Winter December 10, 2016

# The Impact of Culturally Engaging Campus Environments on Sense of Belonging

Samuel D Museus
Varaxy Yi
Natasha Saelua

# The Impact of Culturally Engaging Campus Environments on Sense of Belonging

Samuel D. Museus, Varaxy Yi, Natasha Saelua

# The Impact of Culturally Engaging Campus Environments on Sense of Belonging

*Samuel D. Museus, Varaxy Yi, and Natasha Saelua*

Low rates of student persistence and degree completion are a major concern of colleges and universities across the United States. Of all incoming students enrolled at four-year institutions in 2005, less than 60% completed their bachelor's degree within six years (National Center for Education Statistics [NCES], 2013). In addition, students of color exhibit lower rates of degree attainment than the overall population. While 62% of first-time, full-time White students who matriculate at a four-year college complete a bachelor's degree in six years, that percentage is significantly lower for American Indian and Alaskan Native (39%), Black (40%), and Latino (50%) students (NCES,

Please send all correspondence regarding this manuscript to: Samuel D. Museus, Indiana University, Bloomington, 201 N. Rose Ave., Bloomington, IN 47405; Email: smuseus@iu.edu

Samuel D. Museus is Associate Professor of Higher Education and Student Affairs and Director of the Culturally Engaging Campus Environments (CECE) Project at Indiana University, Bloomington. His research agenda focuses on diversity and equity, institutional environments, and diverse student outcomes. His current research is focused on the impact of organizational environments on racial and ethnic minority college student access and success.

Varaxy Yi is a Higher Education doctoral student at the University of Denver. She is dedicated to research involving underrepresented communities and their educational attainment, aspirations, and experiences.

Natasha Saelua is a Higher Education doctoral student at Indiana University, Bloomington. Her research interests include access to higher education for underrepresented minority students.

2013). And, while Asian Americans and Pacific Islanders exhibit relatively high rates of degree completion in the aggregate, many Southeast Asian American and Pacific Islander ethnic groups within this racial category suffer from substantial disparities in degree attainment. For example, Vietnamese (26%), Hmong (14%), Cambodian (13%), and Laotian (12%) Americans, as well as Chamorro (21%), Native Hawaiians (17%), Guamanians (13%), Fijians (11%), Tongans (11%), Samoans (10%), and Micronesians (4%) all hold bachelor's degrees at rates lower than the national average of 28% (Museus, 2013).

These low levels of degree attainment pose negative consequences for both individual students and larger society. For example, individuals without higher education credentials will have lower lifetime earnings and are more likely to remain at or near poverty levels (Baum, Ma, & Payea, 2010). Regarding the impact of low levels of degree attainment on society, those without a college degree will contribute fewer tax dollars and are less likely to engage in civic participation at local, state, and national levels. Thus, it is important for higher education researchers, policymakers, and practitioners to better understand how to maximize the success of higher education's increasingly diverse undergraduate populations.

Previous research has demonstrated that students' ability to find a sense of belonging in college is positively associated with their intent to persist to degree completion (e.g., Hausmann, Schofield, & Woods, 2007). This reality underscores the importance of college educators understanding how to foster a sense of belonging among their students. The current investigation aims to increase knowledge of how campus environments shape students' sense of belonging in college. In the next section, we briefly discuss the evolution of scholarly theory and discourse on college student success. Next, we provide a synthesis of existing literature on the impact of campus environments on sense of belonging in college. Then, we offer an overview of the Culturally Engaging Campus Environments (CECE) Model of college success, which seeks to explain the ways in which particular aspects of institutional environments influence sense of belonging and other important student outcomes in postsecondary education. In the remainder of the article, we focus on our analyses of the relationship between culturally engaging campus environments and sense of belonging in college.

## FROM INTEGRATION TO CULTURAL CONSCIOUSNESS AND SENSE OF BELONGING

For three decades, Tinto's (1975, 1987, 1993) theory of student integration dominated much of the discourse around student success in higher education. Tinto's integration theory is based on the notion that students must go through a process of *separation* from their precollege communities, navigate

a period of *transition* into college life, and *integrate* into the academic and social subsystems of their campuses to maximize their likelihood of success. The theory posits that the extent to which students are able to integrate into these two subsystems of campus partially determine their subsequent commitments to their institutions and their goals to attain a college degree, which ultimately predict their likelihood of persistence and graduation.

Since its inception, several scholars have critiqued Tinto's theory and noted its limitations in explaining persistence processes, especially among students of color (Attinasi, 1989; Rendón, Jalomo, & Nora, 2000; Tierney, 1992, 1999). For example, researchers have questioned the underlying cultural foundations of Tinto's theory, which suggest that students must dissociate from their cultural communities and adopt the dominant values and norms of their respective campuses in order to succeed. These scholars have asserted that this assumption disproportionately disadvantages students of color, who are more likely to encounter campus cultures that are predominantly White and are more likely to have to go through a more significant process of assimilation in order to fit into those cultures (e.g., Tierney, 1992, 1999).

Scholars have also noted that research utilizing Tinto's (1987, 1993) integration framework disproportionately focuses on measuring the frequency of student behaviors (e.g., student-faculty interaction) as indicators of undergraduates' connections to their campus cultures (Hurtado & Carter, 1997; Museus, 2014; Rendón et al., 2000). Researchers assert that this overemphasis on behavior is a limitation of integration research because it does not give adequate attention to understanding the environmental context within which student behaviors occur or the psychological element of students' connections to the cultures of their campuses. They note that when students from racial majority and racial minority groups engage in the same behavior (e.g., interaction with a faculty member) within a campus environment that marginalizes the minority group, racial minority students often have more negative experiences than their majority counterparts. Thus, scholars argue that knowledge of these environmental and psychological elements are necessary to understand student success.

Over the last two decades, scholars have offered several concepts that deviate from the integration perspective to prompt more culturally conscious views of college success (Hurtado & Carter, 1997; Jun & Tierney, 1999; Museus, 2011; Museus & Quaye, 2009; Rendón, 1994; Rendón et al., 2000). Rendón (1994), for example, underscored the importance of the *cultural validation* of the backgrounds and identities of students in promoting their success. Similarly, Jun and Tierney (1999) discussed the importance of *cultural integrity*, which they described as culturally relevant programs and practices that intentionally engage students' cultural backgrounds and therefore increase their likelihood of success in college. Furthermore, Museus (2011) reframed Tinto's concepts of academic and social integration to propose the

concept of *cultural integration,* which refers to the ways in which educators can and sometimes do integrate academic, social, and cultural elements into singular spaces, curricula, programs, practices, and activities to empower students and create the conditions for them to thrive.

Another concept that has helped shift discourse to focus more on culturally conscious frameworks and psychological dimensions of success is sense of belonging, which typically refers to students' psychological sense of connection to their campus community (Hurtado & Carter, 1997). In contrast to Tinto's concept of academic and social integration, studies that examine sense of belonging are based on the notion that students from different backgrounds can perceive and experience environments and their interactions with those environments in distinctive ways. A couple of studies on sense of belonging and educational outcomes suggest that belonging in college is a significant predictor of success (Hausmann, Schofield, & Woods, 2007; Locks, Hurtado, Bowman, & Oseguera, 2008). Hausmann et al. (2007), for example, used growth modeling techniques to analyze a sample of 254 Black and 291 White students at one predominantly White institution (PWI). After controlling for demographic variables, faculty and peer interactions, parental and peer support, and academic integration, the authors found that sense of belonging was a statistically significant positive predictor of intent to persist. Thus, evidence reinforces the importance of understanding how institutions can cultivate a sense of belonging, which might ultimately lead to greater likelihood of success.

