratory factor analysis in Flaggs' (2016) pilot study revealed the nine items measuring students' sense of belonging loaded separately as positive and negative items. The number of Eigenvalues agreed with the scree plot; 64% of the variance was explained by two factors. Identical to the rationale explained with the 2-factor loading for the campus racial climate measure, these factors were collapsed into one as it was apparent that the correlations between items on the same end of the continuum were comparatively strong and those on opposite ends of the continuum were attenuated (Spector, Katwyk, Brannick, 1997). Nonetheless, the two factors represented the same construct. The Cronbach's alpha reliability coefficient for the pilot scale was .857. Further concurrent validity was reflected in the relationship between sense of belonging and students' persistence intentions.

Resilience

As per Morales (2014), resilience was defined as the ability to thrive academically "despite the presence of potentially virulent risk factors" (p. 93). For this study, twelve items were taken from the Connor-Davidson Resilience Scale (CD-RISC) to measure

students' resilience, or ability to cope with adversity; however, though research suggested a correlation between resilience and persistence (Paunesku et al., 2012), the findings in Flaggs' (2016) pilot study revealed that resilience was not found to be a statistically significant predictor of persistence intention or a moderator variable. It was thus possible that the scale used referred to resilience generally and did not encompass students' overall resilience as a college student. This limitation may have prompted students about their resilience academically (e.g., with coursework, test-taking) as opposed to their resilience as a college student, which may have yielded different results.

The resilience scale was modified based on the pilot study's findings to include terms that reminded students to consider their resilience as a college student. Modifications included adapting six items, constructing three new items from personal experience, and omitting three items. For example, the item "I am able to adapt to change" was adapted by adding the prefix "In college," to the beginning. Another example item from the scale stated "Experiencing negative events on campus would not stop me from reaching my academic goals."

The exploratory factor analysis for the pilot study showed two factors explained 67% of the total variance; the scree plot had an elbow after one factor. The Cronbach's alpha reliability was .934.

Developmental Mathematics Course Grade

Course grades were obtained from the instructors. Previous research has shown grades to be a commonly-used and valid measure of academic achievement of college students (Allen, 2005). Course grades at this institution were defined as follows: credit (CR), defined by earning a 70% or above and permitted students to advance to the next

course; progress (RP), defined by earning between a 50% and 69% and needing to repeat the course; and failing (RF/RU), defined by earning a 49% or below and needing to repeat the course. Course grade was transformed into a dichotomous variable with students earning credit coded as pass and all others as did not pass.

Intent to Persist

In this study, intent to persist was defined as students' intentions to enroll the next academic year (Fall, 2017). Information from three items were collected, however, the focus was on students' intention to persist to the following fall semester and therefore asked students to use a Likert scale ranging from one to seven to rate their persistence intentions – "I intend to be enrolled at [institution name] in the Fall semester"; the other two items (spring 2017 intentions and graduation intentions) were measured for exploratory purposes beyond the scope of this dissertation. All three items were tested in a previous collaboration with Dr. Tayor Acee (personal communication, Fall, 2015) as well as in Flaggs' (2016) pilot study. Students' intentions to persist were self-reported; research has suggested students' intentions were positively related to actual persistence (Bean, 1982; Cabrera, Castaneda, Nora, & Hengstler, 1992; Barnett, 2011).

Race/Ethnicity

Race/ethnicity was measured using two, multiple-choice items. The first item asked "What is your ethnicity? Check one" and students were able to choose between "Hispanic or Latino" and "Not Hispanic or Latino." The second item asked "What is your race: Check all that apply" and students were given the following options: African American or Black, Asian/Pacific Islander, Caucasian or White, Hispanic or Latino,

First-Generation

Students' first-generation status was measured using two, multiple-choice items, which asked their parents' level of education. The options ranged from "no high school" to "graduate degree." Students were also given to option to select "I do not know."

Social-Economic Status

Students' family income was measured using one multiple-choice item that asked "which of the following best describes your yearly family income?" Options included the following: less than 14,999, 15,000 – 24,999, 25,000 – 34,999, 35,000 – 49,999, 50,000 – 74,999, 75,000 – 99,999, and 100,000+."

Procedures

Following the script (found in Appendix A), the researcher administered consent forms during the last 15 minutes of each class. This was done prior to the opening of the first survey. For absent students, the consent form and was posted on each courses' TRACS site, the university's learning management system. Survey 1 was administered during week seven of the fall semester using a 38-item self-report survey that contained items on campus racial climate, sense of belonging, and resilience. Demographic information was obtained through a self-report measure from students found attached to the end of Survey 1. Survey 2 was administered using the same 38-item self-report survey during the week prior to Thanksgiving break, week 12. Survey 3 was administered at the end of the semester during final exams, week 16. The third and final survey included a three-item intent to persist measure.

Each survey link was emailed through TRACS and was administered via Qualtrics, a secure, online survey tool offered through the institution; each link was open

for exactly one week. Reminders were sent to students with the survey link approximately 24 hours before each closing time. Developmental mathematics course grades were obtained from the instructors. The consent form and further description of the protocol and guidelines for administration is included in Appendix A. Table 3 below illustrates a detailed timeline of the study's procedure.

Table 3

Overview of Study Procedures

Stage of Project	Timing	Activity
Consent	Approximately 6 weeks into the semester	• Consent forms administered during last 15 minutes of each class
Survey 1	Approximately 7 weeks into the semester (Mid-semester)	• Students took online survey with CRC, SB, Resilience measures • Student completed demographic survey
Survey 2	Approximately 12 weeks into the semester (Thanksgiving break)	• Students took online survey with CRC, SB, and Resilience measures
Survey 3	Approximately 16 weeks into the semester (Final exams)	• Students took online survey with intent to persist measure
Grades	Approximately 3 weeks after the semester ended	• Researcher obtained grade data from instructors

Note. CRC refers to campus racial climate; SB refers to sense of belonging.

Analyses

Exploratory factor analysis was conducted using principal axis factoring and an oblique rotation technique (Promax) that allowed factors to freely correlate with each other rather than maintaining interdependence between rotated factors. The EFA served to assess the content validity of the measurement instruments and identify potentially problematic items that, if removed, could improve the psychometric properties of the instruments. The EFA output in SPSS (version 25.0 for Mac) was examined to determine

the factor model that best fit the data. In determining the dimensionality of the instrument (i.e., the number of distinct factors measured by the set of items being analyzed), I examined the Scree plot, Eigenvalues, and the total variance explained. Specifically, I checked that the Eigenvalues of extracted factors met the Kaiser criterion of greater than one and the total variance explained was at or around 60% (Hair et al., 2009). The scree plot was also used to inform decisions regarding the dimensionality of the instrument. Following (Tabachnick and Fidell, 2013), I inspected the Scree plot in an attempt to find its "elbow" (which is not always clearly defined); ideally, factors above the elbow explain substantial variation in the items and should be retained, whereas factors below the elbow do not explain substantial variation and instead suggest diminishing returns of specifying additional factors.

In interpreting the results of the factor analysis, the pattern matrix was examined for items with weak loadings and for cross loadings. According to Tabachnick and Fidell (2013), the interpretation of the factor pattern matrix is easier and the difference between high and low loadings is more apparent than in the structure matrix. Also, the pattern matrix takes into account the fact that the factors are correlated. Items with a factor loading weight greater than .32 were retained for analysis and factor loadings exceeding .80 were further analyzed to ensure that from a contextual perspective, the items were measuring different aspects of the construct (Tabachnick & Fidell, 2013).

For the reliability analysis, Cronbach's Alpha was calculated for each scale, which is a measure of internal-consistency reliability. Item-total statistics were examined to determine if there were any problematic items that had weak or negative corrected item-total correlations. In addition, each item was assessed individually to determine if

by deleting it, the strength of Cronbach's Alpha would be increased. Furthermore, prior to deleting an item, careful attention was given to how the question was worded and if the item should be retained despite the gain in value of Cronbach's Alpha.

To address Research Question 1, the data were first analyzed using descriptive statistics in SPSS (version 25.0 for Mac). This question asked, "How do students enrolled in DE mathematics courses perceive the campus racial climate and sense of belonging?" The descriptive analysis involved computing means and standard deviations of campus racial climate and sense of belonging for each race/ethnicity group; this analysis was used to describe students' perceptions in regards to these two variables. Subsequently, independent samples t-test and one-way analysis of variance (ANOVA) were used to test mean differences between race/ethnicity groups in relation to their perceptions of the campus racial climate and their sense of belonging. The next step involved examining if the relationship between campus racial climate and sense of belonging existed for students in DE mathematics courses. A Pearson product-moment correlation analysis was conducted to determine the relationship between campus racial climate and sense of belonging.

To address Research Question 2, path analysis in MPlus (version 8.0 for Mac) was used to examine the direct, indirect, and moderating effects within the proposed model. More specifically, a conditional indirect effects model was utilized to test the effects of three predictor variables (campus racial climate, sense of belonging, and resilience), with covariate (race/ethnicity), on the outcome variables (DE mathematics course grade and intent to persist). Preliminary analyses were performed to check for

assumption violations and to help ensure the research and resulting interpretations were valid.

Since there were two dependent measures (i.e., DE mathematics course grade and intent to persist), separate analyses were conducted in MPlus (version 8.0 for Mac) for each dependent measure. DE mathematics course grade was transformed into a dichotomous outcome variable (pass/did not pass); intent to persist was an ordinal variable and it was not transformed. Diagonally weighted least squares (WLSMV) was used as an estimator in MPlus to model the data because the data were skewed (i.e., substantially more students passed their DE course and substantially more students indicated strong intentions to persist) and WLSMV does not assume distributional assumptions (Brown, 2006).

Within the path model, direct effects were examined to estimate the relationships between each of the predictors and student outcomes (i.e., Grade and INT). Further, indirect effects were examined within the path analysis model to determine if sense of belonging mediated the relationship between campus racial climate and the outcome variables. Also, a conditional indirect effects model (i.e., path analysis with at least one path being moderated by another factor) was used to test if resilience and/or race/ethnicity acted as a moderator within the indirect path.

As a note, race/ethnicity was dummy coded as African American, Hispanic, other, and Caucasian as the reference group. Separate analyses also tested if there were differences in regards to students' race/ethnicity within the indirect path. Multiple two- and three-way interactions were tested with each dependent variable; only significant interactions were included in the final model, as suggested by Cohen et al. (2013).

In this chapter, I introduced the conceptual model used in framing this study and also reviewed the research questions guiding the current study. The model illustrated the idea that students' perception of the campus racial climate influenced their sense of belonging, and in turn impacted their academic outcomes (i.e., DE mathematics course grade and intent to persist). Further, I outlined the study context, described the participants, and explained the research design, instrumentation, procedures, and analyses. More specifically, I introduced the correlational research design implemented using online surveys administered at three time points throughout the semester to appropriately address the given research questions. In the subsequent chapter, I will present the findings and results in respect to these research questions.

IV. RESULTS

The present study was an attempt to understand the relationships between campus racial climate, sense of belonging, resilience, race/ethnicity, and how they further interacted to influence students' developmental mathematics course grade and intentions to persist in college. As presented in the previous chapter, data were collected and used in statistical analyses for a sample of 207 undergraduate students enrolled in one of two levels of developmental mathematics. The present chapter includes the results of the preliminary analyses, followed by the results of the primary analyses.

Preliminary Analyses

The preliminary analyses included factor and reliability analyses, descriptive statistics, and testing assumptions. Each of these separate analyses are presented next and were necessary preliminary steps to running the primary analyses used to address the research questions posed in this study.

