A CRITICAL EMPIRICAL EXAMINATION OF THE CONSTRUCT OF CAMPUS CLIMATE

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by

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ABSTRACT

College students’ experiences with their campus environment, and perceptions of
discrimination or a negative climate, influence both their learning and developmental outcomes. Also, research indicates that students experience campus climates differently based upon social group membership. Understanding how students from various social groups experience climate should be important to higher education professionals in designing more effective interventions and removing obstacles to the success of all students. The purpose of this study was to contribute to the literature on the measurement of campus climate by offering an instrument empirically tested with scale development methodology. Several researchers have studied the climate in higher education. This study focuses on one assessment tool that has been used for the last ten years. Building upon the work of Daryl Smith, Sylvia Hurtado and her colleagues, and her own work, Susan Rankin developed the *Transformational Tapestry Model* (TTM). The model approaches the assessment of climate in an inclusive and comprehensive manner. However, it has not been independently tested following Rankin’s initial analysis and the instrument continues to be modified over time, thereby calling into question the psychometric strength of the survey. I used hierarchical factor analysis on a dataset constructed based on responses from students at 23 institutions to determine the structure of the latent constructs of climate represented by the instrument. The resulting *Perceptions of Climate Instrument (PCI)* consists of 14 lower-level factors and three second-level factors (Perceptions of Climate for Members of Underrepresented Groups, Perceptions of an Actively Welcoming Institution, and Perceptions of Visible Leadership). I also provide evidence for the existence of the overarching construct of Perceptions of Climate. I examined the reliability and validity of the resulting scale scores. Full implications are presented, including a discussion of elements of the climate that were eliminated
from the analysis and suggestions for how the PCI can be used by institutions to examine their climate and identify areas for improvement, so that students can get the most out of their college education and continue on to be positive and effective citizens in our increasingly complicated and diverse world.
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Chapter 1

There are only two mistakes one can make along the road to truth; not going all the way, and not starting.  
—Attributed to The Buddha, Siddhārtha Gautama

INTRODUCTION

The Need to Study Campus Climate

Institutions of higher education are complex social and political systems (Altbach, Berdahl, & Gumport, 2005; Birnbaum, 1988; Peterson, 2000; Peterson & Spencer, 2000). They are defined by the relationships between faculty, staff, students, and alumni; bureaucratic procedures embodied by institutional policies; structural frameworks; institutional missions, visions, and core values; institutional history and traditions; and larger social contexts (Hurtado, Milem, Clayton-Pedersen, & Allen, 1998). With over 4,000 degree-granting postsecondary institutions (Altbach, et al., 2005), the heterogeneity of the American “system” of higher education is at once its biggest strength as well as its largest potential complication. In addition to organizational, programmatic, and mission-based differences among institutions, the postsecondary student population continues to diversify in terms of race and ethnicity (Bergman, 2004; Keller, 2001), religion (Bryant, 2006; Mahoney, Schmalzbauer, & Youniss, 2001; U.S. Census Bureau, 2007), national origin (Bryant, 2006; Keller, 2001), age (Keller, 2001), family status (Keller, 2001), and other social identities (Keller, 2001).

This increasing diversity in higher education echoes that of the country. For example, The U.S. Census Bureau projects that Hispanic and Asian Populations may triple by 2050, with Whites dropping to half of the total population (Bergman, 2004). This trend is seen in higher education as well, with the percentage of minority undergraduates increasing from 17% to 32% from 1976 to 2004 (KewalRamani, Gilbertson, Fox, & Provasnik, 2007). In addition, America is one of the most religiously diverse countries in the world (Eck, 2001), and its pluralism is
increasing. Between 1990 and 2001 the U.S. adult population increased by 18.5%, but those reporting Non-Christian religions increased by 32.2% (U.S. Census Bureau, 2007). Even though the percentage of college students who identify with a Non-Christian religion is relatively small, it is increasing, and the numbers are large enough that they should be paid attention to (Bryant, 2006). As higher education is, in many ways, a microcosm of American society, this population will continue to grow and diversify.

Among this backdrop of diversity and diversification, institutional missions suggest that the higher education knowledge industry, as a whole, values multicultural awareness and understanding within an environment of mutual respect and cooperation (Morphew & Hartley, 2006). Individual institutions strive to foster a climate that will promote their missions with the understanding that climate has a profound effect on the academic community’s ability to excel in its three-prong mission of teaching, research, and service. Institutional strategic plans advocate creating welcoming and inclusive climates that are grounded in respect, nurtured by dialogue, and evidenced by a pattern of civil interaction (Harper & Hurtado, 2007).

As colleges and universities increasingly mirror the diverse makeup of American society, many work to design a campus environment that includes, welcomes, and accepts all people (Malaney, Williams, & Geller, 1997; Rankin & Reason, 2008; Worthington, Navarro, Loewy, & Hart, 2008). Of course, colleges and universities are not immune to negative societal attitudes and discriminatory practices. As a microcosm of the larger social environment, college and university campuses reflect the pervasive prejudices of society (Eliason, 1996; Nelson & Krieger, 1997). Consequently, campus climates have been described as “racist” for students and employees of color (Harper & Hurtado, 2007; Rankin & Reason, 2005), “chilly” for women (Hall & Sandler, 1984; Hart & Fellabaum, 2008), and “hostile” for lesbian, gay, bisexual, and
transgender community members (Eliason, 1996; Rankin, 2003, 2006). These negative climates have correspondingly negative influences on the educational, professional, and personal outcomes of students, staff, and faculty.

**The Impact of Campus Climate on Personal, Educational, and Professional Success**

College students’ experiences with their campus environment, and perceptions of discrimination or a negative climate, influence both their learning and developmental outcomes (Pascarella & Terenzini, 2005). Negative campus climates hinder educational attainment and healthy development. Typically, students who experience a campus as supportive are more likely to experience positive learning outcomes (Milem, 2003; Pascarella & Terenzini, 2005; Reason, Terenzini, & Domingo, 2006). Hurtado and Ponjuan (2005) note that when stereotypes “pervade the learning environment for minority students[,] . . . student academic performance can be undermined” (p. 236). In addition, recent research indicates that students experience campus climates differently based upon social group membership, including race (Miller, Anderson, Cannon, Perez, & Moore, 1998), gender (LaRocca & Kromrey, 1999; Sigal, Braden-Maguire, Patt, Goodrich, & Perrino, 2003), and sexual orientation (Bieschke, Eberz, & Wilson, 2000; Rankin, 2003). In general, historically advantaged groups such as White people, men, and heterosexual people express more positive views of the campus climate while historically disadvantaged groups perceive the campus climate more negatively (Norris, 1992; Rankin & Reason, 2005; Worthington, 2008). Students of Color who perceive their campus environment as hostile have higher rates of attrition and problems adjusting to campus life (Brown, Morning, & Watkins, 2005; Guiffrida, Gouveia, Wall, & Seward, 2008; Hurtado & Ponjuan, 2005). Negative experiences with and/or perceptions of the campus climate significantly influence substance use and abuse among LGBT populations (Weber, 2008).
Students of all ethnicities educated at colleges and universities with more diverse campus environments report feeling better equipped to actively contribute to America’s increasingly multicultural society (Gurin, Dey, Hurtado, & Gurin, 2002), while perceptions of racism on campus negatively influences academic experiences, academic and intellectual development, institutional commitment, and persistence (Cabrera, Nora, Terenzini, Pascarella, & Hagedorn, 1999). When the campus climate is more positive, and students have the opportunity to interact with diverse peers, they are better able to learn and develop democratic skills (Hurtado & Ponjuan, 2005). Racial and ethnic diversity in the campus environment, coupled with the institution’s efforts to foster opportunities for quality interactions and learning from diverse others, promote “active thinking and personal development” (Gurin, et al., 2002, p. 338).