## Campus Environments and Sense of Belonging

A small and growing body of scholarship focuses on understanding the factors related to students' sense of belonging in college (e.g., Freeman, Anderman, & Jensen, 2007; Hoffman, Richmond, Morrow, & Salomone, 2002; Hurtado & Carter, 1997; Johnson et al., 2007; Locks et al., 2008; Museus & Maramba, 2011; Nuñez, 2009; Schussler & Fierros, 2008). This research provides some indication that elements of campus environments, such as campus climates and cultures, might be associated with the extent to which college students feel like they belong to the community on their respective campuses. For example, Hurtado and Carter (1997) examined national survey data from sample of 272 Latino students using structural equation modeling techniques to understand the relationship between these students' perceptions of the campus climate and their sense of belonging. After controlling for demographics, academic ability, and institutional selectivity, the authors found that Latino students who reported perceptions of more hostile climates exhibited lower levels of sense of belonging in college. In addition, Museus and Maramba (2011) analyzed single-institution survey data from 143 Filipino American college students using structural equation modeling

techniques, and they found that participants who reported greater pressure to sever ties with their cultural communities within the college environment reported more difficulties during the process of adjusting to college and a diminished sense of belonging on their respective campus.

It is important to note that there are contextual variables that likely shape the ways in which students experience the campus environment and might moderate the relationship between campus environments and sense of belonging. For example, although it is difficult to find studies that have empirically examined the specific connection between students' living situations and sense of belonging, several scholars have noted that living off campus can lead to increased transportation challenges, amplified work and family responsibilities that can detract from student engagement, and limited faculty interactions (Jacoby & Garland, 2004; Kim & Rury, 2011; Kuh, Gonyea, & Palmer, 2001), which are all factors that might influence students' sense of belonging. Kuh et al.'s (2001) analysis of national survey data on more than 100,000 students across 470 colleges and universities provides a case in point. The authors found that commuter students – a population in which students of color are overrepresented – were just as engaged in the classroom as their counterparts living on campus. However, these commuter students also reported lower levels of interaction with faculty and less engagement in co-curricular activities than their peers who live on campus, both of which have been linked to greater sense of belonging (Hurtado & Carter, 1997; Nuñez, 2009). Therefore, existing evidence suggests that students' living situations might shape the extent to which they can engage in campus environments and how they experience these environments, thereby indirectly influencing the extent to which they feel a sense of belonging on campus.

While the aforementioned research offers some evidence that campus environments play a significant role in shaping sense of belonging in college, these inquiries have only begun to shed light on the nature of this relationship. A comprehensive understanding of the elements of campus environments that affect sense of belonging among college students remains elusive. Therefore, further research that increases understandings of the relationship between campus environments and sense of belonging is warranted. In the following section, we turn to a recently developed theoretical framework that can be used to examine the nature of the relationship between campus environments and student outcomes, such as belonging.

## The Culturally Engaging Campus Environments (CECE) Model

Comprehensive and culturally conscious frameworks that attempt to explain the process by which campus environments influence student success are difficult to find. Museus (2014), however, has offered a new theoretical model of student success for racially and ethnically diverse student popula-

tions. The Culturally Engaging Campus Environment (CECE) Model of college success incorporates the cultural critiques of Tinto's (1987, 1993) theory of student integration, is grounded in the voices of diverse populations, and consists of a set of propositions that can be quantified and tested (see Figure 1). The CECE Model acknowledges that external influences (e.g., financial factors, employment, and family influences) and precollege inputs (e.g., academic preparation and academic dispositions at the time of entry) shape college success outcomes (e.g., learning, persistence, and degree completion). However, the core of the CECE Model emphasizes that college students' access to culturally engaging campus environments, described in greater detail below, is positively correlated with individual influences (e.g., sense of belonging, academic self-efficacy, motivation, intent to persist, and performance) on success and ultimately an increased probability of succeeding in college. Most pertinent to the current study is the CECE Model's proposition that undergraduates' access to culturally engaging campus environments is associated with higher levels of sense of belonging and, in turn, greater likelihood of success in higher education.

The nine elements of culturally engaging campus environments can be separated into two categories: cultural relevance and cultural responsiveness. *Cultural relevance* refers to the degree to which students' campus environments are relevant to their cultural backgrounds and identities and is characterized by five indicators. First, *cultural familiarity* is the extent to which college students have opportunities to physically connect with faculty, staff, and peers who understand their backgrounds and experiences. Second, *culturally relevant knowledge* refers to the degree to which students have opportunities to learn and exchange knowledge about their own cultural communities. Third, *cultural community service* refers to opportunities for students to give back to and positively transform their communities via activities aimed at spreading awareness, engaging in community activism, participating in service, or engaging in problem-based research to solve problems relevant to their cultural communities. Fourth, *meaningful cross-cultural engagement* involves students' levels of participation in discussions about solving real social and political problems with peers from diverse backgrounds. Finally, *culturally validating environments* refers to the extent to which students feel that their cultural knowledge, backgrounds, and identities are valued by their respective campuses.

The last four indicators focus on *cultural responsiveness*, or the extent to which campus programs and practices effectively respond to the needs of culturally diverse student populations. First, *collectivist cultural orientations* refer to the extent to which campuses are characterized by values of teamwork and mutual success, rather than individualism and competition. Second, *humanized educational environments* refer to environs in which institutional agents care about, are committed to, and develop meaningful
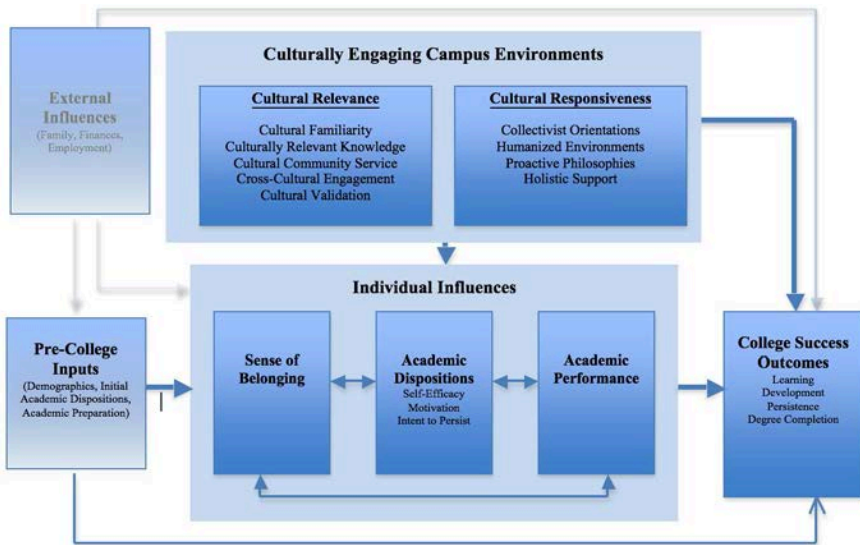
*Figure 1. The Culturally Engaging Campus Environments (CECE) Model of College Success. Source: Adapted from Museus 2014 © Springer*

relationships with students. Third, *proactive philosophies* drive the behavior of institutional agents who go above and beyond making information, opportunities, and support available to ensuring that students have knowledge and take advantage of that information, opportunities, and support. Finally, *holistic support* refers to the extent to which students have access to at least one faculty and staff member who they trust to provide the information and support that they need, or connect them to that information and support, regardless of the question or problem that they face.

It is important to acknowledge that the CECE Model does not explicitly delineate how important contextual variables that have been found to affect student outcomes, such as living situation, shape the relationship between campus environments and sense of belonging. Nor does the CECE Model delineate how the nine CECE indicators affect different types of student involvement or engagement behaviors. Moreover, the ways in which some indicators lead to particular student behaviors is more intuitive than for others. For example, it would make sense to hypothesize that environments with high levels of cultural community service would lead to greater student engagement in research and service projects that are aimed at improving their respective communities. In contrast, proactive support (e.g., proactive efforts to ensure that students are aware of various learning opportunities) might lead to higher involvement or engagement in a wide range of learning opportunities. Nevertheless, one limitation of the CECE model is that it

implies that culturally engaging environments lead to greater participation in academically enriching behaviors, but it does not specifically outline how they do so.