Exploratory Factor Analysis

Exploratory factor analysis (EFA) was conducted on the scale items previously to identify the underlying factor structure that the 38 items represented and to help identify the best factor solution for the scales. To determine the dimensionality of the instrument and establish validity evidence for the study measures, an EFA was conducted in SPSS (version 25.0 for Mac) using this new sample of participants enrolled in developmental mathematics courses. The objective was to identify distinct correlated factors with appropriate factor loadings and determine the extent to which the items represented the theoretical constructs empirically. Items measuring campus racial climate (17), sense of belonging (9), and resilience (12) were all included in one factor analyses, and it was

expected that there would be three distinct correlated factors. Prior to running the factor analysis, negative items were reverse-coded. An oblique rotation technique (Promax) was utilized that assumed the factors in the analysis were correlated (Gorsuch, 1983). Principal axis factoring was utilized as the extraction method to understand the shared variance in the set of measurements through factors without the redistribution of the variance unique to any one variable (Tabachnick & Fidell, 2007).

Theoretically the items were expected to represent three distinct constructs, however, the scree plot was unclear in determining the cutoff for extraction. It was clear though, in the pilot study that the two factors that loaded on each campus racial climate and sense of belonging represented positive- and negative-worded items. It was thus plausible to assume that the negative loadings did not reflect a separate structural property and instead were a product of response styles associated with the wording of the items (see Marsh, 1996); thus, they represented the same construct. I concluded that separating the positive- and negative-worded items into different constructs would not provide a holistic representation of each construct. Based on theory, practice, the operational definitions used in the current study, and previous EFA exploration in Flaggs (2016), I decided to fix the number of factors to extract: three. According to Cattell (1966) it is good practice to combine appropriate criteria (e.g., Eigenvalues higher than one, elbow of the scree plot, Kaiser criterion) to decide how many components or factors to retain; this study followed this recommendation.

The pattern matrix was then examined to identify items with weak loading values and crossloadings. As a note, the pattern matrix showed that positively-worded items did not load on a separate factor from negatively-worded items. It suggested the resilience

items loaded on one factor, the sense of belonging items loaded on one factor, and the campus racial climate items loaded on a single factor, with the exception of seven problematic items. Two of these seven items had weak loading values (one resilience item and one campus racial climate item) and five items crossloaded on sense of belonging (one resilience item and four campus racial climate items). After reviewing the problematic items that crossloaded on another factor from a content perspective, it was determined that these items could be viewed as antecedents to students' perceptions of the environment. The weak item loading values, crossloadings, and examination of item content lead to the decision to remove the seven items from further analysis.

After removing the aforementioned items (i.e., five items from campus racial climate and two items from resilience), I ran another EFA to examine the factor structure of the remaining 31 items, the factor analysis successfully factored these scales into a three-factor simple solution, as expected. The final 3-factor solution (see table 4) included 31 items (CRC had 12 items; SB had 9 items; RES had 10 items) and accounted for 49.89% of the variation in the items; these 31 items were subsequently used to perform separate reliability analyses for the campus racial climate, sense of belonging, and resilience scales (see the following section for reliability analysis results).

Table 4

Pattern Matrix of Retained Self-Report Measures

Survey Items	CRC	SB	RES
There is racial conflict on campus.	**.742**	-.244	.015
I expect to encounter racism when I'm on campus.	**.655**	-.110	-.041
Racism is a problem at this college.	**.645**	-.163	-.061
On campus, there is a sense of trust and respect for people of all racial/ethnic groups.	**.599**	.117	-.045
There is a racial/ethnic separation on campus.	**.586**	.164	-.113
This college seems like a cold, uncaring place for minorities.	**.562**	.109	.029
I have been harassed or discriminated against on campus because of my race/ethnicity.	**.524**	-.018	-.101
This college supports ethnic groups on campus.	**.452**	.135	.162
Because of my race/ethnicity, instructors make assumptions about me.	**.417**	.111	.016
An appreciation of cultural differences is promoted on campus.	**.408**	.111	.058
People on campus speak regularly about the value of diversity.	**.383**	.003	.134
This college seems to value minority students.	**.373**	.112	.022
I feel like an outsider on campus.	-.044	**.845**	-.104
I feel like a member of the campus community.	-.113	**.834**	.040
When I'm on campus, I feel left out.	.027	**.827**	-.109
I feel a sense of belonging to this campus.	-.041	**.721**	.045
I feel comfortable when I'm on campus.	.115	**.697**	.076
I wonder if I really fit in with others on campus.	-.078	**.687**	-.088
I would choose the same college over again.	.020	**.684**	.067
My college is supportive of me.	.113	**.648**	.175
I do not feel valued or important on campus.	.122	**.579**	.003
I think I am good at dealing with the pressures/challenges of college.	.042	-.117	**.945**
I am mentally capable of persisting in the face of challenges.	.029	-.053	**.929**
I think of myself as a strong person.	-.018	-.072	**.873**
I have a strong sense of purpose.	.043	-.032	**.841**

Table 4 cont.

I am confident I can successfully manage my emotions about the culture of this college.	.012	-.036	**.826**
When things look hopeless, I don't give up.	-.090	.059	**.796**
I am not easily discouraged by failure.	-.019	-.053	**.737**
I work hard to reach my most challenging academic goals.	-.014	.105	**.718**
I tend to bounce back after a setback or hardship in college.	-.089	.135	**.717**
In college, I can handle whatever comes my way.	.033	.079	**.670**

Note. The bolded values represent the strongest factor loadings for the survey item and are shown sorted by size. Campus racial climate (CRC) items accounted for 6.375% of the variation; sense of belonging (SB) accounted for 13.642% of the variation; resilience (RES) accounted for 29.877% of the variation.

Reliability Analyses

Separate internal-consistency reliability analyses were conducted for each scale and Cronbach's alpha coefficients for each scale were above .80 suggesting strong reliability (see Table 4). As part of the reliability analysis, I also examined the corrected item-total correlations and resulting Cronbach's alphas if an item was removed; I found not problems with any of the items based on this examination. Moreover, I inspected the inter-item correlation coefficients to determine if there were problematically high correlations of .80 or higher between pairs of items (Tabachnick & Fidell, 2013); again I found no problems. Given that the reliability analyses yielded strong results and did not suggest that I should remove additional items, I computed scale scores for the three constructs represented: campus racial climate, sense of belonging, and resilience (see Table 5 for descriptive statistics on each scale).

Table 5

Descriptive Statistics and Reliability of Measures

Measure	# of Items	*M*	*SD*	α	Minimum	Maximum
Campus Racial Climate	12	5.832	.86	.83	3.00	7.00
Sense of Belonging	9	5.183	1.29	.91	2.11	7.00
Resilience	10	5.531	1.16	.95	2.45	7.00

Note. Each scale ranged from 1 (Strongly Disagree) to 7 (Strongly Agree).

Course Grade. Descriptions of the course grade are presented next. Grades earned are reported on a spectrum of students' progress. Using traditional letter grades, the letter distribution of DE mathematics course grades was as follows: A ($n = 49$, 23.7%), B ($n = 72$, 34.8 %), C ($n = 70$, 31.4%), D ($n = 8$, 6.3%), F ($n = 7$, 3.4%), and I ($n = 1$, .5%). However, the official grades reported to the university were simpler; the corresponding distribution of DE mathematics course grades officially registered with the university was as follows: credit ($n = 191$, 92.3%), progress ($n = 11$, 5.3%), and failing ($n = 5$, 2.4%). These data were transformed into a dichotomous outcome variable in which pass (1) was defined as advancement to next course by earning a course grade of credit (CR), or letters A, B, or C; did not pass (0) was defined as needing to repeat the course by earning progress (RP), failing (RF/RU), and incomplete (I), or letters D, F, or I. A Chi-square test of independence was conducted to determine if the course success (pass/did not pass) of students who consented, but removed from the study due to incomplete survey data ($N = 328$), were statistically different from those retained ($N = 207$). In other words, how did the frequency of students passing the course compare between the two sample sizes? This step was important because research has cited differences may exist between survey responders/completers versus non-responders/completers (NSSE, 2016;

Fosnacht, Sarraf, Howe, & Peck, 2017), suggesting non-completers may be less engaged. In this analysis, the results between the two groups were found to be significantly different, χ^2 (1, $N = 535$) = 30.29, $p < .05$. That is, out of the 207 participants in the final sample, 92.3% earned a passing grade, whereas only 72.9% of the 328 participates removed for incomplete survey data earned a passing grade and 80.4% of all consenters earned a passing grade (see table 6). This suggests that the findings of this study, in regards to course grade, may not be generalizable across the full spectrum of students enrolled in developmental mathematics courses, as the data used to examine my research questions were limited to those who complete my surveys and these students had higher course scores on average. Further discussion about the implications of this finding can be found in the limitations section. The overall mean for students passing the course in the study's sample was 0.92 ($SD = 0.27$), that is, on average 92% of students passed with a 70% or above.

Table 6

*Sample Size * Course Grade Crosstabulation*

Sample		Course Grade Did Not Pass	Pass	Total
Retained ($N = 207$)	Count	16	191	207
	% within Sample Size	7.7%	92.3%	100.0%
	% of Total	3.0%	35.7%	38.7%
Deleted ($N = 328$)	Count	89	239	328
	% within Sample	27.1%	72.9%	100.0%
	% of Total	16.6%	44.7%	61.3%
Total	Count	105	430	535
	% of Total	19.6%	80.4%	100.0%

Testing Assumptions

The data were tested in SPSS (version 25.0 for Mac) to check if the assumptions

for regression were met. There was not an issue with multicollenarity, however the

assumptions of linearity, normality, and homoscedasticity were not met. After trying and

failing to meet individual assumptions of each multiple regression, binomial logistic

regression, and ordinal regression in SPSS, it was determined that due to the nature of the

course grade and intent to persist variables, it was more than plausible that the skewness

of the data represented the population sampled. Thus it was important to utilize a method

that did not require distributional assumptions. Diagonally weighted least squares

(WLSMV) is an estimator in MPlus typically used for modeling categorical or ordinal

data and does not assume distributional assumptions (Brown, 2006). It instead assumes a

normal latent distribution that underlies the observed categorical variable (Li, 2015).

Therefore, using WLSMV was found to be the best approach for analyzing the data in

this study.

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Primary Analyses

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The primary analyses addressed the research questions posed in chapter one and

included again in chapter three. Research Question 1 was addressed using descriptive

statistics and mean comparisons in SPSS (Version 25 for Mac). Research Question 2

(and the sub-questions) were addressed using path analysis in MPlus (Version 8.0 for

Mac).

Of particular importance is the positive relationship found between campus racial

climate and sense of belonging ($r = .393, p < .01$) as it is previously substantiated through

literature and validated with students in developmental mathematics courses though a

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pilot study. Moreover, there is a statistically significant correlation between students'

perception of the campus racial climate and their sense of belonging (β = .394, *SE* = .063,

95% CI [.270, .518]), suggesting that students with a positive perception of the campus

racial climate were more likely to have a stronger sense of belonging and students with

negative perceptions of the campus racial climate were more likely to posses a weak

sense of belonging. A statistically significant bivariate correlation was also found for

sense of belonging with resilience (r = .447, *p* < .01).

Research Question 1

Descriptive statistics and mean comparisons were used to address Research

Question 1 which asks "how do students enrolled in DE mathematics courses perceive

the campus racial climate and sense of belonging" and do these perceptions vary by

race/ethnicity.

Campus racial climate. Table 7 below shows the frequency and percent of

students who scored at different ranges of this scale. A total of 84.1% of students

reported scores of 5, 6, or 7; 3.4% of students reported scores of 1,2, or 3, and 12.5%

selected the middle option on the scale, 4. This implies that the majority of students

enrolled in DE mathematics courses at this institution had a positive perception of the

campus racial climate.