According to Hurtado and Carter (1997), involvement, engagement, and affiliation are central to students’ development and progress in college. Furthermore, students’ educational success is strongly influenced by “their sense of school and social ‘inclusion’ and ‘exclusion’” (Silverschanz, Cortina, Konik, & Magley, 2007, p. 181). Negative campus climates limit students’ integration into their social and academic environments (Cabrera, et al., 1999). Students of Color who perceived racially tense college environments reported less of a sense of belonging to the campus community (Hurtado & Carter, 1997). Recent research indicates that perceptions of the campus racial climate continue to strongly influence minority college students’ sense of belonging (D. R. Johnson et al., 2007). Since “development associated with the college years has far-reaching implications for students’ lives,” it is imperative that barriers to personal development are addressed for all students (Hogan & Rentz, 1996, p. 310).

Most of the research on the impact of climate has focused on college students at four-year residential colleges and universities. One of the contributions of this dissertation is the addition
of the experiences of students at two-year colleges to the analysis. In addition, most studies focus on the campus racial climate, even though there are indications that environmental “fit” influences academic engagement for women as well (Persaud & Salter, 2003; Salter & Persaud, 2003). This project will examine the climate in relation to major social identities, including race/ethnicity, gender, sexual orientation, etc.

**Purpose of the Study and Research Goal**

Institutional climate has wide and varied influences on student outcomes. However, the following review of the literature offers that the study of campus climate in particular, as well as its impact on individual outcomes, has been in turn nebulous, fractured, and primarily restricted to the institution’s racial climate. The purpose of my dissertation is to contribute to the literature on the measurement of campus climate by offering an instrument empirically tested with scale development methodology that will measure the campus climate for students. The instrument is designed to assist institutions in identifying and enhancing aspects of their climate so as to improve students’ educational outcomes. Through this study I will add to the extant knowledge pertaining to the existence and structure of the primary aspects of campus climate by using factor analysis to test the theoretical structure of the survey used to measure campus climate as part of Dr. Susan Rankin’s *Transformational Tapestry Model* (TTM). The factors that result from the analysis may strictly parallel the three major areas of climate found by Rankin (Rankin, 2003; Rankin & Reason, 2008) in her initial analysis (essentially: experiences, perceptions, and institutional actions), or they may present themselves in ways that are best explained via a different conceptual structure. The TTM, the development of Rankin’s survey, and the reasons why I chose to examine this particular instrument are presented in the next chapter.
Chapter 2

All things appear and disappear because of the concurrence of causes and conditions. Nothing ever exists entirely alone; everything is in relation to everything else. -- Attributed to The Buddha, Siddhārtha Gautama

LITERATURE REVIEW

When discussing climate, it is important to distinguish between it and another, similar and often juxtaposed construct: culture. In order to do so for the purpose of this study I will first briefly touch on the wide-ranging and complicated universe of culture. It is an ever-changing construct that deserves, and has inspired, legions of dissertations. Here I will introduce it for the limited purpose of clearly distinguishing climate as a separate entity. I will then examine conceptualizations of climate in general, as well as campus climate in particular. Finally, I will examine the methodologies used in campus climate research and the theoretical and practical reasons for the scale examination and construction methods I intend to use.

Definitions of Culture

There are many ways of defining and studying culture. The father of cultural anthropology, Sir Edward Tylor (1871), defined culture in the following way: “Culture or civilization, taken in its wide ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society” (p. 1). This definition implies that culture is a set of traits passed from a group to an individual, and has historically been used to describe culture at any combination of national, religious, ethnic, organizational, and group levels. However, more recent postmodern and constructivist views on culture have conceptualized it in a more interactive way. For example, cultural psychologists posit the existence of a two-way process. The individual cannot be removed from the context because culture shapes the psyche, while the
psyche constructs culture (Kitayama, Duffy, & Uchida, 2007). As Markus and Hamedani (2007) explain,

The psychological—typically defined as patterns of thought, feeling, and action, sometimes also called the mind, the psyche, mentalities, ways of being, or modes of operating—is grounded in and also fosters the sociocultural. The sociocultural—or patterns in the social world, sometimes called socialities, sociocultural contexts, or the environment, social structure, or culture—are grounded in and foster the psychological, [both through] a process of ongoing mutual constitution…. (p. 1)

Cultural psychologists and social constructivists contend that culture is not just “that variable across which nations and populations differ” or “neatly bounded traditions that help differentiate groups of people” (Moll, 2000, p. 257). Instead, it is dynamic, contextual, and constructed. Moll quotes Ingold (1994) as summarizing that “people live culturally, rather than they live in cultures” (p. 330; emphases in original). This constructivist perspective of culture is also prominent in the study of organizational culture in the business discipline (Denison, 1996).

In a feat of gross simplification, one can define culture as something that connects a group of people, whether it’s through a set of characteristics that they share or via a process of mutual co-construction between the individual and the group. In this way culture can be compared to and confused with climate. But there are some important distinctions.

**Definitions of Climate**

Definitions of climate are also widely varied and have changed over time, but, in general, revolve around it being the transient “personality” of a group of people or organization at a specific place and time. The variability of climate over time and situation is one of the major distinctions between climate and culture. So are the purposes of the researchers who study these
constructs. Culture researchers are interested in how the environment is developed by and reproduced in the individuals who share the culture, whereas climate researchers focus on how the environment is experienced and/or perceived by the individuals within the organization (Denison, 1996). One similarity is that both climate and culture researchers are interested in how their topic of interest affects the individual and her or his growth, development, success, etc. To that end I first explore the conceptualization of climate that is popular in another discipline that has spent a great deal of time examining the construct: business.

The business discipline has explored both organizational culture and organizational climate in detail. Over time, the concepts have morphed and developed. Denison’s (1996) review provides a good explanation of this progression. The two constructs are certainly related in many ways. For the purpose of this dissertation, however, it is necessary to focus the current study solely on climate: its definition, conceptualization, and measurement. Beginning with an overview of the business discipline’s work in this area provides useful context for the subsequent examination of climate from the perspective of higher education.