## CULTURALLY ENGAGING CAMPUS ENVIRONMENTS
## AND SENSE OF BELONGING

Museus (2014) noted that the CECE Model is based on a substantial and growing body of research that suggests that the nine indicators of culturally engaging campus environments discussed above positively influence sense of belonging and other student outcomes (e.g., Guiffrida, 2003, 2005; Lee & Davis, 2000; Museus, 2008, 2011; Museus & Neville, 2012; Museus & Quaye, 2009; Rendón, 1994; Tierney, 1999). For example, Guiffrida (2003) conducted a qualitative analysis of 19 African American students at a PWI to understand the characteristics of faculty who developed meaningful relationships with these participants. He found that participants were able to develop meaningful relationships with faculty members who provided comprehensive support and proactively pushed them to succeed. More recently, building on Stanton-Salazar's (1997) research illuminating how institutional agents help students of color in K-12 schools access social capital, Museus and Neville (2012) conducted individual interviews with 60 undergraduates of color to understand the characteristics of key institutional agents who helped participants gain social capital in college. When asked about the institutional agents who helped them succeed, participants discussed how individuals who shared common ground with students, provided students with holistic support, incorporated a humanized approach into their work with students, and espoused proactive (rather than reactive) philosophies toward providing support for students helped them access networks of important resources (i.e., information and support) and opportunities. The vast majority of the aforementioned literature is qualitative in nature and has helped inductively generate an in-depth understanding of some of the most salient campus environmental factors that might facilitate success among racially and ethnically diverse student populations.

On the other hand, quantitative studies that examine the impact of the nine elements of culturally engaging campus environments on sense of belonging are difficult to find. The quantitative evidence that *does* exist provides initial support for the notion that at least some of the CECE indicators are related to sense of belonging. For example, Locks et al. (2008) utilized structural equation modeling techniques to analyze a national survey sample of 1,346 students and found that positive cross-cultural interactions were statistically and positively associated with greater sense of belonging among students. In addition, Maestas, Vaquera, and Munoz Zehr (2007) conducted a quantitative study of 421 Hispanic college students using regression analysis techniques

and found that students who reported that faculty showed interest in them exhibited greater sense of belonging. It could be hypothesized that faculty interest is a characteristic of a belief in humanizing education (i.e., faculty who care and are committed to student success). If so, Maestas et al.'s finding might suggest a relationship between humanized educational environments and sense of belonging. However, more quantitative examinations are needed to understand the extent to which humanized environments and other CECE indicators are statistically associated with sense of belonging among undergraduate populations.

It is important to note that the relationships between diverse environments and student outcomes are complex. For example, Nuñez (2009) used structural equation modeling techniques to examine a national sample of 362 Latino college students and understand the factors that predict these students' sense of belonging. Her analysis revealed a complicated relationship between multiple diversity experiences and sense of belonging. For instance, positive cross-racial interactions were directly and positively associated with greater sense of belonging. At the same time, positive cross-racial interactions were associated with perceptions of a more hostile climate on campus, which in turn was associated with lower levels of belonging.

In sum, existing literature suggests that access to culturally engaging campus environments might positively influence students' sense of belonging. However, this body of research has two important limitations. First, the majority of this literature has been qualitative in nature and examined relatively small samples. Thus, quantitative studies that examine the statistical relationship between culturally engaging campus environments and sense of belonging are warranted. Second, to the best of our knowledge, the CECE Model has not been utilized to examine the extent to which culturally relevant environments influence sense of belonging in college. Consequently, studies that utilize the CECE Model to examine the impact of the nine indicators of culturally engaging campus environments on sense of belonging are warranted.

## Purpose

The purpose of the current study is to generate a better understanding of how campus environments might influence students' sense of belonging. The following research question guided the inquiry: Are culturally engaging campus environments associated with students' sense of belonging in college? The current article contributes to existing knowledge on campus environments and sense of belonging in multiple ways. First, this study adds to the body of heavily qualitative literature that examines the impact of culturally relevant and responsive campus environments on sense of belonging. In doing so, it generates important knowledge that enhances current levels of understanding

regarding which aspects of campus environments are statistically linked to belonging in college. Second, the current inquiry is the first study to utilize the CECE Model to explore the extent to which culturally engaging campus environments are associated with sense of belonging in higher education. Consequently, the investigation offers initial empirical evidence regarding the efficacy of the CECE Model as a viable conceptual framework in the analysis of campus environments, as well as their relationship with belonging in college. In doing so, the current analysis also constitutes the first study to analyze the impact of the nine CECE indicators on sense of belonging simultaneously to develop a more holistic picture of how culturally engaging environments influence belonging in college.

## METHODS

This study was executed using survey research methods. The survey was distributed electronically to students on one campus on the East Coast and two campuses in the West. The East Coast campus was a four-year urban research university with an undergraduate population of approximately 12,000 students, while the two campuses in the West were both rural community colleges, with undergraduate enrollments of approximately 2,700 and 8,000. With regard to racial composition, at the time of data collection, the undergraduate student body of the four-year university on the East Coast was 41% White, 15% Black, 12% Asian American, 12% Hispanic or Latino, and 2% Multiracial, with 18% reported as unknown and non-resident alien. The larger two-year institution had an undergraduate student body that was 37% Asian American, 30% Multiracial, 12% Hispanic or Latino, 10% White, 7% Native Hawaiian or Pacific Islander, and 2% Black, with 2% reported as unknown and non-resident alien. And, the smaller of the two-year campuses was comprised of 40% Multiracial, 18% White, 16% Asian American, 14% Hispanic or Latino, 10% Native Hawaiian and Pacific Islander, and 1% Black, with 1% reported as unknown and non-resident alien.

### Data Sources and Instrument

A total of 499 students across the institutions completed the questionnaire. The sample included more women (75%) than men (25%). White students constituted the largest racial group (27%) in the sample, followed by Asian Americans (25%), Pacific Islander (9%), Multiracial (9%), Latino (8%), Black (5%), Native American (2%), and Other (15%) students. The sample was diverse socioeconomically, with 29% of the sample originating from families earning between 0–$20,000, 27% of students coming from families earning between $20,001–40,000, 16% of students from families earning $40,001–60,000, and 28% of students with families earning over $60,000 annually. Participants reported an average age of 26 years and aver-

age high school GPA of 3.22. And, respondents were slightly more likely to have first-year (25.5%) or sophomore (29.5%) status, than junior (22%) or senior (23%) status.

The survey instrument included questions about demographic information (e.g., race, age, sex, generational status, family income), academic preparation (i.e., high school grade-point average), financial factors (e.g., tuition and financial aid received), and status in school (i.e., how many college credits the participant had completed). It also included 54 survey items that measured the nine CECE indicators and a 3-item sense of belonging scale.

### Key Variables

The control variables entered into the analysis included race, age, sex, parental education level, family income, academic preparation, tuition and financial aid, and status in undergraduate career. For the race variable, White was utilized as the baseline, and all other races (i.e., Asian American, Black, Latino, Native American, and Pacific Islander) were dummy-coded (0=no, 1=yes). *Female* was also dummy-coded (0=male, 1=female). *Age* was a single continuous variable that measures participants' exact age at the time of the survey. *Family income* was a single continuous item that measures the annual family income reported by participants in dollar amount, and whether students were second-generation college student or beyond was a dummy-coded variable measuring whether participants had at least one parent with at least an associate's degree (0=first-generation, 1=second-generation in college or beyond). *Academic preparation* was a continuous measure of students' grade-point average in high school. *Tuition* was measured by the actual annual tuition costs at participants' respective institutions, while *financial aid* was a continuous dollar amount measuring the amount of total aid students had received during the current academic year. And, the *completed credits* variable was a continuous measure of how many total college credits students had completed at the time of the survey.