Table 7

Students' Perceptions of the Campus Racial Climate

Scale Score	Frequency	Percent (%)	Cumulative %
1.00 – 1.99	0	0.0	0.0
2.00 – 2.99	0	0.0	0.0
3.00 – 3.99	7	3.4	3.4
4.00 – 4.99	26	12.6	15.9
5.00 – 5.99	63	30.4	46.4
6.00 – 6.99	103	49.8	96.1
7	8	3.9	100.0

Note. Higher scores indicate a more positive perceived campus racial climate.

In terms of mean differences between race/ethnicity groups, a one-way ANOVA revealed that there were statistically significant differences in students' perceptions of the campus racial climate between groups, $F(3, 203) = 5.17, p < .05$. Though findings from research question one suggest that the majority of students view the campus racial climate more positively, I ran post hoc test with Bonferroni adjustments to determine which groups were significantly different. This revealed that African American students' perceptions of the campus racial climate were significantly different from each of the other race/ethnicity groups. That is, African American students had significantly lower mean campus racial climate perceptions ($M = 5.40$) compared to Caucasians ($M = 6.00$), Hispanics ($M = 5.89$), and mixed/other ($M = 6.12$) (see table 8). These differences can be clearly seen in figure 2 depicting the mean scores of each of the four groups. This finding suggests that African Americans at this institution had a baseline perception of the campus racial climate that was significantly different and less positive compared to each of the other racial/ethnic groups.

Table 8

Multiple Comparisons between Race/Ethnicity Groups

(I) Race/Ethnicity	(J) Race/Ethnicity	Mean Difference (I-J)	Std. Error	Sig.
African American	Caucasian	-.59427*	.16132	.000
	Hispanic	-.47744*	.15834	.003
	Mixed/Other	-.71550*	.29461	.016
Caucasian	Hispanic	-.11683	.13543	.389
	Mixed/Other	-.12123	28296	.669
Hispanic	Mixed/Other	-.23807	.15834	.003

Note. * $p < .05$. The means for African American students were significantly different compared to other race/ethnicity groups.
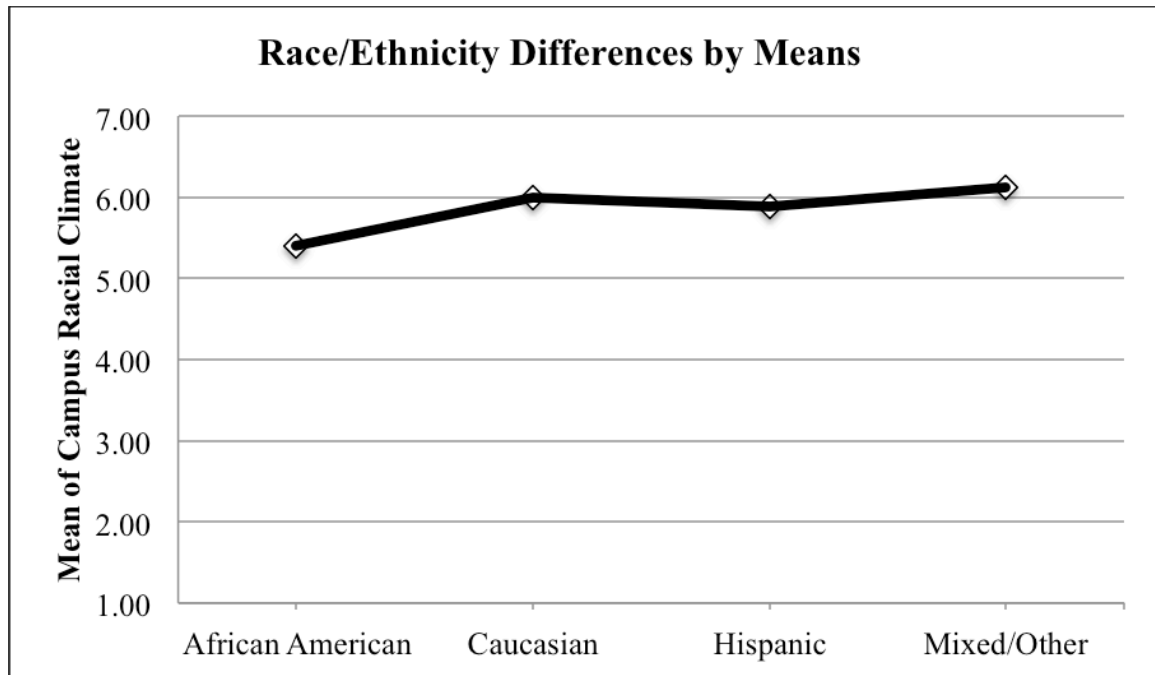

Figure 2: Race/Ethnicity Differences by Means. Mean differences by race/ethnicity group show African American students had a baseline perception of the campus racial climate (CRC) that was statistically lower than those of other groups. The CRC scale ranged from 1 to 7 with higher scores indicating more positive perceptions.

Sense of belonging. Table 9 below shows the frequency and percent of students who scored at different ranges of the sense of belonging scale. The distribution of responses were more normally distributed than what was presented above for students' perceptions of the campus racial climate. Only about half of the students, 55.5%, reported a sense of belonging score of 5,6, or 7. A total of 18.4% of students reported their sense of belonging to the institution as a 1, 2, or 3. The remaining 26.1% of students reported a score of four (i.e., the midpoint of the scale). This implies that though the slight majority of students had a stronger sense of belonging to the institution, a considerable percentage of students did not share those same feelings of belonging. In fact, it suggests a notable variation in students' sense of belonging, which will be further discussed in chapter five.

Table 9

Students' Sense of Belonging to the Institution

Scale Score	Frequency	Percent (%)	Cumulative %
1.00 – 1.99	0	0.0	0.0
2.00 – 2.99	10	4.8	4.8
3.00 – 3.99	28	13.5	18.4
4.00 – 4.99	54	26.1	44.4
5.00 – 5.99	43	20.8	65.2
6.00 – 6.99	51	24.6	89.9
7	21	10.1	100.0

Note. Higher scores indicate a stronger sense of belonging.

A one-way ANOVA revealed there were no significantly different means between race/ethnicity groups in terms of students' sense of belonging. This finding implied that each of the different subgroups were similar in regards to their sense of belonging.

Research Question 2

The second research question asked what are the direct (Research Question 2a), indirect (Research Question 2b), and moderating (Research Question 2c) effects of the study's predictor variables – perceptions of the campus racial climate, sense of belonging, and resilience – on DE mathematics course grade and intent to persist. Moreover, Research Question 2d asked does race/ethnicity moderate the direct and indirect effects within the proposed indirect path model and if so, what are the two- and three-way interactions between the study's predictor, outcome variables, and race/ethnicity. In the subsequent sections, these results will be presented in two parts: DE mathematics course grade, followed by intentions to persist.

Path analyses were conducted in MPlus (version 8.0 for Mac) using weighted least squares (WLSMV) as an estimator. The bootstrapping approach was used in testing the indirect effects because this corrective approach is important for small sample sizes and with parameter estimates that have non-normal sampling distributions (Fritz & MacKinnon, 2007; Hayes, 2017). Further, bootstrapping generally produces preferable confidence intervals and standard errors (Fritz & MacKinnon, 2007; Hayes, 2017). The models for DE mathematics course grade and intent to persist were tested progressively rather than including all variables at once to get a complete understanding of the data. Specifically, for testing Research Question 2, the predictor variables (campus racial climate, sense of belonging, resilience) were included with DE mathematics course grade. Then, insignificant paths were removed and race/ethnicity was included in the model. Next interaction terms between the predictor variables and race/ethnicity were included

in the model and insignificant interactions were removed. The same steps were applied

for the model with intent to persist.

DE mathematics course grade. In Math 1300, the lower level of DE

mathematics, 97.8% ($n = 88$) students passed and 2.2% ($n = 2$) students did not pass. In

Math 1311, the upper level of DE mathematics, 88.0% (n =103) students passed and

12.0% ($n = 14$) students did not pass. Of all students participating in this study, 92.3% (n

$= 191$) passed the course and 7.7% ($n = 16$) did not pass the course. Table 8 below shows

the bivariate correlations among study predictors and course grade. There was one

statistically significant bivariate correlation between overall course grade and sense of

belonging ($r = -.194, p < .01$). This implies that students with a lower sense of belonging

were more likely to intend to persist. This finding is teased apart more within the path

analysis to get a more complete understanding.

Table 10

Correlation Coefficients for DE Mathematics Course Grade

	Campus Racial Climate	Sense of Belonging	Resilience	Course Grade
Predictor	r	r	r	r
Campus Racial Climate	1	-	-	-
Sense of Belonging	.393**	1	-	-
Resilience	.098	.447**	1	-
Course Grade	-.125	-.194**	-.055	1

Note. ** $p < .01$. Spearman's Rho is reported for course grade variable.

Path analyses for DE mathematics course grade. First, a simple mediation

model was conducted in MPlus (Version 8.0 for Mac) to test if sense of belonging

mediated the path between campus racial climate and DE mathematics course grade. The

model was marginally significant ($p = .67$). Next, resilience and interactions with

resilience (i.e., resilience x CRC, resilience x SB) were included in the model iteratively

and tested one at a time to determine if resilience moderated the paths from campus racial

climate to course grade and from sense of belonging to course grade. The direct effect of

resilience on course grade was not statistically significant, nor were the two interaction

terms tested iteratively. Next, resilience and the interactions were removed from all

further analyses. Then, race/ethnicity and interactions with race/ethnicity were added to

the model iteratively (i.e., the simple mediation model from CRC to SB to course grade)

and one at a time. The fit indices for this mediation model with race/ethnicity showed a

good fit of the data: $\chi^2(3) = 3.133, 42.265$; CFI $= .996$; TLI $= .988$; RMSEA $= .015$.

Including race/ethnicity changed the model from being marginally significant at the .67

level to being significant at the less than .05 level. Interactions with race/ethnicity were

not significant and consequently removed from the model. The direct, indirect, and

moderating effects using this model (see figure 3) are discussed below.
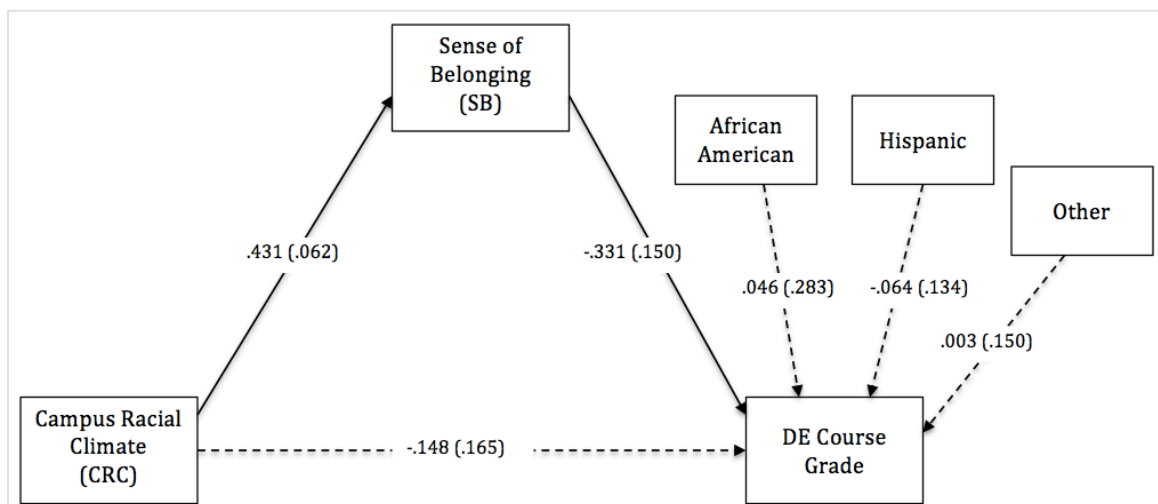

Figure 3: Mediation Model for DE Mathematics Course Grade. The indirect path from CRC to SB on DE course grade was significant. All other paths within the mediation model were not statistically significant.