Climate in the business discipline has traditionally been defined in terms of employees’ shared perceptions of their organization and may be thought of as the organization’s personality (Saal & Knight, 1995). It has been divided into two general areas, psychological climate and organizational climate. Psychological climate is a multidimensional construct representing the meaning and significance of work contexts for individual employees (James & Jones, 1974). It represents “individuals’ perceptions of their work environment” including “structures, processes and events” (Parker et al., 2003, p. 390). In contrast, organizational climate refers to the shared perceptions of a work environment (King, Hebl, George, & Matusik, 2010). King et al. explain a useful functional difference between the two: “By focusing on individual perceptions (i.e.,
psychological climate), rather than on an aggregate measure (i.e., organizational climate), we can better understand the uniquely individual manner in which practices and policies are interpreted, as well as the consequences for individuals who hold such interpretations” (King, et al., 2010, p. 487). Individual perceptions of climate have been shown to affect employee outcomes. In their review of 121 samples, Parker et al. (2003) used meta-analytic procedures and Structural Equation Modeling to show that individuals' perceptions of their work environment significantly predicted their motivation and performance, as mediated by their work attitudes. The desire to connect individual’s perceptions of their climate to their outcomes is why this study focuses on climate in a way that assists us in understanding an organization through the process of exploring individual students’, faculty members’, and staff members’ experiences with and perceptions of climate.

An examination of the concept of structural diversity helps to illustrate this distinction between an organizational characteristic and its impact on individual students’ educational outcomes. While structural diversity (the number and/or percentage of individuals from underrepresented groups in the organization) has been linked to student outcomes (Gurin, et al., 2002; Milem, 2003; Pascarella & Terenzini, 1991, 2005), I contend that it is the individual's perception of that diversity that is vital to the fulfillment of those outcomes. A greater concentration of underrepresented students, faculty, and/or staff may lead to more frequent opportunities for students to interact with or simply observe them (Maruyama & Moreno, 2000), and these students’ perceptions influence their beliefs and behaviors, which result in positive educational outcomes.

However, greater numbers do not automatically equal better outcomes. A simple scenario will provide a disconfirming example. Say that 20% of a College of Engineering’s
student enrollments are women. That does not automatically lead to each engineering class being comprised of 20% women. A woman who happens to take classes where there are several other women would perceive that level of structural diversity differently than one who is always the only woman in the class. Certainly, the relationship is more complicated than a direct and immediate influence of diversity on retention. For example, even though Black engineering students at Historically Black Colleges and Universities had more favorable views of their institutions and had higher grades, when the researchers controlled for the type of institution, lower perceptions of racism and discrimination were associated with higher graduation rates for those students (Brown, et al., 2005). The measure of structural diversity is a useful proxy that has a mediated influence on student-level outcomes and contributes to our understanding of climate and its influence on student outcomes. However, my research focuses on the part of that process that pertains to the individual’s perceptions of the campus climate. These perceptions are understood through models of climate that have been used in higher education.

**Models of Higher Education Climate**

Several researchers have studied the climate in higher education. Initially, the work was defined generally in terms of environment and the research was essentially atheoretical in nature (for an early review of the literature see Baird, 1988/2003). The terms environment, culture, and climate were used interchangeably and with different emphases in combined or confounded research studies (Baird, 1988/2003; Rankin, 1994). Peterson and Spencer’s (2000) extensive review distinguished among these terms, specifying that environment is the broadest concept that includes potentially all internal and external aspects of the organization, whereas culture is related to the group’s underlying values, beliefs, and meaning (reminiscent of Sir Edward Tylor’s original definition) and climate consists of resulting current perceptions, attitudes, and
behaviors. Peterson and Spencer (2000) identified three broad categories of climate: (a) Objective Climate, focusing on “patterns of behavior or formal activity” (p. 176), (b) Perceived Climate, the impressions that individuals have about the organization’s norms and personal expectations, and (c) Psychological or Felt Climate, how people feel about their organization and their experiences, including loyalty, satisfaction, and belonging. These categories are echoed in subsequent models. However, note that this definition of climate already differs from the ones used in the business literature in that it expands climate beyond individual or shared perceptions to also include behaviors and feelings. Because of the largely atheoretical nature of most of the early research on higher education climate, Baird (1988/2003) called for the development and use of theoretical models that would describe the environment at the personal, group, and organizational levels while also explaining the process of how individuals and their environments interact. This also echoes the conceptualization of climate in business as something that is either individual or shared. Subsequent models that focused on the campus climate for diversity have included perceptions, attitudes, and behaviors or institutional activity at both the individual and organizational levels.

Hurtado’s work (1992), as further developed by Hurtado, Milem, Clayton-Pederson, and Allen (1998), introduced a multidimensional framework for understanding campus racial climate. It moved beyond what they called “psychological climate” (i.e., perceptions and attitudes) to a more inclusive definition that also included the institution’s structure and history, the interactions among people of different identities, and the internal and external forces that shape campus climate (Milem, Chang, & Antonio, 2005). Specifically, this framework included four interrelated dimensions of the campus racial climate: (a) an institution's historical legacy of inclusion or exclusion of various racial or ethnic groups, (b) structural diversity in terms of the
number of racial or ethnic groups represented on campus, (c) psychological climate consisting of perceptions and attitudes between and among groups, and (d) behavioral climate, characterized by intergroup relations on campus (Hurtado, et al., 1998). By developing a comprehensive framework for understanding campus racial climate, Hurtado and colleagues (Hurtado, 1994; Hurtado, et al., 1998) were able to offer suggestions about “how to improve educational policy and practice through the engagement of campus diversity” (Milem, et al., 2005, p. 14).

Milem, Chang, and Antonio (2005) expanded on the work of Hurtado and colleagues (Hurtado, 1994; Hurtado, et al., 1998) by offering a more comprehensive model that, while acknowledging the importance of compositional diversity, includes other influences on the campus climate. Although Hurtado and colleagues underscored the interaction between historical exclusion and institutional policies and practices, they did not elaborate on this argument, and thus did not fully consider the influence of daily institutional processes on campus climate. As a result, Milem, Chang, and Antonio (2005) added the organizational/structural aspect to the original model (Figure 1). This dimension represents the organizational and structural aspects of colleges and the ways in which benefits for some groups become embedded into these organizational and structural processes. The organizational/structural dimension of climate is reflected in the curriculum; in campus decision-making practices related to budget allocations, reward structures, hiring practices, admissions practices, and tenure decisions; and in other important structures and processes that guide the day-to-day ‘business’ of our campuses. (Milem, et al., 2005, p. 18)
Hurtado’s work is the model of campus climate most often cited and used by higher education researchers and practitioners. However, one of the limitations of Hurtado’s and Milem’s models is the strong focus on racial climate. Each aspect of the model is in relation to racial diversity. The institution’s historical legacy of inclusion or exclusion relates to various racial or ethnic groups, including the institution’s resistance to desegregation. Compositional diversity is evaluated in terms of the number of students enrolled on campus and faculty and staff hires from different racial or ethnic groups. The psychological climate consists of perceptions of
racial/ethnic tension and discrimination. The behavioral dimension includes social interactions across racial/ethnic groups as well as intra- and intergroup relations on campus. Finally, the organizational/structural dimension is characterized by the diversity of the curriculum and policies that relate to diversity. In order to obtain a complete picture of the climate on campus it is necessary to explore the experiences with, perceptions of, and impact of climate in terms of all possible social identities.