Table 1 displays the variable definitions, alpha scores, and numerical codes for the key independent variables (i.e., the variables that represent the CECE indicators) and the dependent sense of belonging variable. The outcome was self-reported *sense of belonging* (alpha=.97) and was comprised of three survey items that measured the extent to which students (1) see themselves as part of the campus community, (2) feel that they are a member of the campus community, and (3) feel a sense of belonging to the campus community. The three sense of belonging items are based on the scale developed by Bollen and Hoyle (1990) and subsequently utilized by Hurtado and Carter (1997) to study sense of belonging among Latino college students. These items are now part of a Cooperative Institutional Research Program survey of the Higher Education Research Institution at the University of California, Los Angeles (UCLA).

## TABLE 1.
## KEY VARIABLE NAMES, ALPHA SCORES, DEFINITIONS, AND NUMERICAL CODES

| Variable Name | Variable Definitions and Codes |
| --- | --- |
| *Dependent Variable* | |
| Sense of Belonging (alpha=.97) | A latent variable that was constructed using three items measuring students' sense of belonging to their campus cultures, including the following: The extent to which students (1) see themselves as part of the campus community; (2) feel that they are a member of the campus community; and (3) feel a sense of belonging to the campus community. |
| *Key Independent Variables* | |
| Cultural Familiarity (alpha=.82) | A latent variable constructed using three indicators of the extent to which students were able to connect with people from similar backgrounds: The extent to which (1) it is easy to find people on campus with similar backgrounds as me; (2) I interact with people from similar backgrounds as me frequently on campus; and (3) there is sufficient space for me to connect with people from my community. |
| Culturally Relevant Knowledge (alpha=.90) | A latent variable comprised of four indicators that measure the extent to which students had opportunities to learn and exchange knowledge about their own cultural communities: The extent to which (1) there are enough opportunities to learn about the culture of my own community; (2) there are enough opportunities to learn about my own cultural community's history; (3) There are enough opportunities to gain knowledge about my own cultural community; and (4) there are NOT as many opportunities to learn about my own cultural community as I expected (reverse coded). |
| Cultural Community Service (alpha=.91) | A latent variable that was constructed using five items measuring the extent to which students had opportunities to give back and positively transform their cultural communities: The extent to which (1) there are enough opportunities to help improve the lives of people in my cultural community; (2) there are enough opportunities to give back to my cultural community; (3) there are NOT enough opportunities to positively impact my cultural community (reverse coded); (4) there are enough opportunities to make a positive difference in my cultural community; and (5) there are NOT enough opportunities to help solve problems in my cultural community (reverse coded). Each survey item coded: 0=strongly disagree, 1=disagree, 2=neither agree nor disagree, 3=agree, 4=strongly agree. |

| | |
|---|---|
| Cross-Cultural Engagement (alpha=.89) | A latent variable that was comprised of five survey items that measure the extent to which students had opportunities to engage in meaningful discussions with people from different cultures to solve real social and political problems across: The extent to which (1) there are enough opportunities to have meaningful interactions with people from other cultural backgrounds; (2) there are NOT enough opportunities to discuss important issues with people from different cultural backgrounds (reverse coded); (3) there are enough opportunities to discuss important social issues with people from different cultural backgrounds; (4) there are enough opportunities to have meaningful discussions about racial and ethnic issues; and (5) there is NOT a supportive environment for having meaningful discussions about important social issues across cultural groups (reverse coded). |
| Cultural Validation (alpha=.90) | A latent variable that was constructed using five indicators measuring the extent to which students feel like they are valued by the campus community: The extent to which (1) people on campus value the cultural knowledge that I possess; (2) my culture is valued on campus; (3) people on campus do NOT value my cultural community (reverse coded); (4) people on campus value the experiences of people in my cultural community; and (5) people on campus do NOT value the knowledge possessed by people in my cultural community (reverse coded). |
| Collectivist Cultural Orientations (alpha=.89) | A latent variable that was constructed using three indicators that measured the extent to which students had felt like the culture of campus was more collectivist and less individualistic: The extent to which (1) people on this campus help each other succeed; (2) people on this campus do NOT support each other (reverse coded); and (3) people on this campus work together toward common goals. |
| Humanized Educational Environments (alpha=.88) | A latent variable that was constructed comprised of four indicators measuring the extent to which students felt like faculty and staff cared about them and were committed to their success: The extent to which (1) I view faculty on campus as caring human beings; (2) faculty do NOT care about students on my campus (reverse coded); (3) faculty on campus are committed to my success; and (4) staff on campus are committed to my success. |

| | |
|---|---|
| Proactive Philosophies (alpha=.87) | A latent variable constructed using five indicators measuring the extent to which students felt like faculty and staff proactively ensured that they had access to information, opportunities, and support: The extent to which (1) people on this campus often send me important information about new learning opportunities; (2) people on this campus often send me important information about support that is available on campus; (3) people on campus do NOT often push me to seek out new learning opportunities (reverse coded); (4) people on campus often push me to take advantage of new learning opportunities; and (5) I feel like I have to hunt down new learning opportunities on my own (reverse coded). |
| Holistic Support (alpha=.94) | A latent variable constructed using five items measuring items measuring the extent to which students had access to one or more campus agents who they were confident would provide the information or support they need: The extent to which (1) if I need support, I know a person on campus who I can trust to give me that support; (2) if I have a problem, I know a person on campus who I can trust to help me solve that problem; (3) if I need information, I know a person on campus who I can trust to give me the information I need; (4) if I have a question, there is NOT a person who I can trust to answer it (reverse coded); and (5) there is someone on campus I can trust to help me, no matter what kind of support I need. |

*Note:* All survey items in this table were coded: 0=strongly disagree, 1=disagree, 2=neither agree nor disagree, 3=agree, 4=strongly agree.

The focal predictor variables that were included in this regression analysis included the nine CECE indicators. Museus, Zhang, and Kim (2015) previously developed an initial CECE Scale of 54 items designed to measure the nine CECE constructs. To examine the content validity of the CECE Scale, they asked a panel of nine subject matter experts (SMEs) in the areas of quantitative methods, campus diversity, and college student success to critique the survey items, and incorporated the expert feedback into a revised set of items.

Then, building on the work of validity experts (Lawshe, 1975; Wilson, Pan, & Schumsky, 2012), Museus et al. (2015) asked a second panel of 5 SMEs to rate each individual item on how essential it was to the measurement of the construct that it was intended to measure on a 3-point scale (1=very important, 2=useful but not important, and 3=and not important at all). Next, they used those ratings to compute content validity ratios (CVRs) to assess content validity (Lawshe, 1975; Wilson et al., 2012). CVRs are values measured on a scale from -1 to +1, with a +1 being the outcome when all SMEs rate the item as *very important*, a 0 indicating that half of the SMEs rate the item as *very important*, and a -1 resulting when all SMEs rate the scale as *not important at all* or *useful but not very important*. CVRs are computed using the equation,

$$CVR = \frac{n_{e-(\frac{N}{2})}}{\frac{N}{2}},$$

where $n$ is the number of SMEs who evaluated the respective survey item as very important and $N$ is the total number of SMEs on the panel. Next, based on criteria used in previous validity studies (Schmitt & Ostroff, 1986; Schultz, Whitney, & Zickar, 2013), they retained all items with positive CVRs for the construct validity analysis. Then, to assess construct validity, Museus et al. (2015) used a sample of 499 students across three campuses to conduct factor analyses and reliability analyses and concluded that all nine constructs had high construct validity and alpha scores between .81 and .94. Overall, these results suggest that the content and construct validity of the CECE Scale are sufficient for it to be used in further analyses.