Direct effects. Similar to the bivariate correlation analysis, the direct effects within the path model (campus racial climate to sense of belonging to course grade) analysis showed a statistically significant relationship between sense of belonging and course grade, after adjusting for the other variables in the model (β = -0.331, *SE* = .150, 95% CI [-.624, -.085]), suggesting that students with a lower sense of belonging were more likely to pass the course and students with a stronger sense of belonging were less likely to pass the course. Given the small number of students who did not pass the course (n = 16), perhaps those students had a stronger sense of belonging but had other risk factors working against them (e.g., lower mathematics skills or poor time management and study skills etc.). Perhaps though, this result is a product of the small number of students and needs further exploration prior to making conclusions. Campus racial climate, resilience, and race/ethnicity were not found to be predictors of DE mathematics course grade, meaning their impact on students' course grade was not as influential as sense of belonging.

Indirect effects. Testing the indirect effects in the mediation model with race/ethnicity using bootstrapped standard errors showed campus racial climate had a positive indirect effect on DE mathematics course grade through sense of belonging (β = -.142; *SE* = .071, 95% CI [-.282, -.003]). This result suggests that students with a positive perception of the campus racial climate were more likely to have a strong sense of belonging, and in turn, were less likely to pass the course; the proposed mediation model was supported empirically. The direct effects between campus racial climate and course grade and between race/ethnicity and course grade remained insignificant.

Moderation. Resilience was not a statistically significant moderator between sense of belonging and DE mathematics course grade. The moderating role of race/ethnicity did not show any significant differences. These findings suggests that neither resilience or race/ethnicity played a significant role in influencing the established indirect path from students' perception of the campus racial climate to their sense of belonging to their course grade.

Intent to persist. Of the 207 students participating in this study, 84.8% either agreed or strongly agreed they had intentions to persist to the next semester; as expected, persistence intentions were positively skewed. Inter-correlations among study variables suggested two statistically significant bivariate correlations with persistence intentions: sense of belonging with intent ($r_s = .270$, $p < .01$) and resilience with intent ($r_s = .168$, $p < .01$). This suggests that there exists a positive relationship between each of these sets of variables. See table 11 below for bivariate correlations.

Table 11

Correlation Coefficients for Persistence Intentions

Predictor	Campus Racial Climate r	Sense of Belonging r	Resilience r	Intent to Persist r
Campus Racial Climate	1	-	-	-
Sense of Belonging	.393**	1	-	-
Resilience	.098	.447**	1	-
Intent to Persist	-.003	.270**	.168*	1

Note. ** $p < .01$; * $p < .05$. Spearman's Rho is reported for persistence variable.

Path analyses for intent to persist. The analyses procedures performed for course grade were repeated for intent to persist (i.e., weighted least squares and

bootstrapping in MPlus version 8.0 for Mac). Again, the model was tested and is

presented progressively. First, a simple mediation model was conducted to test if sense

of belonging mediated the path between campus racial climate and intent to persist.

Following, resilience and interactions with resilience (i.e., resilience x CRC, resilience x

SB) were included in the model iteratively and tested one at a time; resilience and the

interactions were removed from all further analyses, as they were not significant. Next,

race/ethnicity and interactions with race/ethnicity were added to the model (i.e., the

simple mediation model from CRC to SB to intent to persist) iteratively and one at a

time; insignificant interactions then were removed. Below are indices fit descriptions of

each model tested (i.e., the simple mediation model, the mediation model with resilience,

the mediation model with race/ethnicity, and the mediation model with race/ethnicity and

the significant interaction) and a table summarizing the models (see table 10). The direct,

indirect, and moderation effects are presented using the final model.

    Mediation model. The mediation path model from campus racial climate to sense

of belonging to intent to persist was just identified, meaning the variables in the model

were just sufficient enough to allow each parameter in the model to be identified; see
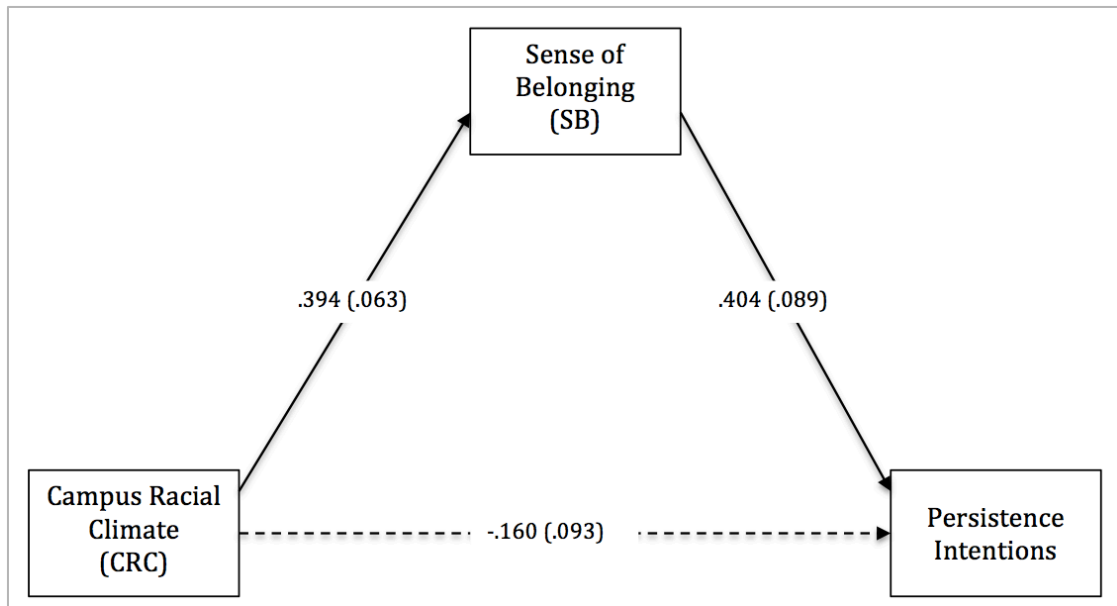
figure 4.

Figure 4: Mediation Model for Intent to Persist. Model fit indices revealed a good fit of the data: $\chi^2(3) = 0.000$, 49.244; CFI/ TLI = 1.000; 95% CI [-.282, -.003] suggesting the proposed mediation model was supported empirically. Solid lines denote a statistically significant effect (*p* < .05). Dotted lines denote a statistically insignificant effect. *N* = 207; point estimate *(SE)*.

Mediation model with resilience. First, resilience was tested as a predictor of persistence intentions within the indirect path model. Though resilience did appear to act as a predictor of students' persistence intentions the overall model fit of this model was bad and was not retained. Resilience was included as a moderator within the indirect path and the same results appeared. Interactions with resilience (i.e., RES x SB, RES x CRC, RES x race/ethnicity) were included iteratively, and once more, no statistically significant effects were present. Overall, the mediation model with resilience as the moderator (i.e., moderated mediation), yielded a bad fit to the data. Though theoretically it was hypothesized that resilience would act as a moderator between students' perceptions of the campus racial climate and their sense of belonging, the data suggested otherwise. The indirect effect tested using bootstrapped standard errors was not significant, suggesting the proposed moderated mediation model was not predictive of

students' persistence intentions. In other words, the resilience of students did not act to mitigate students' negative perceptions of the campus racial climate or their low sense of belonging. Resilience was subsequently removed from further analyses.

Mediation model with race/ethnicity. The subsequent mediation model (with race/ethnicity as a predictor) yielded a good fit to the data: $\chi^2(3) = 7.815, 3.116$; CFI = .998; TLI = .993; RMSEA = .014; see figure 5. As was expected from these results, the indirect effect from campus racial climate to sense of belonging to intent to persist was tested using bootstrapped standard errors was found significant ($\beta = .207$, *SE* = .058, 95% CI [.078, .280]) suggesting the proposed mediation model was supported empirically. This indirect effect was the same path found significant in the model above, and remained significant after adding race/ethnicity as a predictor in the model. The figure further shows positive direct effects for African Americans and Hispanics on persistence intentions (Caucasians were the reference group) suggesting they were more likely to have intentions to persist than Caucasians.
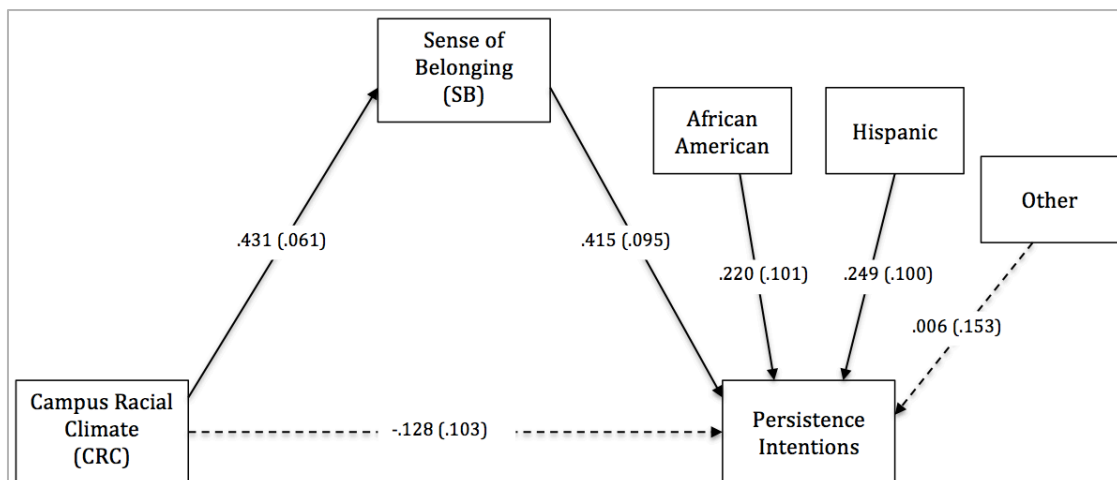
Figure 5: Mediation Model with Race/Ethnicity. This path analysis model shows point estimates and standard errors for direct and indirect effects within the model. The model further shows the direct effects of race/ethnicity on persistence intentions and the indirect effect of CRC on persistence intentions through SB. Solid lines denote a statistically significant effect (*p* < .05). Dotted lines denote a statistically insignificant effect. *N* = 207; point estimate *(SE)*.

Mediation model with race/ethnicity and SBxAA interaction. For this final model, race/ethnicity remained in the model and interactions between the predictor variables (campus racial climate and sense of belonging) and race/ethnicity (i.e., CRC x AA, CRC x Hisp, CRC x Oth, SB x AA, SB x Hisp, and SB x Oth) were added iteratively and tested one at a time. This step was important in determining if the path of associations was truer for some students than for other students.