Recently, Hurtado and her colleagues have started work on a more comprehensive assessment of climate, going beyond racial climate to include the overall climate for diversity on campus as well as institutional practices and student outcomes (Hurtado, Cuellar, Alvarez, & Colin, 2009). In addition to providing a way for postsecondary institutions to assess their own campus climate for diversity and institutional actions, they intend to produce a nationally-comparable data base that can be used by institutions to evaluate their performance in these areas compared to other colleges and universities (Higher Education Research Institute). Still, until recently, no study has empirically tested Hurtado et al.’s model (Hutchinson, Raymond, & Black, 2008) and much of the work done using it has been limited to single-institution studies (Hurtado, Griffin, Arellano, & Cuellar, 2008). Even though there is a "dearth of nationally available instruments purporting to study campus climate" (Rankin & Reason, 2008, p. 272), there is one assessment tool that has been in use for the last ten years.

The development of that tool began in the mid 1990’s. In 1997 Daryl Smith and others published an analytical literature review of work done regarding diversity in higher education. Smith et al.’s (1997) review of the literature on the impact of campus diversity initiatives on college students lead them to identify four dimensions of campus diversity, one of which was
campus climate. This early mention of campus climate served as a foundation for the work of Susan Rankin—the work that’s examined in this dissertation.

**The Transformational Tapestry Model**

Building upon Smith, et al., (1997), Hurtado et al. (1998), and her own work (Rankin, 1994, 1998), Rankin developed the *Transformational Tapestry Model* (TTM). The model was further conceptualized by Rankin and Reason (2008) and approaches the assessment of climate in a more inclusive and comprehensive manner than ones that focus exclusively on the campus racial climate. In this model (Figure 2), Rankin and Reason posit that campus climate is influenced by six areas within the higher education system: (a) access and retention (i.e., access to higher education and provision of the necessary supports for success and retention), (b) research and scholarship (i.e., encouragement of diversity in educational and scholarly activity), (c) inter- and intra-group relations (i.e., a diverse student body with educationally purposeful interventions and interactions), (d) curriculum and pedagogy (i.e., diversity education and proactive educational interventions), (e) university policies and services (i.e., university commitment to diversity and social justice through response to harassment, as well as written and behavioral policies), and (f) external relationships (i.e., acknowledgement of and response to external influences in society and government).

Rankin states that the six dimensions are both independent and interconnected. This corresponds with common theories of higher education organizational theory (Birnbaum, 1988; Bolman & Deal, 2003; Katz & Kahn, 1978; Scott & Davis, 2007; Weick, 1976). She claims that the independence of these factors and the relationships they form affect the learning and social outcomes of students as well as the personal and professional development of faculty, administrators, and staff. These positive student and employee outcomes result when higher
education administrators design initiatives that create inclusive campus climates and quality interactive experiences (Rankin & Reason, 2005). As such, it is clear that while some may see these six areas as being components of climate, Rankin’s TTM model focuses on these areas as ones through which transformational change can be enacted. The six areas are organizational entry points to interacting with (and therefore affecting) the climate. The actual construction of the psychological climate for the individual is organized in a different manner, which I will now describe.

Figure 2. Transformational Tapestry Model (Rankin & Reason, 2008)

The original survey that led to the TTM was primarily based on Rankin’s dissertation (1994) and her analytic review of work done to examine and address the campus climate for
LGBT individuals (1998). The template was reviewed by experts in diversity, two Higher Education researchers (M. Lee Upcraft and Patrick T. Terenzini), and members of underrepresented constituent groups, then pilot tested at her home institution. She then administered the resulting survey of 55 items to ten institutions in 2000 and 2001 (Rankin & Reason, 2008).

Rankin conducted an exploratory factor analysis on the resulting database which yielded three factors she called “personal campus experiences, perceptions of campus, and institutional actions” (Rankin & Reason, 2008, p. 268). She also conducted thematic analyses of the comments provided by participants to open ended questions on the survey. The emergent themes paralleled the factor structure. Rankin then used these results, along with conversations with participating institutions, to develop the TTM. The relationship between these three conceptualized psychological components of climate and the six areas of the higher education system named in the TTM is now clearer. As Rankin and Reason explain,

the final survey was designed to have respondents provide information about the five areas within the higher education system that influence campus climate . . . through their personal campus experiences, their perceptions of campus, and their perceptions of institutional actions including administrative policies and academic initiatives regarding campus climate. (Rankin & Reason, 2008, p. 268)

Critiques of the Transformational Tapestry Model

The Transformational Tapestry Model has been used by Rankin and her associates to assist 95 colleges, schools, and organizations in examining and improving their living, learning

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1 “…external relations was added to the model in 2006 based on the results of recent assessments” (Rankin & Reason, p. 266).
and working climate. The institutions have found the process and subsequent transformations to be enlightening and productive, with several returning to conduct follow-up assessments (Rankin, 2011). Based on those criteria, the model has been successful for the past ten years. However, the theoretical basis for the assessment of campus climate (that it consists of individual experiences, perceptions, and perceptions of institutional actions) has not been independently tested following Rankin’s initial analysis (as detailed in Rankin & Reason, 2008). In fact, aside from mention of the factor reliabilities in a few articles, there is no published description of the specific results of the factor analysis, including which survey items loaded onto each factor and their factor loadings (Rankin, 2011).