Five variables measuring cultural relevance emerged from the aforementioned content and construct validity analyses (Museus et al., 2015). First, *cultural familiarity* (alpha=.81) was comprised of three items that measured the extent to which students agreed that they had opportunities to connect with people who understood their backgrounds and identities. Second, *culturally relevant knowledge* (alpha=.91) was measured by four factors measuring the extent to which participants agreed with statements that they had opportunities to learn and exchange knowledge about their own cultural communities. Third, *cultural community service* (alpha=.92) was comprised of five measures of the extent to which students felt like they

had opportunities to give back and positively transform their communities. Fourth, *cross-cultural engagement* (alpha=.90) was comprised of five items measuring the degree to which students agreed that they had spaces to engage in meaningful cross-cultural dialogue. Finally, *cultural validation* (alpha=.90) consisted of five items that measured the extent to which respondents agreed that they felt that the campus valued members of their cultural community.

Four emergent items measured cultural responsiveness (Museus et al., 2015). First, *collectivist cultural orientations* (alpha=.89) was comprised of three items that measured the degree to which students perceived their campus communities to have collectivist orientations. Second, *humanized educational environments* (alpha=.87) was comprised of four items measuring the extent to which students felt that faculty and staff on campus cared about and were committed to the success of students. Third, *proactive philosophies* (alpha=.87) consisted of five questions that measured the extent to which participants felt people on their campus went above and beyond offering opportunities for learning and were proactive in their provision of support. Finally, *holistic support* (alpha=.94) was comprised of five items that measured the degree to which students believed that they had at least one institutional agents who they could trust to provide them appropriate support, regardless of the question they had or problem that they faced.

## Data Analysis

Data were entered into SPSS and missing values were imputed using the Expectation Maximization option. Data analysis for this study was conducted in two phases. In Phase I, we employed Principal Components Analysis (PCA) with Varimax Rotation and reliability analyses to reduce the number of variables and maximize the amount of variance in the measured variables. The PCA was conducted and principal components were evaluated using Eigenvalues and factor loadings. We followed researcher recommendations that minimum eigenvalues of 1.0 are recommended for retaining principal components, while factor loadings of .40 and communalities of .50 are adequate thresholds for retaining survey items (see Hinton, McMurray & Brownlow, 2014; Larose & Larose, 2015; Osborne & Costello, 2004; Stevens, 1992; Tabachnick & Fidell, 2001). Thus, criteria we used to retain components and items in the PCA included (1) Eigenvalues above 1.0 to retain principal components and (2) factor loadings above .40 and communalities above .50 to retain corresponding survey items. The PCA resulted in nine components that correspond with the nine CECE indicators discussed in the sections above.

The constructs, alpha reliability scores, and survey items that emerged from the current PCA all mirrored those resulting from our earlier factor analysis (Museus et al., 2015). The PCA resulted in nine principal components that correspond with the nine factors from the earlier factor analysis.

These emergent components had alpha reliability scores between .82 and .94, which were very similar to the alpha scores of .81 and .94 resulting from the earlier construct validity analysis. In addition, similar to the earlier factor analysis, the PCA resulted in the retention of 39 items corresponding to the 9 indicators.

After identifying the nine emergent factors mentioned above, we examined the factor loadings of each individual survey item and reliability of each of the nine latent constructs. First, to determine which survey items to retain for each indicator, we omitted factor loadings below .40. Then, we conducted reliability analyses and computed alpha reliability scores for each of the nine factors. In cases in which the reliability statistics indicated that one or more survey items could be dropped to reduce the number of items associated with each factor and increase reliability, those items were omitted to generate a more parsimonious and refined set of items for each factor. After excessive items were removed, reliability analyses were computed again for each of the nine factors to generate the final reliability coefficients. The result of this PCA and reliability analysis was a 41-item scale represented by nine factors. We repeated the same process for sense of belonging, and we generated a single three-item belonging factor.

In Phase II, we examined the relationships between the CECE indicators and the sense of belonging outcome. First, we computed bivariate correlations for the CECE indicators and sense of belonging (see Table 2). Then, we utilized hierarchical linear regression techniques to evaluate the predictive power of demographic, precollege preparation, financial factors, status, and culturally engaging campus environments on belonging. The demographic variables were entered into the regression equation in Block 1. Financial variables and credits completed were entered into the equation in Block 2. And, the nine CECE indicators were entered into the equation in the final Block. The hierarchical approach permitted the examination of the unique contribution of the CECE indicators in explaining the variance in the outcome.

## Limitations

Before proceeding with the overview of the results of the current analysis, it is important to note at least three limitations of our study. First, our sample only included 499 students across three institutions, and the generalizability of our results is limited. Second, some groups (e.g., Native Americans) were not well represented in our sample, so the findings of this analysis might be less indicative of their realities than the populations that had greater representation in the participant sample. Third, the study was conducted using a cross-sectional design and only captured students' perspectives at one point in time. As a result, we were unable to control for initial predispositions to participants reporting of higher or lower levels of sense of belonging at the

TABLE 2.
KEY VARIABLE CORRELATIONS

|  | SOB | CF | CRK | CCS | CCE | CV | CCO | HE | PP | HS |
|---|---|---|---|---|---|---|---|---|---|---|
| Sense of Belonging (SOB) | 1.00 | .61*** | .45*** | .42*** | .39*** | .61*** | .69*** | .60*** | .64*** | .60*** |
| Cultural Familiarity (CF) | .61*** | 1.00 | .49*** | .52*** | .48*** | .58*** | .56*** | .52*** | .53*** | .49*** |
| Culturally Relevant Knowledge (CRK) | .45*** | .49*** | 1.00 | .62*** | .45*** | .55*** | .44*** | .48*** | .46*** | .42*** |
| Cultural Community Service (CCS) | .42*** | .52*** | .62*** | 1.00 | .53*** | .53*** | .45*** | .46*** | .49*** | .39*** |
| Cross-Cultural Engagement (CCE) | .39*** | .48*** | .45*** | .53*** | 1.00 | .49*** | .45*** | .42*** | .39*** | .34*** |
| Cultural Validation (CV) | .61*** | .58*** | .55*** | .53*** | .49*** | 1.00 | .53*** | .51*** | .50*** | .42*** |
| Collectivist Cultural Orientations (CCO) | .69*** | .56*** | .44*** | .45*** | .45*** | .53*** | 1.00 | .67*** | .62*** | .59*** |
| Humanized Educational Environments (HE) | .60*** | .52*** | .48*** | .46*** | .42*** | .51*** | .67*** | 1.00 | .63*** | .66*** |
| Proactive Philosophies (PP) | .64*** | .53*** | .46*** | .49*** | .39*** | .50*** | .62*** | .63*** | 1.00 | .59*** |
| Holistic Support (HS) | .60*** | .49*** | .42*** | .39*** | .34*** | .42*** | .59*** | .66*** | .59*** | 1.00 |

Note: * indicates statistical significance at the .05 level
     ** indicates statistical significance at the .01 level
     *** indicates statistical significance at the .001 level

time of entry into higher education. Fourth, our data represent a snapshot of students' experiences and perspectives at a single point in time. Thus, we could not account for the role of time in our parameter estimation. Nevertheless, we developed our regression model using existing theory and evidence to ensure the most logical hypothesis of relationships among those variables (Hurtado & Carter, 1997; Jun & Tierney, 1999; Kuh & Love, 2000; Museus & Quaye, 2009; Tierney, 1999). Hence, the results should be interpreted with caution until future studies are conducted with larger diverse samples and longitudinal analyses that control for pre-college dispositions to reporting of sense of belonging. Finally, our regression model did not control for contextual variables (e.g., work hours and living on campus) that might moderate students' access to culturally engaging environments or the ways in which they experience them.