The mediation model with race/ethnicity and the interaction SB x AA, yielded an adequate fit to the data: $\chi^2(4) = 9.488, 9.592$; CFI = .879; TLI = .668; RMSEA = .082; see figure 5. The indirect effect tested using bootstrapped standard errors was moderately significant ($\beta = .117$, *SE* = .044, 95% CI [.031, .204]) suggesting the proposed mediation model was supported empirically. Variables and interactions that were not found to be statistically significant were removed from the final model. The path model results are described below (also see Figure 6). The remaining results will be based on the mediation model with race/ethnicity and interaction SB x AA illustrated in figure 6. Model fit indices for each persistence model are summarized in table 12.
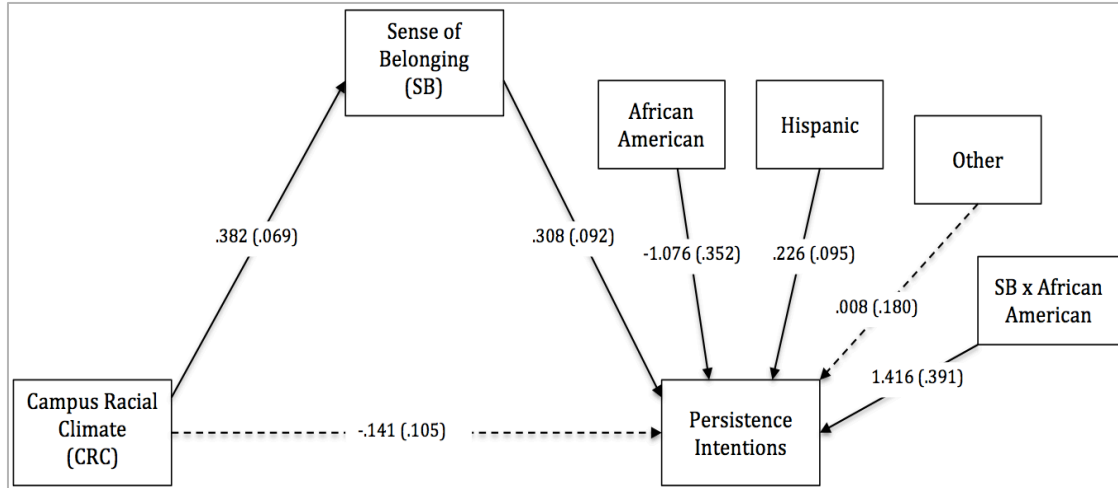
Figure 6: Mediation Model with Race/Ethnicity and SB x AA. This mediation model with race/ethnicity and the SB x African American interaction shows point estimates and standard errors for direct effects of CRC and SB on persistence intentions and the direct effects of race/ethnicity on persistence intentions (Caucasians were the reference group). The model further shows the indirect effect of CRC on persistence intentions through SB. Solid lines denote a statistically significant effect (*p* < .05). Dotted lines denote a statistically insignificant effect. *N* = 207; point estimate *(SE)*.

Table 12

Summary of Goodness of Fit Indices for Mediation Models

Model	χ^2 (*df*)	CFI	TLI	RMSEA Estimate	90% CI	Prob. RMSEA ≤ .05
Mediation Model	$\chi^2(0)$	1.000	1.000	0.000	0.000 – 0.000	0.000
Mediation Model with Race/Ethnicity as a predictor	$\chi^2(3)$	.998	.993	0.014	0.000 – 0.119	0.579
Mediation Model with Race/Ethnicity and Interaction SB x AA	$\chi^2(4)$	0.879	0.668	0.082	0.007 – 0.150	0.161

Note: CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root mean square error of approximation.

Direct effects were found in the mediation model with race/ethnicity and the

SB_AA interaction. First, sense of belonging had a statistically significant positive effect

on persistence intentions (b = .308; SE = .092, 95% CI [.128, .487]). This means that

students who had a stronger sense of belonging at the institution were more likely to intend to persist to the next academic year than students with a weaker sense of belonging. Campus racial climate and resilience were not found to be predictors of intent to persist. Further, there was a positive, statistically significant direct effect between Hispanic students and persistence intentions (β = .226, SE = .095, 95% CI [.039, .413]). There was also a statistically significant direct effect between African American students and persistence intentions in the negative direction (β = -1.076, SE = .352, 95% CI [-1.767, -.386]). Though the previous model (mediation with race/ethnicity as a predictor) showed a positive statistically significant direct effect on persistent intention for African American students, the significant interaction between sense of belonging and race/ethnicity suggested that this direct effect was actually more complicated and this finding will be explained in more detail in the conditional indirect effects section below. In sum, the direct effects in this model suggested that that African Americans were less likely to intend to persist than Caucasians, and Hispanic students were more likely to intend to persist than Caucasians.

Indirect effects in the model were tested using the mediation model with race/ethnicity and the SB x AA interaction. Results showed campus racial climate had a positive indirect effect on persistence intentions through sense of belonging (β = .117; SE = .044, 95% CI [.031, .204]). This result suggests that students with a positive perception of the campus racial climate were more likely to have a strong sense of belonging, and in turn, were more likely to have persistence intentions. The insignificant direct path from campus racial climate to intent to persist implies that sense of belonging accounted for a substantial percentage of the variation within the indirect path.

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Conditional indirect effects using the mediation model with race/ethnicity and the interaction SB x AA showed the direct effect between sense of belonging and persistence intentions was moderated by race/ethnicity ($\beta = .639$, $SE = .178$, 95% CI [.291, .987]). In order to help interpret this interaction further, the correlations between sense of belonging and persistence intentions were explored separately in SPSS (Version 25.0 for Mac) for African American, Caucasian, and Hispanic students and results revealed that the relationship between sense of belonging and persistence intentions was positive and significant for African American students ($r_s = .717$, $p < .01$) and null for Caucasian students ($r_s = .207$, $p = .075$). Figure 7 shows the sense of belonging means for students who were one standard deviation below and one standard deviation above the mean. This finding suggests that African American students who had a weaker sense of belonging were more likely to intend to drop out of college. For Caucasian students, their sense of belonging was not related to their persistence intentions. No other interactions were found to be significant.
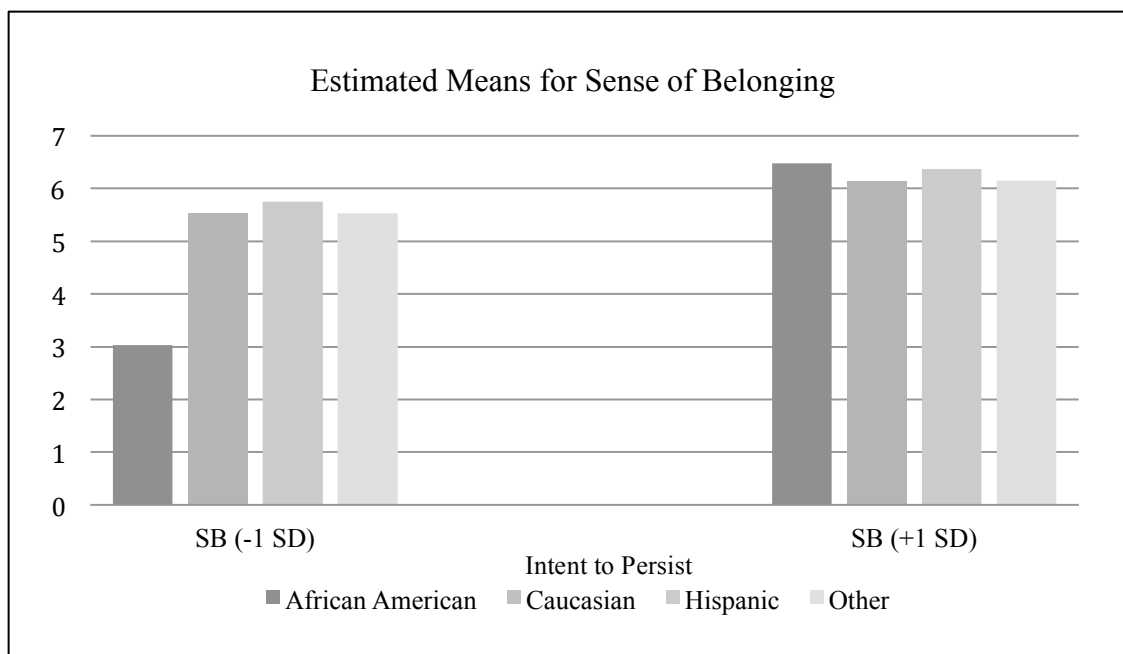
Figure 7: Estimated Means for Sense of Belonging. Estimated means for sense of belonging (SB) for students one standard deviation (SD) below the mean and for students one SD above the mean. For students one SD below the mean, only African Americans had lower means than the other race/ethnic groups.

In the current chapter, the study results were presented as outlined by the research questions. I found that the statistically significant relationship between campus racial climate and sense of belonging was supported empirically within the developmental mathematics setting. Moreover, there were significant mean differences between African American students and other race/ethnicity groups in regards to their perceptions of the campus racial climate. In performing the path analyses, the expected results revealed that the path from campus racial climate to the outcome variables was mediated by sense of belonging. Unexpectedly though, the indirect path from campus racial climate to sense of belonging to course grade was negative. Further, testing interactions with the study variables showed that the effect of sense of belonging on persistence intentions was stronger for African American students than their Caucasian counterparts. In the subsequent chapter, I will further discuss the results and what they mean for the DE

mathematics instructors, institutions of higher education, and the field of developmental education. In addition, I will address the study's limitations and provide implications for further research.

V. DISCUSSION

Literature consistently reports a positive correlation between campus racial climate and sense of belonging suggesting that students' perceptions of the campus racial climate influence their feelings of belonging to the institution (Museus, Nichols, & Lambert, 2008; O'Keeffee, 2013). Further, both of these psychosocial factors have been found to have positive relationships with academic outcomes (Hausmann et al., 2007; 2009). Despite the fact that relationships have been repeatedly found between these variables, limited research has been conducted specifically assessing sense of belonging as a mediator between campus racial climate and academic outcomes (i.e., course grades and intentions to persist). Further, given the disproportionate number of minority students placed in developmental (DE) mathematics courses, interactions with race/ethnicity and resilience (a personal characteristic that can help minority students persist in the face of race-related issues) are important factors to explore. Moreover, the scarcity of literature assessing these variables collectively in one study provided a rationale for bridging this gap by exploring all of these variables in a path model.

In this study, the proposed path model of associations was tested to validate previous findings (see Flaggs, 2016); the pilot study was also extended to learn more about factors potentially influencing students' academic outcomes. The conceptual model projected that students' perceptions of the campus racial climate would impact their sense of belonging and in turn influence their course grades and their decisions to persist in college. In addition, the model aimed to determine if students' resilience mitigated negative effects of these psychosocial variables on academic outcomes for students of color. For example, if a student possessed a negative perception of the

campus racial climate or a weak sense of belonging, could their resilience act to push them towards achieving academically and persisting in spite of these factors? The results supported the proposed paths of relationships from campus racial climate to sense of belonging to the academic outcomes, but there was no support for resilience as a moderator within the indirect paths. However, race/ethnicity was found to moderate the path between sense of belonging and students' persistence intentions. This chapter is outlined by the research questions; major findings will be highlighted in the discussion that follows. I will also discuss the study's limitations, implications for practice, and aims for future research.

Differing Perceptions

Research Question 1 asked "how do students enrolled in DE mathematics courses perceive the campus racial climate and their sense of belonging? To address this question, the differing perceptions in regards to campus racial climate and sense of belonging were examined among students enrolled in developmental (DE) mathematics courses. Given the disproportionally high percentage of students of color who are placed into developmental mathematics courses based on test scores (e.g., the Texas Success Initiative, SAT, and ACT), Research Question 1 served to identify the overall perceptions of students and if these perceptions differed by students' racial/ethnic background.