In addition, the survey itself has been modified throughout the years (Rankin & Reason, 2008). Because climate is contextual and varies over time, Rankin’s assessment process involves working with each institution to ensure that the assessment addresses the topics that are salient to that organization at that point in time. Rankin works with an institutional committee that draws from a bank of questions and response items as well as themes revealed in campus-wide focus groups to add questions and/or items as necessary. Rankin and Reason (2008) explain that new questions have also been added when new themes emerged from qualitative responses to open-ended questions (e.g., sexual misconduct, work-life issues). New response choices are also added based on the results of each assessment. If a particular response is listed frequently in the “other, please specify” option for a question, that response is added to the question bank for future institutions to utilize. Some questions have even been deleted from the bank if they were not leading to actionable results or if it was thought that respondents were giving socially acceptable responses.
Rankin’s primary professional status during the survey’s development and modification was that of an administrator. As such, she focused on using theory to inform actionable practice, as opposed to conducting subsequent psychometric analysis on an instrument that already had a solid original base. However, the combined limitations of the lack of independent empirical testing of the theoretical structure of the survey and the ongoing modifications to the instrument call into question the psychometric strength of the survey. This is important because the survey is the primary method of assessing the campus climate in the TTM and it, along with varying numbers of focus group meetings and general background research, informs the researcher’s recommendations to the institution. If the assessment fails to accurately describe the climate on campus, then the institution may take action that can be unwarranted, superfluous, or counterproductive.

**Methodological Considerations**

**Different Methodologies of Climate Research**

Multiple research methods have been used to measure and examine climate, but the primary techniques have utilized statistical analyses of numerically-coded data (Denison, 1996). This is another commonly held distinction between the study of climate and culture. Cultural researchers have traditionally examined the construct via thematic analyses of non-numeric data, using techniques originating from anthropology such as ethnography, case studies, and various methods of qualitative data collection such as interviews and observation (Denison, 1996). The process of assessing and enhancing climate using the TTM is a multi-method approach. First, the primary researcher visits the campus and engages with focus groups comprised of students, faculty, and staff from various constituent groups. The results of those focus groups are used by the institution’s steering committee to solidify the survey questions for that institution as well as
inform the final assessment of the climate and the resulting recommendations. Following the focus group meetings the comprehensive survey is anonymously administered to the entire campus population. The survey contains several questions that give respondents the opportunity to elaborate on their quantitative responses, thereby allowing them to reflect and report on their experiences and perceptions in greater detail, and in their own words. These responses are used to give voice to the general results through specific examples, anecdotes, and explication (Rankin & Reason, 2008).

The Theoretical Foundations of Scale Construction

The construct of climate is sufficiently nebulous so as to require researchers to surround it in an attempt to identify it from several directions. One cannot simply ask a member of the community “What is the climate here?” and expect to get an answer that is structured even remotely similar to other responses. As such, climate is similar to culture, intelligence, personality, or a host of other theoretical concepts that are, at their best, difficult to describe, and even more difficult to measure. Scales are often used to measure something that is not equivalent to overt behavior or that can’t be directly measured via some physical quantity. Scales are commonly defined as “measurement instruments that are collections of items combined into a composite score, and intended to reveal levels of theoretical variables not readily observable by direct means” (DeVellis, 2003, pp. 8, 9). Climate’s nebulous, theoretical nature makes it difficult to quantify, so multiple questions are needed to spiral in to a close approximation of the construct. In the realm of scale development such a concept is called a latent variable. The items in a scale measure values that are caused by the latent variable. The theory and practice of psychometrics is a methodological paradigm for the measurement of psychological and sociological phenomenon and includes the use of factor analysis, the
development of scales to measure concepts, and the notions of reliability and validity (DeVellis, 2003; Duncan, 1984). As such, psychometrics is the theoretical framework for the methodological aspect of this dissertation.

An examination of commonly used demographic characteristics provides a useful example of the benefit to using scales of various levels of complexity. Age can typically be measured via a single survey question. Occasionally it may vary based on cultural conventions (e.g. some cultures begin “counting” one’s age at conception rather than birth), but, in general, once the rules have been established the answer is quick and easy. Gender is a bit more complicated. Most surveys simply ask if one is male or female. Unfortunately, this confounds the concepts of sex and gender. A more specific question would be “What is your gender: Man or Woman?” However, this also fails to capture the entire picture. There are potential differences between one’s birth sex, current sex, gender identity, and gender expression. A study that hinges on an accurate measure of the concept of “gender” should draw upon several of these concepts. An even more complicated example is that of ethnicity. Most researchers agree that the concept of race is socially constructed. Ethnicity potentially combines not only the aspects of race itself, but also racial identity, others’ perception(s) of the individual’s racial identity, one’s ethnic identity (and others’ perceptions of this), nationality, culture, community, religious affiliation and expression, and history. Even though ethnicity is typically determined via a single question on a survey, the construct of one’s ethnicity, what it may mean for the individual, and how it may be defined in relation to the other constructs of interest in the study should necessitate the triangulation of such a potentially complicated idea.

As it has been illustrated, there is value to producing a highly accurate and reliable scale. However, one of the disadvantages of using a multi-item scale is directly related to the number
of items used for the scale. College students are increasingly exhibiting survey overexposure and are responding at lower rates (Sax, Gilmartin, & Bryant, 2003), so the longer the survey is, the less the chance that it will be completed. Researchers must balance the need for accurate measures of their constructs of interest with the need for an acceptable response rate. A commonly agreed upon goal among researchers for generalizing to a study’s sampling frame is a 30% response rate. Even if one does not reach this mark, findings can still be used and conclusions drawn, but there is less confidence that the results are representative of what would be found in the larger population. Therefore, researchers should strive to find an acceptable “sweet spot” between scale accuracy and brevity. Much has been written on the best practices of quantitative research study design (Creswell, 1994, 2003; Shadish, Cook, & Campbell, 2002; Sowell, 2001), survey construction and administration (Allen & Yen, 1979; Dillman, 2002; Fowler, 1995; Hambleton, Swaminathan, & Rogers, 1991), and scale construction (Allen & Yen, 1979; de Gruijter & van der Kamp, 2008; DeVellis, 2003; Harman, 1976; Suen, 2008). Factor analysis is offered in the literature as the most appropriate tool for this task due to its ability to help the researcher identify items that combine to measure a latent construct while also potentially reducing the number of items needed to do so (Brigham Young University, 2006; Darlington, 2006; de Gruijter & van der Kamp, 2008; DeVellis, 2003; Garson, 2010; Harman, 1976). The description of the specific factor analytic procedure used and rationale for its use are described in the Methodology section.

Building upon these goals, the primary objective of this study is to create a campus climate scale that can be used by a higher education institution to assess its climate, identify successes and challenges, and implement initiatives to promote change. As such, it is important that the scale be relatively easy to implement, interpret, understand, and utilize. However, a
simple overall campus climate “score” is of little use to those who wish to improve aspects of the climate (Baird, 1988/2003). I propose creating a campus climate “profile” consisting of each of the subscales resulting from the factor analysis procedure. The campus would obtain an overall picture of their campus climate that can then be disaggregated by group, using characteristics such as demographics, unit, rank, role, etc. More information about the calculation of the scale scores is provided in the “Factor Scale Score Calculations” section in the Methodology chapter.