## RESULTS

The *R*-squared for the final model was .69, while the adjusted *R*-squared was .68, suggesting that the model explained 68–69% of the variation in sense of belonging outcome. The *R*-squared change that resulted from the addition of Block 3 (i.e., the CECE indicators) to the equation was .56, indicating that 56% of the variation in the belonging outcome variable was explained by the nine CECE variables.

Table 2 includes the bivariate correlation coefficients, which is measured on a scale from 0-1 and offers a measure of the strength of the relationship between the two variables. The table also provides an indication of whether each coefficient is statistically significant. The correlation statistics indicate that all nine CECE variables are positively correlated with sense of belonging, and these relationships are all significant at the .001 level. Collectivist cultural orientations ($r$=.69) was most strongly correlated with sense of belonging, followed by proactive philosophies ($r$=.64), cultural familiarity ($r$=.61), cultural validation ($r$=.61), humanized educational environments ($r$=.60), holistic support ($r$=.60), culturally relevant knowledge ($r$=.45), cultural community service ($r$=.42), and cross-cultural engagement ($r$=.39).

The results of the regression analysis are shown in Table 3. The results display the standardized regression coefficients (i.e., the beta weights) and p-values. The standardized path coefficients represent the standard deviation change in the dependent variable for each one standard deviation change in the independent variable, holding all other predictor variables in the regression equation constant. And, p-values below .05 suggest statistical significance.

The resulting regression statistics in Table 3 show that, controlling for other factors, Latinos ($\beta$=.07) exhibited a stronger sense of belonging than Whites,

and this relationship was statistically significant at .05. In contrast, identifying with any other group of color was not significantly associated with sense of belonging. The regression results suggest that women exhibited a greater sense of belonging than men ($\beta$=.07), and this relationship was statistically significant at the .01 level. The regression coefficients for age ($\beta$=.06), family income ($\beta$=-.02), and second generation or beyond ($\beta$=.00) were all statistically insignificant in the final model. However, academic preparation ($\beta$=.10) and financial aid awards ($\beta$=.16) were positively associated with belonging, and these relationships were significant at the .001 level. In contrast, tuition ($\beta$=-.11) was negatively associated with belonging and statistically significant at the .001 level. Finally, number of credits completed ($\beta$=.01) was not significantly related to belonging.

Given the moderate-to-strong relationships between the CECE predictor variables and the large $R$-squared that resulted from the regression analysis, it was important to examine regression diagnostics for indications of multicollinearity. The regression output indicated that the Tolerance statistics of each individual variable in the model were .40 or higher, and all VIF were 2.2 or lower, indicating that multicollinearity did not bias the regression results.

Table 3 also displays standardized coefficients and p-values related to the relationships between the nine CECE variables and sense of belonging outcome. When holding all other variables in the final model constant, eight of the nine CECE variables were positively associated with sense of belonging, while one indicator (i.e., cultural community service) was negatively related to the outcome. Of the nine indicators, five exhibited positive and statistically significant relationships with the sense of belonging outcome, while one exhibited a negative and statistically significant relationship. Collectivist cultural orientations exhibited the strongest positive relationship with the belonging outcome ($\beta$=.25, $p$<.001), followed by cultural validation ($\beta$=.24, $p$<.001), cultural familiarity ($\beta$=.23, $p$<.001), proactive philosophies ($\beta$=.19, $p$<.05), and holistic support ($\beta$=.14, $p$<.001). The only indicator that was negatively associated with sense of belonging was cultural community service ($\beta$=-.10, $p$<.01). The regression coefficients exhibited by culturally relevant knowledge, cross-cultural engagement, and humanized educational environments were all insignificant at the .05 significance level.

To examine whether the relationships between the nine CECE indicators and sense of belonging vary by race, we conducted a post-hoc analysis. Specifically, we sought to examine the interactions between race and the nine CECE indicators. First, we created a dichotomous *non-White* variable (0=White, 1=non-White). Second, we centered each independent variable. Researchers have noted that interaction terms can increases the probability of multicollinearity, and some researchers argue that centering variables on their mean can help minimize the potential of multicollinearity resulting

## TABLE 3. REGRESSION RESULTS

| | Block 1 Beta | Block 1 p-value | Block 2 Beta | Block 2 p-value | Block 3 Beta | Block 3 p-value |
|---|---|---|---|---|---|---|
| Race | | | | | | |
| Asian American | .11 | .02* | .11 | .02 | .05 | .09 |
| Black | .01 | .88 | .03 | .50 | -.01 | .62 |
| Latino | .03 | .49 | .03 | .53 | .07 | .01* |
| Native American | -.01 | .88 | -.01 | .63 | .01 | .72 |
| Pacific Islander | .18 | .00*** | .10 | .05* | -.06 | .06 |
| Female | .17 | .00*** | .12 | .00** | .07 | .01* |
| Age | .14 | .00** | .10 | .05 | .06 | .06 |
| Family Income | -.04 | .34 | -.04 | .34 | -.02 | .42 |
| 2nd generation in college or beyond | .03 | .49 | .03 | .49 | .00 | .90 |
| High School GPA | | | -.01 | .80 | .10 | .00*** |
| Tuition | | | -.16 | .00** | -.11 | .00*** |
| Financial Aid | | | .07 | .15 | .16 | .00*** |
| Completed Credits | | | -.08 | .08 | .01 | .83 |
| Cultural Familiarity (CF) | | | | | .23 | .00*** |
| Culturally Relevant Knowledge (CRK) | | | | | .03 | .35 |
| Cultural Community Service (CCS) | | | | | -.10 | .01** |
| Cross-Cultural Engagement (CCE) | | | | | .00 | .94 |
| Cultural Validation (CV) | | | | | .24 | .00*** |
| Collectivist Cultural Orientations (CCO) | | | | | .25 | .00*** |
| Humanized Educational Environments (HE) | | | | | .01 | .86 |
| Proactive Philosophies (PP) | | | | | .19 | .00*** |
| Holistic Support (HS) | | | | | .14 | .00*** |
| $R^2$ | .11 | | .13 | | .69 | |
| Adjusted $R^2$ | .09 | | .11 | | .68 | |
| $R^2\Delta$ | .11*** | | .03** | | .56*** | |

Note: * indicates statistical significance at the .05 level
  ** indicates statistical significance at the .01 level
  *** indicates statistical significance at the .001 level

from such interactions (Tate, 1984; West, Aiken, & Krull, 1996). Centering is the process of subtracting a constant, such as the mean, from each individual value of a variable. Thus, we subtracted the mean for each predictor variable from each individual value. Third, we multiplied the non-White variable by each of the nine CECE indicators, resulting in nine corresponding interaction variables. These interaction variables can be used to understand whether the relationship between each CECE indicator and sense of belonging depends on whether participants are White and or non-White. If the $R$-squared change that results from adding the interaction terms is significant, it would indicate that the interaction terms explained a significant amount of variation in the sense of belonging outcome above and beyond the individual variables analyzed in the main analysis. If the regression coefficients are significant, it would be an indication that the nature of the relationship between the corresponding CECE indicator and sense of belonging depends on whether participants report being White or non-White. When we added the interactions terms into the post-hoc regression equation, the $R$-squared change was less than .01 and insignificant at the .05 level, while all nine interaction terms were insignificant at the .05 level, indicating that the relationships between the CECE indicators and sense of belonging do not vary by White or non-White status.

## DISCUSSION

Several important conclusions can be drawn from the current study. First, our current analysis emphasizes the importance of analyzing the relationship between qualitative aspects of institutional environments and students' outcomes. As mentioned, traditional student success frameworks, such as Tinto's (1987, 1993) integration theory, and the research that has employed them to study student success have focused more on students' behaviors than the environmental and psychological elements of college success (Hurtado & Carter, 1997; Museus, 2014; Rendón et al., 2000). Recently, scholars have begun to shed light on how campus environments shape student outcomes, but much remains to be learned about this relationship (Hurtado & Carter, 1997; Locks et al., 2008; Museus & Maramba, 2011). The current analysis adds to that understanding by providing a more comprehensive analysis of how perceived elements of campus environments are associated with sense of belonging.