Descriptive statistics of students' response patterns to the campus racial climate scale showed that it was highly skewed in the positive direction. This result suggested that overall students' thought that the institution was supportive of students of all racial/ethnic backgrounds and race-related disparities were not a major concern on campus. This finding was anticipated because research shows that the mainstream

population at PWI's views the campus positively and often do not experience race-related barriers. The follow-up question then became: are students' perceptions of the campus racial climate different in regards to their race/ethnicity? This was addressed using a one-way ANOVA testing mean differences between groups. Results revealed statistically different perceptions implying that all race/ethnicity groups did not share the overall perception of the climate discussed previously. In fact, African American students reported a considerably lower perception of the racial climate than other racial/ethnic groups. This finding suggests that African American students had a less positive perception of the campus racial climate than any other group, which has been repeatedly found in research (Fisher, 2007, 2010; Rankin & Reason, 2005). The mean differences between groups showed that there were no differences between students who identified as Caucasian, Hispanic, or mixed/other.

Further, I refer to pervious results (Flaggs, 2016) to demonstrate the importance of perceptions of the campus racial climate for African American students and to call attention to the significance of their experiences in college. Specifically, in the pilot it was found that African American students' perceptions of the racial climate on campus directly impacted their decisions to stay or leave the institution and that the more negatively they perceived the climate the more likely they were to drop out prior to graduation. This finding further supports the notion that students of color may face race-related issues more often (Fisher, 2007, 2010), and further, it may be due to their race and the magnitude of systemic racism. Whereas for Caucasian students of the mainstream population, they may not see race as an issue at all because their experiences with race-related issues are not as common (Feagin, Vera, & Imani, 2014). For example, Steele

(1992) explains how the disadvantages (e.g., societal barriers and in academic achievement deficits) faced by African American students begins long before entering college, and once in college, these students often must assimilate to the mainstream culture in order to be successful. This suggests that African American students are faced with systemic racial inequities perceivably extraneous to Caucasian students that may impede their trajectory towards academic success. In addition to testing the mean differences between race/ethnicity groups in regards to the campus racial climate, differences were also tested in regards to students' sense of belonging to the institution.

Results showed that there was much more variation in students' reported sense of belonging. The distribution of responses was more normally spread from a weaker sense of belonging to a stronger sense of belonging. On average, students' reported a moderate sense of belonging, and there were no statistically significant differences found between race/ethnicity groups. This finding diverges from previous research studies that suggest sense of belonging is experienced differently for different populations. Research examining students' sense of belonging often make comparisons between minority students (i.e. African Americans and Hispanics) and their Caucasian counterparts and find that their feelings of belonging differ statistically (Strayhorn, 2012). In some instances, differences have been found relative to the type of institution (e.g., an HBCU versus a PWI). For example, Strayhorn (2012) found that African American students often had a lower sense of belonging at PWIs and a higher sense of belonging at HBCUs. In another study, Strayhorn (2012) suggested that Hispanic students reported having a lower sense of belonging than their Caucasian peers. Though neither of these examples were the case for the current study, as no differences were found to be statistically

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significant between groups, it is possible that (a) the institutional classification (i.e. a Hispanic-Serving Institution) played a role in minimizing differences between Hispanic students and Caucasian students (b) the disproportionate overrepresentation African American and Hispanic students in the DE mathematics course allowed these students to find a "safe space" in which they could maintain or increase their sense of belonging, and/or (c) students in the DE mathematics courses possessed common feelings of belonging in terms of being provided messages from the institution that they needed to take developmental mathematics courses because their mathematics placement test scored were not high enough to enroll in college-level algebra courses. It is also plausible that the institution is being effective in efforts to promote sense of belonging on campus (e.g., repeated messages of inclusivity via emails, school paraphernalia, verbal affirmation from instructors and administrators).

Supported Relationships

In addition to examining mean differences for campus racial climate and sense of belonging between race/ethnicity groups, the results of this study showed bivariate correlations between students' perceptions of the campus racial climate and their sense of belonging, which literature corroborates (Alvarez et al. 2007; Hurtado & Carter, 1997; Johnson et al., 2014). Given that much of the research to date has substantiated these results in other settings and with various student populations (e.g., Asian students, see Wells & Horn, 2015; diverse women students in STEM, see Johnson, 2012; immigrant students at research universities, see Stebleton et al., 2014), situating this study within the context of developmental mathematics courses was important for addressing the gap in literature related to studying underrepresented minority students in developmental

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education contexts. The positive correlation between campus racial climate and sense of belonging supports the decision to analyze this association within DE mathematics courses. Further, bivariate correlations between these psychosocial variables were present for each race/ethnicity group. This finding suggested that regardless of students' racial/ethnic identity, their perception of the campus racial climate was related to their individual feelings of belonging. In other words, students who had a more positive perception of the campus racial climate, whether they were of the mainstream population or identified as a racial minority, also had a higher sense of belonging to the institution. Thus, efforts to change the overall campus racial climate of an institution to be more welcoming and equitable may be beneficial to all students rather than just racial/ethnic minority students. This was particularly important because students' expressed need for belonging are often different based on their identities and backgrounds (Strayhorn, 2012) and these needs and perceptions may be partially fulfilled, regardless of race/ethnicity, through their perceptions of the campus racial climate.

Effects on DE Mathematics Course Grade

Research Question 2 served to identify the direct, indirect, and moderating effects within the path from campus racial climate to sense of belonging to the outcomes (i.e., DE course grade and intent to persist). Researchers have found that the environment on campus can communicate messages to students that in turn influence their belonging (Kuh, Kinzie, Schuh, Whitt, & Associates, 2005). Moreover, institutional environments perceived to be inclusive or affirming are reported to positively effect student learning (Kuh et al., 2005; Pascarella, 2001).

The first part of this research question examined sense of belonging as a mediator between campus racial climate and students' developmental (DE) mathematics course grade. Many mediation models examine factors that mediate the relationship between sense of belonging and academic outcomes (see Won, Wolters, & Mueller, 2017 and Kennedy & Tuckman, 2013), rather than examining sense of belonging as a mediator itself. For this study, the path model from campus racial climate to sense of belonging to DE course grade was tested and found to be marginally significant at the .067 level. However, upon controlling for race/ethnicity in the model, the model fit indices showed a good fit and changed from .067 to less than .05. Confidence intervals were also examined and supported other indices (e.g., CFI/TLI) suggesting a good model fit. This finding supports the hypothesized model, which shows sense of belonging mediates the path from campus racial climate to course grade. Upon analyzing the significance of the indirect path from campus racial climate to sense of belonging to course grade, results showed that students with a positive perception of the campus racial climate were more likely to have a higher sense of belonging, and in turn were less likely to pass the course. This finding contradicts research showing a positive relationship between sense of belonging and academic outcomes (Hurtado & Carter,1997; Just, 1999).

It is possible that classroom level factors, as opposed to campus level factors, related to climate and belonging could be more predictive of course grades. For example, Strayhorn (2012) posits that students' perceptions about belonging are context-dependent, meaning ones' "sense of belonging in a particular context (e.g., department, classroom) has the greatest influence on outcomes (e.g., adjustment, achievement) in that area" (p. 20). Therefore, fostering students' sense of belonging through supportive classroom

environments may be key to increasing course grades. In fact, a study of 212 undergraduate students found support for the relationship between instructors' academic and social support in the classroom and students' sense of belonging (Zumbrunn et al., 2014), suggesting that the support from instructors increases students' feelings of belonging.

Further, in a study exploring students' perceptions of belonging in college classrooms, Freeman et al. (2007) surveyed 238 freshmen and found positive associations between students' sense of belonging in the classroom and instructors' behaviors. Specifically, they found that instructors' warmth and openness, encouragement of student participation, and organization all were antecedents to building students' sense of belonging in the classroom. Until more recently, research in DE mathematics courses primarily focused on curriculum, technology infusion, and delivery methods to explain academic outcomes (Hogan, 2016; Stigler, Givvin, & Thompson, 2010; Wladis, Offenholley, & George, 2014). In addition, these findings may help explain the extent to which psychosocial variables are uniquely experienced by minority students and may also allude to positive outcomes (e.g., increased motivation and eagerness to assume leadership roles) and negative outcomes (e.g., health concerns and isolation) within and beyond higher education.

Effect on Persistence Intentions

The proposed path from campus racial climate to intent to persist with sense of belonging as a mediator was tested to help extend models of college student retention (namely Astin's 1993 I-E-O model and Tinto's 1993 model of college student departure). The direct effect between campus racial climate and sense of belonging was significant

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and the direct effect between sense of belonging and persistence intentions was significant. Moreover, the findings from this study suggested sense of belonging acted as a mediator between campus racial climate and persistence intentions. More specifically, students who had positive perceptions of the campus racial climate were more likely to have a stronger sense of belonging, and in turn, were more likely to want to persist in college. Similarly, students who had a negative perception of the campus racial climate were more likely to have a weaker sense of belonging, and in turn, were less likely to want to reenroll in the next long semester.

From a theoretical standpoint, these findings align with research suggesting a positive relationship between campus racial climate and sense of belonging (Locks, 2008). Based on the model, if initiatives were put into place that successfully helped students generate more positive perceptions of the campus racial climate, those efforts may in turn increase students' sense of belonging to the institution. Moreover, stronger persistence intentions would be expected, to the extent that students had a higher sense of belonging. The model also implies that fostering a sense of belonging in students may lead to their persistence from semester to semester and ultimately to graduation. This chain-like effect within the model could prove beneficial for institutions in that it identifies key factors that may be targeted to both directly and indirectly increase retention rates.

This study also took into account race/ethnicity as a possible moderator within the hypothesized path model. In terms of direct effects, results showed that Hispanic and African American students' intentions to persist differed significantly from those of Caucasian students. For Hispanic students within this study, their intentions to persist

were significantly higher than their Caucasian counterparts. This finding is interesting in that national reports commonly cite Hispanics to have lower graduation rates than Caucasians. It is plausible that the type of institution in which this study was conducted had an impact on this result. For example, Maestas, Vaquera, and Zehr (2007) found that sense of belonging was increased for Hispanic students attending a Hispanic-Serving Institution (HSI) in which there was a perceived interest by faculty in student development. In this case, given the study was conducted at an HSI, the finding of this study was substantiated.

African American students, on the other hand, were less likely to intend to persist in comparison to their Caucasian peers. Researchers consistently found that while enrollment of African American students has increased in higher education, persistence rates to graduation remains less than 50% (Slater, 2007). Further, African Americans often face additional barriers to college completion (e.g., stereotype threat), which may help explain why they had lower intentions to persist in this study as well as in others. This finding is important to note because not only does it corroborate existing research revealing lower persistence rates for African American students (Shapiro et al., 2017), but it also identifies a specific racial population that may need additional supports in order to be successful academically.

Furthermore, the path model tested in this study suggested that campus racial climate and sense of belonging may influence students' intentions to persist and that sense of belonging may be a particularly salient attribute for African American students when forming persistence intentions. Results from this study showed a significant two-way interaction between sense of belonging and race/ethnicity. This interaction

suggested that the relationship between sense of belonging and persistence intentions was stronger for African American students than it was for Caucasians. This finding supports theory and research suggesting that when students lack feelings of inclusion then they want to leave their institution (Johnson et al., 2014), and this is especially true for students of underrepresented racial groups, in this case African American students. Therefore, by enacting campus activities and customs that promote inclusion (e.g., including culturally relevant theories in curriculum, observing cultural celebratory days), institutions can begin to increase students' feelings of belonging and perceptions of the campus racial climate.

Moreover, combating the effect of stereotype threat with self-affirmation interventions (see Martens et al., 2006) and through the promotion of growth mindset interventions (Blumenstyk, 2016; Rattan, Good, & Dweck, 2012) may yield more positive persistence intentions for African American students. In addition, incorporating sense of belonging interventions that involve writing personal narratives about academic challenges and sharing these stories has been one approached used to help students internalize the message of academic struggles as common (Aguilar et al., 2014; Walton & Cohen, 2011). This type of social-belonging intervention has been found to be particularly effective for African American students (Walton & Cohen, 2011) and could used by instructors to positively influence students belonging and in turn, their persistence intentions.