In this literature review I briefly introduced the concept of culture in order to distinguish climate as a separate entity. I then examined conceptualizations of climate in general and campus climate in particular, including descriptions of models to measure climate, and a critique of the analytical basis for Rankin’s Transformational Tapestry Model. Finally, I examined the methodologies used in campus climate research and the theoretical and practical reasons for the scale construction methods I intend to use to examine the ability of her survey to measure campus climate and to develop the Perceptions of Climate Instrument.
Chapter 3

Research your own experiences for the truth, absorb what is useful, reject what is useless, add what is specifically your own. -- Jiddu Krishnamurti (later adapted by Bruce Lee)

METHODOLOGY

This chapter outlines the steps of analysis and the reasons for their use. Recall the two-fold purpose of this dissertation: to inform the research literature on the conceptualization of campus climate, and to develop an instrument that will measure climate in such a way that it can be used by institutions to examine, identity, and enhance certain aspects of the climate for both the whole and particular groups of constituents. The psychometric nature of the second purpose of this dissertation dictates that I explain in detail the methods I used and the reasons I chose them for this project. In this chapter I will explain how campus climate is typically researched via the TTM, review the development of the surveys that produced the data I used for the analysis, explain how I combined the existing data into a merged dataset, identify the method used for data imputation, detail the factor analysis processes and procedures I used, describe how I constructed the resulting instrument, and review the methods for supporting the reliability and validity of the scale.

Using the TTM for Campus Climate Research

The Context of the Existing Climate Assessment Work Using the TTM

Rankin’s TTM is rooted in a theoretical perspective and an overall methodology that focus on effecting change. The work of the TTM is based on the researcher’s lens of power and privilege, which is

grounded in critical theory and assumes that power differentials, both earned and unearned, are central to all human interactions (Brookfield, 2005). Unearned power and privilege is associated with membership in certain dominate social groups (e.g., white,
heterosexual, able-bodied; A. Johnson, 2005). Because we all hold multiple social identities we have the opportunity and, we assert, the responsibility to address the oppression of underserved social groups within the power/privilege social hierarchies on our campuses. (Rankin & Reason, 2008, p. 263)

In addition to approaching the work from a critical lens of power and privilege, Rankin intends the work on climate to have immediate, active, and practical applications for the institutions who participate. The full preparation, assessment and reporting process are illustrations of action research, which includes enhancing campus climate as a goal of the research. Rankin and Reason (2008) explain that the TTM model is “instituted via a transformational process that capitalizes on the inclusive power and privilege perspective” (p. 263). The TTM’s role as the center of a transformational action research process is itself rooted in the tenets of the critical lens. I will now explain how this process is implemented.

The use of the TTM is centered in a transformational action research process rooted in the tenets of the researchers’ critical lens. To provide a context for the analysis of the model of campus climate included in the TTM I explain the action research process as it is implemented through each institution that uses the model. After agreeing to engage in the assessment of the institution’s campus climate, several meetings of a steering committee comprised of members from various areas, roles, and ranks on campus occur. The committee establishes protocols for communication and marketing, sampling, survey administration, data analysis, dissemination of results, and developing action initiatives. Based in action research, the campus steering committee informs the focus group about the interview protocol, considers the individual constituent groups who will participate in the focus groups, and finds participants. The research team facilitates the focus groups, and then invites all students, faculty, and staff to participate in
the survey. In addition, individuals from underrepresented groups on that campus (based not only on race and gender, but also on multiple other social identities) may be sampled purposefully or through snowball sampling method. If there were no other intentional sampling methods beyond simple random sampling those individuals would most likely continue to be underrepresented and their voice diluted or lost, which would provide an incomplete picture of the climate in relation to the diversity inherent in each of the campus constituent groups.

Once the data have been analyzed the results are disseminated to the campus via multiple meetings with constituent groups and typically a campus-wide presentation. The results are also usually disseminated through a prominent link on the institution’s web site. The assessment ends with the steering committee and constituent groups developing actions based on key findings from the survey, an external audit of other available data (e.g. from NSSE, CIRP, and others), and results from the original focus groups. The actions are in addition to the several meetings, focus groups, and individual conversations the researchers and committee members have along the way with members of the campus community. This entire process, from beginning to end, happens over a timespan of one to two years.

**Prior Survey Development**

As described in the literature review section, the surveys used for the assessment were primarily constructed based on Rankin’s previous work, reviewed by experts and members of respective constituent groups, piloted, and factor analyzed to determine the conceptual structure of the instrument: (a) respondents’ personal campus experiences, (b) their perception of the campus climate, and (c) their perceptions of institutional actions related to diversity issues and concerns on campus (Rankin & Reason, 2008). For each assessment, the survey is typically input into a web-based online format, with the campus also given the option of providing a
paper-and-pencil machine-readable format geared to ensure participation from members of the campus community who, due to their job responsibilities or lower levels of computer literacy, are less likely to complete a web-based survey. Also recall that subsequent administrations of the survey have been based on conversations with each institution’s steering committee. Therefore, the instrument has been revised several times. In addition, parts of the survey have been used for other studies, including a recent nation-wide study of the campus climate for student-athletes (Merson & Rankin, 2010; Rankin et al., 2009), LGBT students (Rankin, Weber, Blumenfeld, & Frazer, 2010), and transgender individuals in particular (Beemyn & Rankin, 2011). However, neither the original survey nor any of the subsequent revisions have been empirically tested by another researcher. In this study I intend to establish the conceptual structure of the instrument. To that end I analyzed a dataset composed of responses from a variety of institutions so the results are not emic to a particular institutional type or organizational circumstance. In the next section I describe how I constructed the database.

**Database Merging and Imputation**

The dataset I used was constructed based on responses from students at 23 two-year colleges, four-year colleges, and four-year universities from 2005 through 2008. Question stems and response items were compared and reconciled, potentially resulting in the elimination or combination of questions and/or response items. It was not a simple matter to combine the results of several administrations of an evolving survey instrument. I worked with a team of two faculty members and five graduate students with interests in climate research. We examined each question and response item of each survey and compared them to find the similarities and differences. Data from the surveys were simply combined for questions and response categories that were identical. Most others were combined under three other circumstances: 1) they were
worded differently but the concepts were deemed to be equivalent, 2) the concepts were hierarchical, i.e. an item or set of items could be categorized as being “a part of” a more general group, or 3) the items were similar enough to be combined under a newly-created category. The following examples illustrate each of the three circumstances as applied to select questions in the dataset.

1) “Gender” and “Gender Identity” were combined and labeled “Gender.”

2) “Academic Buildings,” “Administrative Building,” and “Admissions Building” were grouped under the category “Buildings.”

3) “Academic Dean,” “Department Chair,” and “School Dean/Unit Head” were added to a new category “Academic Leadership.”

Each question and response item for each dataset was coded to match a common set of variables. Each institution was assigned a unique identifier and associated institutional information based on IPEDS data from the year in which the instrument was administered on the corresponding campus. The individual datasets were then merged into a single file. Frequencies, histograms, and descriptive statistics were used to identify and repair any data-based discrepancies or procedural errors. A full codebook documents the resulting dataset variables and values and how they correspond to variables in each of the component datasets. For the purpose of this study only the questions directly related to the campus climate for students were used for the factor analysis.