Second, our study reinforces the importance of examining the types of campus environments that have a *positive* influence on college students' experiences and outcomes. Over the last few decades, higher education scholars have generated a fairly extensive body of research that sheds light on the ways in which negative aspects of the institutional environment – including prejudice and discrimination, marginalization and isolation, differential

treatment, stereotypes, and other aspects of hostile or "chilly" campus climates – negatively influence students' college experiences (see Museus, 2014). However, while researchers have begun to develop knowledge of the elements of campus environments that contribute to the conditions that allow diverse populations to thrive (e.g., Guiffrida, 2003; Maestas et al., 2007; Museus, 2008, 2011), a coherent picture of the nature of such environments has been elusive. The current examination adds to extant literature by providing one of the most comprehensive analyses of aspects of institutional environments that influence students' sense of belonging.

Third, this investigation provides initial evidence that the CECE Model might be a useful conceptual lens for studying the impact of campus environments on sense of belonging. As mentioned, while previous studies have begun to examine the influence of environmental factors on students' sense of belonging (Hurtado & Carter, 1997; Locks et al., 2008; Museus & Maramba, 2011), this is the first examination to apply the CECE framework to examine the relationship between campus environments and sense of belonging. The findings provide initial evidence that the CECE Model might explain a substantial amount of the variation in sense of belonging in college. In fact, the regression model examined herein accounted for 68% of the variation in belonging, which is a greater portion of variance in belonging explained by previously examined statistical models (Freeman et al., 2007; Johnson, 2012; Johnson, et al., 2007; Locks et al., 2008; Maestas et al., 2007; Ostrove & Long, 2007; Strayhorn, 2008).

Fourth, our results suggest that all nine CECE indicators might be correlated with sense of belonging, but that some indicators might be more salient influences on belonging than others. However, when we controlled for demographic, financial, and enrollment variables and entered the CECE indicators into the regression equation, only seven of the nine indicators exhibited a positive influence on belonging and five of the nine indicators exhibited positive statistically significant associations with the belonging outcome. Given our study limitations, however, results should be interpreted with caution, and more research is needed to draw more informed conclusions about the relative impact of the nine indicators on sense of belonging in college.

Finally, it is important to note that the statistically significant negative association between cultural community service and sense of belonging is counterintuitive and could suggest that a complex relationship exists between these experiences and belonging in college. While our analysis does not illuminate the specific cause of this negative relationship, there are some potential explanations for this finding. First, as mentioned, studies that utilize structural equation modeling techniques have demonstrated that elements of campus environments can be related to sense of belonging in complex ways (Locks et al., 2008; Nuñez, 2009). Therefore, it is possible that any positive

correlation between cultural community service and sense of belonging is attributable to the ways in which these experiences allow students to connect with people who have similar backgrounds, learn about their own cultural communities, and feel validated. If this explanation is true, the inclusion of other CECE indicators (e.g., cultural familiarity, culturally relevant knowledge, cultural validation) in the regression equation could account for much of these positive aspects of their service experiences, while the cultural community service regression coefficient might reflect the remaining (more negative) aspects of such experiences.

Second, higher education researchers have noted that service learning opportunities can often be constructed in ways that negatively impact the experiences of college students of color by treating their communities of origin in deficit-oriented ways and reinforcing negative views of the communities from which these students come (Swaminathan, 2007; Tharp, 2012). Such deficit-oriented experiences could further alienate students of color from campus and weaken their connections to their respective institutions. Studies that account for some of these potential explanations and use techniques to analyze more complex relationships (e.g., structural equation modeling) can help shed light on this potentially complex relationship.

## Implications for Research and Practice

This study has several important implications for research and practice. First, future research on the relationship between culturally engaging campus environments and sense of belonging should be conducted with larger sample sizes. The current analysis was conducted with a sample size of 499 college students at three postsecondary institutions. Investigations that utilize larger sample sizes would permit the examination of whether these findings are generalizable to larger regional and national student populations.

Second, future inquiries should seek to examine the impact of culturally engaging campus environments on sense of belonging within different contexts. For example, researchers should analyze to what extent culturally engaging campus environments are salient predictors at larger and small, public and private, and four-year and two-year campuses. These types of examinations could also generate insight into whether, and the extent to which, the influence of culturally engaging campus environments on sense of belonging varies across institutions with varying racial compositions (e.g., whether the salience of culturally engaging campus environments varies between predominantly White and minority serving institutions). It is also important for future research to shed light on how living conditions (e.g., living on campus, near campus, or at home), employment situations (e.g., place and hours of employment), or field of study shape the ways in

which students experience culturally engaging environments and how these environments impact outcomes such as sense of belonging.

With regard to implications for practice, this study also offers college educators some initial evidence that the CECE model might be a useful tool to inform the creation of campus environments that meet the needs of their racially diverse populations. The CECE model can be used to build programs, initiatives, and events that are relevant and responsive to the cultural identities of students and are more likely to cultivate an increased sense of belonging among those undergraduates. A thorough discussion of the ways in which college educators might utilize the CECE Model to inform practice is beyond the scope of the current article, but we offer a couple possibilities herein for purposes of illustration. For instance, a history professor might integrate cultural familiarity, culturally relevant knowledge, and collectivist orientations into designing the curriculum and pedagogy of an introductory American history course by integrating lessons on diverse histories from the perspectives of indigenous and immigrant communities, allowing students to engage in oral history projects in which they interview members of their communities about critical events within their communities, or taking students on field trips that allow them to learn about their own communities' histories (e.g., taking a course with Asian American students to visit a World War II Japanese American internment camp and learn in-depth about the discrimination faced by Japanese Americans). Similarly, academic advisors might engage in humanized, holistic, and proactive support by probing to understand how students' cultural backgrounds, family relationships, and community obligations might be influencing their experiences and success in college. These are just a couple examples to demonstrate the ways in which educators working across campuses can think about incorporating the CECE indicators into their work with college students. However, these methods will likely vary across respective contexts and professional positions.

Finally, the results of this study provide support for the utility of the CECE Model and Scale as tools for conducting campus environment assessment. Such assessments can help college educators better understand the environments that they have created and are perpetuating on their respective campuses. Campus environment assessments can also help postsecondary educators increase their knowledge regarding how these environments are influencing students' experiences and outcomes. By developing a better understanding of how campus environments are impacting student success, educators can be equipped with valuable information to initiate change, target areas of growth, and most importantly, improve student outcomes.

## REFERENCES

Attinasi, L. C. Jr. (1989) Getting in: Mexican Americans' perceptions of university attendance and the implications for freshman year persistence. *The Journal of Higher Education, 60*(3), 247–77.

Baum, S., Ma, J., & Payea, K. (2010). *Education pays, 2010: The benefits of higher education for individuals and society.* New York: The College Board.

Bollen, K. A., & Hoyle, R. H. (1990). Perceived cohesion: A conceptual and empirical examination. *Social Forces, 69*(2), 479–504.

Freeman, T., Anderman, L., & Jensen, J. (2007). Sense of belonging in college freshmen at the classroom and campus levels. *The Journal of Experiential Education 75*(3), 203–220.

Guiffrida, D. A. (2003). African American student organizations as agents of social integration. *Journal of College Student Development, 44*(3), 304–319.

Guiffrida, D. (2005). Othermothering as a framework for understanding African American students' definitions of student-centered faculty. *The Journal of Higher Education, 76*(6), 701–23.

Hausmann, L. R. M., Schofield, J. W., & Woods, R. L. (2007). Sense of belonging as a predictor of intentions to persist among African American and White first-year college students. *Research in Higher Education, 48*(7), 803–839.