Theoretical Foundations

The path findings discussed in the previous sections converge with Astin's (1993) Inputs-Environment-Output model. According to the model, inputs (e.g., demographic

characteristics) and the environment (e.g., college experiences) impact students'

outcomes (e.g., persistence and achievement). The conceptualization of this model

functioned well in exploring the impact of cultural backgrounds and collegiate

experiences on students' persistence intentions. Though to expand Astin's model of

student involvement, the proposed model in this study accounted for students' subjective

sense of belonging. In other words, instead of focusing merely on involvement as

behavioral as suggested through Astin's (1984) five postulates within his theory (see

Chapter 2 of this dissertation), this study's model accounted for what students thought or

felt as apart of their academic experience. According to Hagerty et al. (1995), sense of

belonging has two critical dimensions and one of which involves students' fit and is

described as "the person's perception that his or her characteristics articulate with or

complement the system or environment" (p. 173). For the current study, this important

distinction in observing students' sense of belonging allowed for a more in-depth

understanding of students' feelings or perceptions as a result of their interactions with the

institution, peers, and faculty.

    The results also align with Tinto's (1993) model, which asserts that institutional

commitment reinforces students' persistence intentions. Students who do not feel like

they belong or that the campus environment is unwelcoming are presumably less likely to

want to remain at that institution. This study highlights that Tinto's (1975, 1993) theory

of institutional commitment and social engagement have equally important antecedents

that impact students' decisions on whether to stay of leave an institution. Thus, it is

important to note that similar to Astin's model, the integration piece of Tinto's model

omits students' thoughts or feelings of belonging, an aspect represented in the current

study. Further, critics have contested that integration does not have the value to standalone as a construct (Huratado & Carter, 1997), partially because of the many extraneous variables that impact ones' choice to engage, especially for historically underrepresented populations in higher education. In fact, studies using the National Survey of Student Engagement (NSSE), a survey of over 80,000 students across 365 four-year institutions, have reported differing levels of engagement for students for diverse racial and ethnic backgrounds. African American students are somewhat more likely to participate in enriching academic experiences and report more collaborative learning, but are generally the least satisfied with their college experiences (NSSE, 2005). Though a growing body of research suggests compensatory effects of engagement for diverse populations (Pike & Kuh, 2005; Quaye & Harper, 2014), it is possible that students' perceptions of the campus climate impact their level of belonging and in turn have effects on their willingness to integrate and commitment to an institution.

Limitations

There were a several limitations in the current study. One limitation of the current study was the mortality rate in student participation over time. Three hundred and twenty-four students were removed due to not having complete data on at least one of the three surveys. Administering the survey in class rather than online may have garnered increased completion of surveys, as time would have been previously allotted for students to participate. Noticing that some of these cases were missing a single item on a scale and considering the surveys were administered online, the survey could have been constructed so that this would not have been as much of an issue (e.g., requiring responses for all items and including an option for items students did not feel comfortable

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responding). Lastly, the timing of the last administration (i.e. during final exams) was not ideal for optimal participation. Since students were occupied with studying and taking multiple exams, it is plausible that taking the final survey during this time was not a priority. In addition, for students who had already determined if they passed or failed the course, taking the survey to earn extra credit may have become a frivolous act. The overall decrease in participation over time also led to a final sample that may have not been representative of the full range of course grades and/or students intentions to persist. For instance, course grade data was highly skewed (as mentioned in chapter three), meaning the percentage of students in this sample who passed the course was significantly higher than the overall percentage of DE mathematics students that successfully passed the course; this leave little room for generalizations. Further, research has found that those who fail to complete surveys or interventions in educational settings commonly have low engagement or lower GPAs (Porter & Umbach, 2009), and perhaps are those that could benefit most from participation.

Implications for Practice

Perceptions of institutional characteristics have the potential to greatly influence students' sense of belonging and racial academic achievement gaps. Factors such as campus racial climate can act as either pathways to persistence or barriers to retention, particularly for African American students. The results of this study highlight a possible systemic disparity in higher education in the form of campus racial climate. More specifically, when a single group of students are more likely to have a perception of the campus racial climate that is significantly less positive than other racial/ethnic groups on campus, it may allude to an issue of equitable practices on campus. Results from this

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study highlight differences between groups and thus should prompt DE mathematics instructors and institutional administrators to seek avenues for improvement and inclusivity.

For DE mathematics instructors, there are several ways in which a sense of belonging can be fostered in the classroom. As found by Freeman et al. (2007), instructors can start by humanizing themselves (e.g., by sharing relevant personal experiences) to make them more approachable to students. DE mathematics instructors can also communicate messages of student success to influence students' belonging and academic success (Walton & Cohen, 2007, 2011). For minority students in particular, this practice may be interpreted as caring, which in turn may influence students' sense of belonging (Freeman, Anderman, & Jensen, 2007). Even research on students in elementary and middle school shows that being responsive to students' academic and psychosocial needs influence minority students' perceptions of teachers (Garza et al., 2014) and leads to academic success.

Beyond the classroom, students must also feel that they belong to the institution. Perhaps engaging in campus activities leads to higher persistence rates and other positive academic outcomes (Astin, 1993; Webber, Krylow, & Zhang, 2013), but would increased engagement with a racially unfriendly environment promote satisfaction and persistence? The answer is probably no, so then one must consider that the role of engagement in persistence might be tempered by the racial environment with which one is engaging. Therefore, short of asking students already facing non-academic barriers to interact with such an environment, perhaps modifying the environment would take precedence over recommending acclimation. The results of this study are clear in validating the effects of

students' perceptions of the campus racial climate on their sense of belonging and subsequently their persistence intentions. Thus, institution administrators, in particular, have the opportunity and obligation to create an inclusive environment in which all students can learn (Kuh et al., 2011). This study provides information to target specific psychosocial factors that may be negatively impacting students. Further, it provides justification to implement strategic initiatives and research-based interventions to foster a more inclusive environment for students, African American students in particular in this case. One example that may be adopted is a social-belonging intervention. Walton and Cohen (2011) conducted an intervention with two cohorts of African American and Caucasian students. Students were given messages highlighting the normality of having a low sense of belonging and also given reports containing quotes for seniors suggesting this was the case for them but it was only temporary. To facilitate internalization of the messages, students then were tasked with writing an essay and speaking about their own college experiences in relation to the stories they read. Long-term effects of the intervention were evidenced by a close in academic achievement gaps between racial/ethnic groups, an increase in sense of belonging, and a decrease in self-doubt (Walton & Cohen, 2011). Although correlational, model results from the current study indicate that there is potential for increasing students' intentions to persist indirectly though modifying the campus racial climate (or students perceptions of it) and directly through increasing students' feelings of belonging. Walton and Cohen (2011) provide an effective example of how institutions can begin to implement initiatives on campus that help change the culture of an institution and thus provide space for students' sense of belonging to grow stronger.

The path between campus racial climate and sense of belonging further alludes to the potential for students' sense of belonging to be altered (increased or decreased) based on their perceptions. Bearing in mind recent attempts by institutions of higher education to understand individual campus climates, this finding may provide insight into how to impact students' sense of belonging to an institution through efforts to improve campus climates. For example, instead of exacerbating societal racism that protrudes onto college campuses (i.e. Justice Antonin Scalia's remark on mismatch theory, which implied African Americans should attend slower-track schools to do well), institutions could take stake in adequately supporting minority students' belonging (i.e. enacting diversity initiatives such as infusing cultural sensitivity practices in first-year experience courses).

Based on the results of the current study, these are a few possible implications for practice for DE mathematics instructors and higher education administrators. Each of these implications address an aspect of students' perceptions of the campus racial climate and their sense of belonging that can be constructively altered to help cultivate a positive campus racial climate and foster a strong sense of belonging.

Future Research

Though the interaction with sense of belonging and African American students was statistically significant, it is unclear what other factors outside of their perceptions of the campus racial climate contributed to their feelings of belonging. Extending this research to include interviews and focus groups with study participants may yield more insight on the antecedents to African American students' perceptions and sense of

belonging. Student voices add another layer of understanding and clarification that would be beneficial in unpacking the results more.

Continued research in this area is imperative and increased attention is necessary to expand previous models of student persistence and account for social inequities that may go beyond academic underpreparedness. Future studies should not just explore ways to help students feel a stronger sense of belonging by using coping strategies, but also explore ways to change the campus racial climate to be less hostile and more supportive.

Further, future research should examine this path model at different types of higher education institutions such as small liberal arts colleges, Historically Black Colleges and Universities (HBCU's), and community colleges. The culture of different institutional types may introduce other variables that may be more pertinent for some populations than others. In addition, studying the path between campus racial climate and sense of belonging at different levels (e.g., student-student, student-faculty, student-staff, student-major department, and student-dorm) may be fruitful avenues to explore in an attempt to more holistically understand the impact and influence of these variables.

Lastly, analyzing the differences in this study from time one (pre-election) to time two (post-election) may help explain if there was a change in racial climate on campus. This extension to the current study may provide insight into general campus racial climate changes in relation to the presidential election. It is plausible that the events on campus during the current study had a significant impact on students' perceptions of the campus racial climate, their feelings of belonging to the institution, and their academic outcomes.

Conclusion

The relationship between campus racial climate and sense of belonging is well established through research in different educational settings (Locks, 2008; Mendoza-Denton, 2002; Museus, Nichols, & Lambert, 2008; O'Keeffee, 2013). However, this study adds to the body of research by exploring these variables within courses that are disproportionally represented by students whom are historically underrepresented, particularly those in developmental (DE) mathematics. This study speaks to Fike and Fike's (2008) findings about the negative impact of extended enrollment in DE mathematics courses and also helps identify significant factors, namely campus racial climate and sense of belonging, that have the potential to keep students from prolonged enrollment in DE mathematics courses, and getting them to persist. The study's findings have practical implications for institutions and mathematics educators striving to identify key variables in developing research-based initiatives and interventions that cultivate positive campus racial climates and foster students' sense of belonging.

As research in DE mathematics is advancing, this study helps to explain the effects of institutional level characteristics on underrepresented populations placed into these courses. Findings suggest that DE mathematics programs could better support African American students whom are academically underprepared for college-level mathematics, as their sense of belonging was found to be a stronger predictor of persistence intentions compared to their Caucasian peers. The earlier finding from Research Question 1 (i.e. African Americans had considerably lower or more negative perceptions of the campus racial climate) supports the arguments for developing initiatives and support systems that cater to this group. This impact of having a low sense

of belonging affects African American students to the extent that their persistence in college is threatened. Moving beyond accommodation to promoting inclusivity and protecting the social belonging needs of this *at-risk* student groups may yield more positive persistence rates.

The findings in this study further address a gap in the literature by exploring potential causal paths and interactions among psychosocial variables and demographics that may work to influence students' persistence intentions. The results of this study can help strengthen our theoretical understanding of how systematic structures may add to the complexities involved in student persistence for racially underrepresented and academically underprepared students. It may be that minority students are academically underperforming in comparison to other students in DE mathematics because they are also balancing race-related environmental factors. Informing institutions of the disparities across campus that lead to high failure rates may nudge them to create specific aims for better serving all students in these high DFW courses. The findings further inform DE mathematics program evaluators of psychosocial factors that may be feeding into the low completion and persistence rates of this minority population. With DE mathematics educators constantly looking to new technology and teaching modalities for improvement in completion rates, this study offers a different path that can be explored that may lead to higher course completion rates.