Most data collections are incomplete due to item non-response, which results in a dataset in which some of the questions are lacking responses for certain subjects (Cohen, Cohen, West, & Aiken, 2003). There may be missing data on questions due to respondent survey fatigue, respondents feeling uncomfortable answering sensitive questions, lack of knowledge, lack of
applicability to the respondent’s circumstances, or even data processing and programming errors. If not randomly distributed, missing data can adversely affect the analysis or prevent a researcher from being able to generalize findings to a broader population. Missing data can affect analysis in many ways (Cohen, et al., 2003; "SPSS Missing Values™ 17.0," 2007). The researcher must determine what data are missing, if they are biased (as opposed to randomly missing), and what effect they may have on the analysis. One must then decide what to do about them. One distinction to note is whether the data are missing on the independent variables (IVs) or the dependent variables (DVs). Data missing on the IVs affect the sample size of the study, which may harm the statistical analyses if it becomes too small (due to a reduction of statistical power). Biased missing data on the DVs affect the generalizability of the study. Conclusions are limited to the cases that do not have missing data and, therefore, limit our generalization to populations that share the same qualities as those sample cases. The overall sample size is also reduced, having the same effect as when data on IVs are missing. Factor analysis uses procedures that are comparable to linear regression, so these concerns with missing data are valid for this dissertation.

When the number of cases with missing data on a particular item is small, dropping those cases, also called listwise deletion, is acceptable for some types of analysis (Brick & Kalton, 1996; Garson, 2009a; "SPSS Missing Values™ 17.0," 2007). However, when cases are dropped from multiple items in a large analysis, the result is a highly limited set of data that may have fundamentally different characteristics than the dataset when taken in its entirety or, in fact, may lack the number of common cases required to conduct the analysis. The hierarchical factor analysis for this project includes a large number of variables, such that listwise deletion would result in too few cases for the analysis. Therefore, I decided to use data imputation to compute
appropriate values to complete the dataset, reducing the bias that would exist in analyses that use incomplete data (Brick & Kalton, 1996; Garson, 2009a; Graham, 2009).

I used the maximum likelihood estimation-based Expectation-maximization (EM) method from within SPSS to impute the merged database. The first choice of an imputation method is a Multiple Imputation (MI) process because it best retains the covariance structure of the dataset, which is the basis for factor analysis (Graham, 2009). However, my experience with other research projects suggests that this dataset has too many parameters for MI to process. In addition, SPSS does not support the use of pooled data resulting from MI in the factor analysis procedure. I therefore had to consider other imputation methods.

As the “second-best” option, EM is potentially less accurate than MI and produces smaller standard errors that may influence significance testing, but it gives better results than other methods of dealing with missing data and is frequently used by researchers (Allison, 2003; Garson, 2009a; Graham, 2009; Musil, Warner, Yobas, & Jones, 2002). Attenuated standard errors were not of concern as this study does not involve multivariate statistics that rely on significance testing (such as ANOVA or regression). There was also reason to believe that any changes to the covariance matrix would be acceptably small. In another project that utilizes similar factors related to climate and student outcomes I compared the factor analysis used to establish scales both before and after EM imputation. Factor loadings and other calculations typically varied by less than one hundredth of a point, and the overall structure of the factors and items that loaded onto the final scales did not change, indicating only minor changes to the underlying covariance matrix (Merson & Rankin, in preparation). Therefore, EM was chosen as the best option to fill out the dataset in preparation for the hierarchical factor analysis. Each of the pre-merge datasets resulted from a slightly different survey instrument, but every question
and item response option was examined and reconciled based on logic and theoretical foundations, so I chose to impute the merged database. All of the questions related to the campus climate for students were imputed for this analysis.

Scale Construction

Factor analysis is a particularly useful technique for scale construction. It is used to determine how well a set of survey questions combine to measure a latent construct by measuring how similarly respondents answer them. It is used to determine the number of latent constructs described by the items in question and examine or verify their meaning, as well as reduce the number of items necessary to adequately measure those constructs (DeVellis, 2003; Garson, 2010). There are many aspects to factor analysis that require the researcher to intentionally consider which procedures are appropriate for the study’s goal. The major decision points are (a) the factor extraction method, (b) determining which factors to retain, and (c) the method of rotation used to facilitate factor interpretation. In the next sections I describe the options available for each of these decision points and explain my decisions.

Factor Extraction

There are two major methods of factor extraction and several others that are useful in limited circumstances. Principal Components Analysis (PCA) and Principal Axis Factoring (PAF) are the two methods most used by researchers. There are distinct differences between them. Principle Components is, strictly speaking, not factor analysis because it does not attempt to determine the relationship of each item to a theoretical construct, or latent variable (de Gruijter & van der Kamp, 2008; DeVellis, 2003; Garson, 2010). It is essentially a data reduction technique. Its goal is to produce one or more variables that mathematically explain as much of the variance among the original items as possible. It is very popular in the literature but is
undesirable for this study because it merely categorizes data without taking into account the theory predicting the latent variables. Instead, I used Principal Axis Factoring. This technique is true factor analysis in that the resulting composite variables represent the structure of the theoretical latent variables (de Gruijter & van der Kamp, 2008; DeVellis, 2003; Garson, 2010). Even though data reduction is an agreeable byproduct of my intended analysis, the primary purpose is to determine and explain the underlying structure of constructs based on the theoretical framework. This makes PAF a more appropriate choice than PCA.

**Factor Retention**

Just as there is more than one option for extracting factors, there are many criteria used to determine which of the extracted factors to retain. Another similarity with the decision making process for factor extraction is that the most common factor retention criteria are not necessarily the most accurate. Kaiser criterion is the most prominent, partially because of its ease of use and partially because it is the default in common statistical packages. The common Kaiser criterion is to only retain factors that have an eigenvalue of greater than one (Kaiser, 1960). The eigenvalue of the factor’s eigenvector essentially quantifies how much of the variance in the analyzed items is explained by that factor (in terms of percentage out of the total number of items). Therefore, a factor with an eigenvalue of less than one explains less of the total information among the items than a single item would. Since one of the goals of factor analysis is to reduce the number of items necessary to adequately measure a latent variable, retaining factors that explain less variance than single items is counter-productive (Darlington, 2006). Additionally, one should consider if a factor that explains slightly more variance than a single item (for example, a factor with an eigenvalue of 1.1) sufficiently meets the goals of the analysis. Unfortunately, because of this difficulty in using a specific cut-off value, the Kaiser criteria
typically suggests retaining more factors than are optimal (Garson, 2010; Zwick & Velicer, 1986).