Hinton, P. R., McMurray, I., & Brownlow, C. (2014). *SPSS explained.* New York: Routledge.

Hoffman, M., Richmond, J., Morrow, J., & Salomone, K. (2002). Investigating "sense of belonging" in first-year college students. *Journal of College Student Retention, 4*(3), 227–256.

Hurtado, S., & Carter, D. (1997). Effects of college transition and perceptions of the campus racial climate on Latina/o college students' sense of belonging. *Sociology of Education, 70*, 324–345.

Jacoby, B., & Garland, J. (2004). Strategies for enhancing commuter student success. *Journal of College Student Retention, 6*(1), 61–79.

Johnson, D. R. (2012). Campus racial climate perceptions and overall sense of belonging among racially diverse women in STEM majors. *Journal of College Student Development 53*(2), 336–346.

Johnson, D. R., Soldner, M., Leonard, J. B., Alvarez, P., Inkelas, K. K., Rowan-Kenyon, H., & Longerbeam, S. (2007). Examining sense of belonging among first-year undergraduates from different racial/ethnic groups. *Journal of College Student Development, 48*(5), 525–542.

Jun, A. & Tierney, W. (1999). At-risk urban students and college success: A framework for effective preparation. *Metropolitan Universities: An International Forum 9*(4), 49–62.

Kim, D., & Rury, J. L. (2011). The rise of the commuter student: Changing patterns of college attendance for students living at home in the United States, 1960–1980. *Teachers College Record*, *113*(5), 1031–1066.

Kuh, G. D., Gonyea, R. M., & Palmer, M. (2001). The disengaged commuter student: Fact or fiction. *Commuter Perspectives*, *27*(1), 2–5.

Kuh, G. D., & Love, P. G. (2000). A cultural perspective on student departure. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 196–212). Nashville, TN: Vanderbilt University Press.

Larose, D. T., & Larose, C. D. (2015). *Data mining and predictive analytics.* Hoboken, NJ: Wiley.

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology, 28*, 563–575.

Lee, M., & Davis, C. (2000). Cultural orientation, past multicultural experience, and a sense of belonging on campus for Asian American college students. *Journal of College Student Development, 41*(1), 110–115.

Locks, A. M., Hurtado, S., Bowman, N. A., & Oseguera, L. (2008). Extending notions of campus climate and diversity to students' transition to college. *The Review of Higher Education, 31*(3), 257–285.

Maestas, R., Vaquera, G. S., & Munoz Zehr, L. (2007). Factors impacting sense of belonging at a Hispanic-serving institution. *Journal of Hispanic Higher Education, 6*(3), 237–256.

Museus, S. D. (2008). The role of ethnic student organizations in fostering African American and Asian American students' cultural adjustment and membership at predominantly White institutions. *Journal of College Student Development, 49*(6), 568–586.

Museus, S. D. (2011). Using cultural perspectives to understand the role of ethnic student organizations in Black students' progress to the end of the pipeline. In D. E. Evensen and C. D. Pratt (Eds.), *The end of the pipeline: A journey of recognition for African Americans entering the legal profession* (pp. 162–172). Durham, NC: Carolina Academic Press.

Museus, S. D. (2013). Asian Americans and Pacific Islanders: A national portrait of growth, diversity, and inequality. In S. D. Museus, D. C. Maramba, & R. T. Teranishi (Eds.), *The misrepresented minority: New insights on Asian Americans and Pacific Islanders, and their implications for higher education.* Sterling, VA: Stylus.

Museus, S. D. (2014). The Culturally Engaging Campus Environments (CECE) Model: A new theory of college success among racially diverse student populations. In M. B. Paulsen (Ed.) *Higher Education: Handbook of Theory and Research.* New York: Springer.

Museus, S. D. & Maramba, D. C. (2011). The impact of culture on Filipino American Students' sense of belonging. *Review of Higher Education, 34*(2), 231–258.

Museus, S. D., & Neville, K. (2012). Delineating the ways that key institutional agents provide racial minority students with access to social capital in college. *Journal of College Student Development, 53*(3), 436–452.

Museus, S. D., & Quaye, S. J. (2009). Toward an intercultural perspective of racial and ethnic minority college student persistence. *The Review of Higher Education, 33*(1), 67–94.

National Center for Education Statistics [NCES] (2013). *Graduation rates of first-time postsecondary students who started as full-time degree/certificate-seeking students, by sex, race/ethnicity, time to completion, and level and control of institution where student started: Selected cohort entry years, 1996 through 2007.* Retrieved from http://nces.ed.gov/programs/digest/d13/tables/dt13_326.10.asp

Nuñez, A. (2009). A critical paradox? Predictors of Latino students' sense of belonging in college. *Journal of Diversity in Higher Education, 2*(1), 46–61.

Osborne, J. W., & Costello, A. B. (2004). Sample size and subject to item ratio in principal components analysis. *Practical Assessment, Research & Evaluation, 9*(11). Retrieved September 22, 2015 from http://PAREonline.net/getvn.asp?v=9&n=11

Ostrove, J. M., & Long, S. M. (2007). Social class and belonging: Implications for college adjustment. *The Review of Higher Education, 30*(4), 363–389.

Rendón, L. I. (1994). Validating culturally diverse students: Toward a new model of learning and student development. *Innovative Higher Education, 19*(1), 33–51.

Rendón, L. I., Jalomo, R. E., & Nora, A. (2000). Theoretical considerations in the study of minority student retention in higher education. In J. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 127–156). Nashville, TN: Vanderbilt University Press.

Schmitt, N., & Ostroff, C. (1986). Operationalizing the "behavioral consistency" approach: Selection test development based on a content-oriented strategy. *Personnel Psychology, 39,* 91–108.

Schultz, K. S., Whitney, D. J., Zickar, M. J. (2013). *Measurement theory in action: Case studies and exercises.* New York: Routledge.

Schussler, D., & Fierros, E. (2008). Students' perceptions of their academics, relationships, and sense of belonging: Comparisons across residential learning communities. *Journal of The First-Year Experience & Students in Transition 20*(1), 71–97.

Stanton-Salazar, R. D. (1997). A social capital framework for understanding the socialization of racial minority children and youths. *Harvard Educational Review, 67*(1), 1–40.

Stevens, J. P. (1992) *Applied multivariate statistics for the social sciences* (2nd edition). Hillsdale, NJ: Erlbaum.

Strayhorn, T. L. (2008). Fittin' in: Do diverse interactions with peers affect sense of belonging for Black men at predominantly White institutions? *NASPA Journal, 45*(4), 501–527.

Swaminathan, R. (2007). Educating for the real world: The hidden curriculum of community service-learning. *Equity and Excellence in Education, 40*(2), 134–143.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics.* Boston: Allyn and Bacon.

Tate, R. L. (1984). Limitations of centering for interaction models. *Sociological Methods and Research, 13,* 251–271.

Tharp, D. S. (2012). A proposed workshop curriculum for students to responsibly engage cultural conflict in community-based service learning. *Journal of Transformative Education, 10*(3), 177–194.

Tierney, W. G. (1992). An anthropological analysis of student participation in college. *Journal of Higher Education, 63*(6), 603–618.

Tierney, W. G. (1999). Models of minority college-going and retention: Cultural integrity versus cultural suicide. *The Journal of Negro Education, 68*(1), 80–91.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*(1), 89–125.

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd edition). Chicago: University of Chicago Press.

West, S. G., Aiken, L. S., & Krull, J. L. (1996). Experimental personality designs: Analyzing categorical by continuous variable interaction. *Journal of Personality, 64*(1), 1–48.

Wilson, F. R., Pan, W., & Schumsky, D. A. (2012). Recalculation of the critical values for Lawshe's content validity ratio. *Measurement and Evaluation in Counseling and Development, 45*, 197–210.