Conceptually and theoretically, this research plays an important role in expanding retention and persistence models. The usefulness of this study in identifying potentially contributing factors to student retention can prove valuable to institutions with respect to

developing culturally accepting practices, designing targeted initiatives, and being

intentional with race-related policy implementation.

INFORMED CONSENT

Study Title: CAMPUS RACIAL CLIMATE, SENSE OF BELONGING, & RESILIENCE: RELATIONSHIPS WITH PERSISTENCE INTENTIONS AND DEVELOPMENTAL MATHEMATICS ACHIEVEMENT
Principal Investigator: Darolyn Flaggs   **Co-Investigator/Faculty Advisor:** Taylor Acee

Purpose/Background:
You are being asked to be part of a research project. We're trying to learn more about students' perceptions of campus racial climate, sense of belonging, and resilience and how they relate to intentions to persist and course performance. This research could help to inform Texas State University and other institutions about factors that they could potentially target to help better support diverse students in higher education and in particular developmental mathematics. We need your help to conduct the study.

Procedures:
If you agree to be part of this research, we will ask you to take two online surveys of about 38 items and one online survey of about 5 items. The surveys will focus on your perceptions and experiences related to this university. It should take about 15 minutes to complete each survey. As part of this research, we are asking you for permission to obtain all of your course/lab activities, assignments, grades, and class attendance from your instructor, and your age, sex, ethnicity, student classification, first generation status, major, course grade, and grade point average from the university's records.

Participation is Voluntary:
Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You may choose not to answer any question(s) for any reason, and you may request that your data not be included as part of this research. You can stop your participation at any time without penalty or loss of benefits to which you are otherwise entitled, and your refusal will not impact current or future relationships with Texas State University.

Risks/Discomforts: Taking the study survey may involve risks that are concurrent with everyday experiences on campus. Some items related to inclusiveness, discrimination, and harassment students may not feel comfortable answering. You will be given the option to skip any items in which you feel will affect you emotionally and/or physically. All items are a reflection of students' common experiences**.** Information on the confidentiality and privacy safeguards that will be followed regarding student data are provided below.

Benefits/Alternatives:
By participating, you will receive extra credit in your mathematics course. There are no other direct benefits from participating in this study. However, the results could help to

improve student support and inclusiveness on campus. If you decide not to participate, you can still earn an equal amount of extra credit by completing three one-page essay assignments.

Confidentiality and Privacy Protections:
For the survey, we will ask you to report your student identification number. This will make it possible for us to link your survey data and other course data. Once all data is merged, we will remove your student identification number from the dataset. We will keep the surveys in a locked file cabinet at Texas State University for up to three years and then we will destroy the surveys.

The electronic dataset will be stored on an encrypted hard drive on a computer and/or network that is password protected. Only the researcher, Ms. Flaggs, and her dissertation committee will have direct access to the data. However, the data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

Questions:
If you have any questions or concerns about your participation in this study, you may contact the Principal Investigator, Darolyn Flaggs: df1170@txstate.edu.

This project 2016K9115 was approved by the Texas State IRB on []. Pertinent questions or concerns about the research, research participants' rights, and/or research-related injuries to participants should be directed to the IRB chair, Taylor Acee 512-245-7903 – (ta19@tstate.edu), Dr. Jon Lasser 512-245-3413 – (lasser@txstate.edu) or to Monica Gonzales, IRB Regulatory Manager 512-245-2314 - (meg201@txstate.edu).

A summary of the findings will be provided to participants upon completion of the study, if requested. Contact Ms. Flaggs if you would like to receive this summary.

Statement of Consent: I am at least 18 years of age, I have read the above information, and I have sufficient information to make a decision about participating in this study. I consent to participate in the study.

Student Texas State ID:_____

Student Texas State NetID:_____

Student Signature:_____Date: _____

Signature of Investigator:_____ Date: _____

Script for Consent Form

[Greet and thank instructor, politely ask them to leave]

-[Write today's date on the board].

Hi Everyone! First, I would like to thank you all for your time today. Before we begin, please clear your desks. All you will need is a writing utensil. You can use pen or pencil.

-My name is Darolyn Flaggs. I am a doctoral student here at Texas State in the Department of Curriculum and Instruction. I am working on a research project trying to learn more about students' perceptions of campus racial climate, sense of belonging, and resilience and how they relate to intentions to persist and course performance. This research could help to inform Texas State University and other institutions about factors that they could potentially target to help better support diverse students in higher education and in particular developmental mathematics. I really needs your help with this project.

-You will receive extra credit for participating in the study. Unfortunately, if you are under 18, you cannot participate in this study and you should not sign the consent form. However, you can still earn extra credit through an alternative essay assignment.

-Now, I will hand out the consent form. Please do not sign the consent form until I have gone over the form with you. You can use pen or pencil. [Pass out consent form]

-The consent form is available on your TRACS site so you may have already had a chance to look it over. However, I will still review it with you. If you opt to complete the alternative essay assignment you may begin writing now.

-If you consent to be part of this research, I will ask you to take three survey that takes about 15 minutes or less to complete. By consenting, you are also giving me permission to obtain all of your mathematics coursework and scores from your instructor as well as your grades and demographic information (such as, age and gender) from university records.

-In terms of risks, there are no foreseeable risks to participating in this study. All data collected as part of this project will be stored in a secure location under lock and key and on a password-protected encrypted hard drive. After all data are finalized, any identifying information will be removed.

-In terms of benefits, by participating in this study you will receive extra credit in your mathematics course. You can receive (tbd) as extra credit.

-If you decide not to participate or if you are under 18, you can still earn an equal amount of extra credit by completing a one-page essay assignment that has the same due date as

the survey. Please inform me if you are interested in this option. My contact information is at the end of the first paragraph on the consent form.

-Your participation in this study is entirely voluntary, and you can stop participation at any time. Please contact me if you want to stop participating.

-Do you have any questions about the consent form?

-Please turn to page 2. If you would like to take part in the study, please sign your consent form at this time. For the consent form, make sure you clearly print your student ID number, NetID, and sign your name.

[Give them some time to look it over and fill it out]

-Please pass your signed consent form to the center aisle for me to pick up. As soon as I have everyone's consent form, you are free to go.

[When finished, **THANK STUDENTS**, collect consent forms/.]

APPENDIX B

Survey

You are invited to participate in a survey regarding your sense of belonging and your perceptions of the campus climate at Texas State. Please answer each item honestly and openly. The results of the survey will provide important information about our campus climate and will enable us to improve the environment to better serve all students.

Instructions: For the following items, consider your observations and personal experiences on campus at Texas State University. Read each item carefully and respond using the scale provided. Circle the number that best describes your perceptions of the campus environment.

	Strongly Disagree						Strongly Agree
1. I would recommend this college to other students of all races.	1	2	3	4	5	6	7
2. Students interact with others of different racial/ethnic groups.	1	2	3	4	5	6	7
3. The student body is racially diverse.	1	2	3	4	5	6	7
4. The faculty and staff are racially diverse.	1	2	3	4	5	6	7
5. On campus, there is a sense of trust and respect for people of all racial/ethnic groups.	1	2	3	4	5	6	7
6. Racism is a problem at this college.	1	2	3	4	5	6	7
7. An appreciation of cultural differences is promoted on campus.	1	2	3	4	5	6	7
8. People on campus speak regularly about the value of diversity.	1	2	3	4	5	6	7
9. There is racial conflict on campus.	1	2	3	4	5	6	7
10. This college supports ethnic groups on campus.	1	2	3	4	5	6	7
11. This college seems to value minority students.	1	2	3	4	5	6	7
12. This college seems like a cold, uncaring place for minorities.	1	2	3	4	5	6	7

		Strongly Disagree						Strongly Agree
13.	This college seems like a cold, uncaring place for minorities.	1	2	3	4	5	6	7
14.	Because of my race/ethnicity, instructors make assumptions about me.	1	2	3	4	5	6	7
15.	There is a racial/ethnic separation on campus.	1	2	3	4	5	6	7
16.	I am comfortable on campus saying what I think about race issues.	1	2	3	4	5	6	7
17.	I expect to encounter racism when I'm on campus.	1	2	3	4	5	6	7
18.	I have been harassed or discriminated against on campus because of my race/ethnicity.	1	2	3	4	5	6	7

Instructions: For the following items, consider your personal experiences on campus at Texas State University. Read each item carefully and respond using the scale provided. Circle the number that best describes your personal experiences on campus.

	Strongly Disagree						**Strongly Agree**
19. I wonder if I really fit in with others on campus.	1	2	3	4	5	6	7
20. I feel like an outsider on campus.	1	2	3	4	5	6	7
21. I feel a sense of belonging to this campus.	1	2	3	4	5	6	7
22. I do not feel valued or important on campus.	1	2	3	4	5	6	7
23. When I'm on campus, I feel left out.	1	2	3	4	5	6	7
24. I feel like a member of the campus community.	1	2	3	4	5	6	7
25. I feel comfortable when I'm on campus.	1	2	3	4	5	6	7
26. I would choose the same college over again.	1	2	3	4	5	6	7
27. My college is supportive of me.	1	2	3	4	5	6	7

Instructions: For the following items, consider your experiences as a student at Texas State. Read each item carefully and respond using the scale provided. Circle the number that best describes you.

28. I am confident I can adapt to the culture at this college.	1	2	3	4	5	6	7
29. In college, I can handle whatever comes my way.	1	2	3	4	5	6	7
30. Experiencing negative events on campus would not stop me from reaching my academic goals.	1	2	3	4	5	6	7
31. I tend to bounce back after a setback or hardship in college.	1	2	3	4	5	6	7
32. I work hard to reach my most challenging academic goals.	1	2	3	4	5	6	7
33. When things look hopeless, I don't give up.	1	2	3	4	5	6	7
34. I am not easily discouraged by failure.	1	2	3	4	5	6	7
35. I think of myself as a strong person.	1	2	3	4	5	6	7
36. I am confident I can successfully manage my emotions about the culture of this college.	1	2	3	4	5	6	7
37. I have a strong sense of purpose.	1	2	3	4	5	6	7

38. I am mentally capable of persisting in the face of challenges.	1	2	3	4	5	6	7
39. I think I am good at dealing with the pressures/ challenges of college.	1	2	3	4	5	6	7

Instructions: **For the following items, consider your future plans. Read each item carefully and respond using the scale provided. Circle the number that best describes you.**

	Strongly Disagree						Strongly Agree
40. I intend to be enrolled at Texas State in the Fall semester.	1	2	3	4	5	6	7
41. I intend to earn a degree from Texas State.	1	2	3	4	5	6	7
42. I intend to be enrolled at Texas State in the Spring semester.	1	2	3	4	5	6	7

Demographic Information

What is your current age: _____

What is your student classification: Check One
□ First-year
   Sophomore
   Junior
   Senior
   Post-baccalaureate
   Other (please specify) _____

What is your sex: Check One
   Male
   Female

What is your ethnicity? Check One
   Hispanic or Latino
   Not Hispanic or Latino

What is your race: Check all that apply
   African American or Black
   Asian/Pacific Islander
   Caucasian or White
   Hispanic or Latino
   Native American or American Indian
  Other (please specify) _____

Parents Education Level (highest earned): Check One

What is your mother's level of education?
   No High school
   Some high school
   High school diploma, GED, or equivalent
   Some college
   Associate degree or certification
   Bachelor degree
   Graduate degree
   I do not know
What is your father's level of education?
   No High school
   Some high school

High school diploma, GED, or equivalent
Some college
Associate degree or certification
Bachelor degree
Graduate degree
I do not know

Which of the following best describes your yearly family income?
Less than 14,999
15,000 – 24,999
25,000 – 34,999
35,000 – 49,999
50,000 – 74,999
75,000 – 99,999
100,000+

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