Reading a scree plot may also give an indication of the number of factors to retain (Cattell, 1966). When the eigenvalue for each factor is plotted such that the factor number is on the x-axis and the eigenvalue is on the y-axis, the values start relatively high (since the first factor explains the most variance), drop off quickly, and asymptotically reach zero (for an analysis with a large number of factors). Cattell (1966) suggested retaining the number of factors that compose the steep part of the slope, through the “elbow” in the curve, until it levels off, like the scree at the bottom of a hill. This method can be a good option, but can be very difficult to interpret, especially for solutions with a very small or very large number of factors (Garson, 2010; Zwick & Velicer, 1986). The reliability of judgments based on scree plots may be increased by having more than one researcher examine the plot and come to an agreement (Zwick & Velicer, 1986).

Log likelihood or maximum likelihood tests determine the statistical probability that the difference between m- and n-factor solutions, or the amount of variance remaining after each factor is extracted, is equivalent to zero (Darlington, 2006; Zwick & Velicer, 1986). Much like using the Kaiser criterion, such a test is likely to produce more factors than are optimal (Darlington, 2006; Garson, 2010; Zwick & Velicer, 1986). For scale construction, it is important to obtain a parsimonious representation of the underlying constructs, as opposed to an exhaustive accounting of as much variance as possible (DeVellis, 2003; Garson, 2010). Therefore, these methods are not ideal for the current project.

The final, and presently most recommended method, is parallel analysis (Garson, 2010; O’Connor, 2000; Velicer, Eaton, & Fava, 2000; Zwick & Velicer, 1986). This is also a method of
determining which factors to retain, which acts as a statistical test. However, it is more accurate, and due to the potential shortcomings of the other methods, is the primary choice for this study. The first step in a parallel analysis is to create a random correlation matrix of the same size as your dataset. Next, one would factor analyze the random matrix to extract a set of eigenvalues for each potential factor. Then compare the eigenvalue for each factor extracted from the actual dataset to the corresponding random factor (i.e. compare eigenvalues from both of the first factors, then both of the second factors, and so on). The last empirical factor eigenvalue that is higher than its corresponding random factor eigenvalue is the last factor to be retained. The logic is that the actual eigenvalue must explain more variance in the actual dataset than an equivalent factor that is calculated based on random data. The primary limitation of this method is its relative obscurity, perhaps due to its novelty. None of the major statistical packages offer it as an option, but code has been written that will allow one to conduct the analysis (O'Connor, 2000). Unfortunately, the code can be tricky to implement and is not supported by a commercial software company. In previous projects I have had varying degrees of success with this method. I intended to primarily use this method of factor retention due to its accuracy and dependability relative to the other options, but in the end I had to rely on other criteria as well.

One more criteria must be acknowledged. Factor analysis is not a precise and straightforward statistical analysis. It involves many decisions along the way. These decisions are made by default if researchers choose not to change the defaults offered by statistical packages. As Neil Peart wrote for the Rush song Freewill, “If you choose not to decide, you still have made a choice.” True factor analysis (as opposed to data reduction using PCA) is predicated on the assumption that there are latent variables that can be indirectly measured. This assumption flows from whichever theory indicates the existence of the constructs to be examined. Therefore, most
of the decisions researchers must make should be based on the theory they are investigating. This can be done at the factor retention phase by imposing the structure based on theory, then checking to see if the factor loadings match the predicted structure, thereby determining/confirming how many factors should be retained. It can also be used as the overarching criteria to decide between different results obtained from the previous methods (Garson, 2010; Velicer, et al., 2000; Zwick & Velicer, 1986). This also incorporates factor interpretation, which is best conducted on rotated factors.

**Factor Rotation and Interpretation**

The purpose of rotating the factor structure is to clarify the factors and determine which items load onto which factors so the researcher can better interpret the latent variables the factors represent (Darlington, 2006; DeVellis, 2003; Garson, 2010). Rotations are either orthogonal or oblique, depending on the assumptions of the underlying theory explaining the latent variables. If the researcher has reason to believe that the underlying constructs are related to each other (as is often the case in real-life applications of social science research) then an oblique rotation should be used (DeVellis, 2003; Garson, 2009b). However, if the constructs are unrelated then an orthogonal rotation is called for.

There are other considerations as well. Because oblique rotations assume correlations between the factors, many times the items themselves will appear to load onto more than one factor, thereby making it more difficult to interpret the findings and attenuating the primary purpose of rotation (DeVellis, 2003; Garson, 2010). If one wants a very clear factor structure, which is typically appealing when a-theoretically exploring a set of items, then one should use an orthogonal rotation (Garson, 2010). For this reason alone, orthogonal rotations are more
common in social science research, where the ambiguity inherent in social science theory makes factor interpretation difficult (Garson, 2010).

The commonly used orthogonal rotations are Varimax, Quartimax, and Equimax, while oblique rotations include Oblimin and Promax. Varimax is the most common rotation because it produces the clearest picture. It works to maximize the differences in factor loadings across items for each factor (separating the factors as much as possible), whereas Quartimax maximizes the differences across factors for each item (separating the items), which might not be helpful for social science research (Garson, 2010). Equimax compromises between the two. By assuming the factors to be related to each other, oblique rotations allow one to maximize each factor instead of clarifying one at the cost of another. Oblimin is a popular oblique rotation. Promax is more computationally efficient for large datasets, which is not as necessary with modern statistical programs and computers (Garson, 2010).

For this project I invoked SPSS’s “direct Oblimin” rotation with an initial delta value of zero, the default. The delta value indicates how oblique the factors should be, and ranges from a high of 0.8 to increasingly negative values indicating a more orthogonal structure (SPSS Inc., 2010). My previous experience with factor analysis indicates that slight variations in delta make little difference in the “messiness” of the solution. Therefore, after using the default value of zero and seeing a number of items co-loading onto several factors, I chose to use a delta of negative 20 to try to produce a simpler factor structure. That solution was cleaner in that it contained fewer co-loaded items, but it was conceptually incomprehensible. I increased delta to negative ten, and then negative five, attempting to find a balance between cleanliness and comprehensibility. I determined that the best solution was the original one, with a delta of zero.
After the factors have been extracted and rotated, one must verify the items that primarily contribute to (i.e., load on to) each factor. In order to do so, researchers use a combination of the items’ factor loadings, comprehensibility of the factors in relation to the underlying theory, and the reliabilities of the resulting scales. Keeping in mind that different factor analysis procedures produce different factor loadings (DiStefano, Zhu, & Mîndrilă, 2009), the minimum acceptable factor loading required to retain an item varies from approximately .3 to .7 in the literature, with .4 being a common minimum cut-off value and .6, .65, or .7 constituting a high-level cut-off used for more rigorous choices when analyzing Likert items or doing a confirmatory analysis (Darlington, 2006; DeVellis, 2003; Garson, 2010). A cut-off value of .7 is appealing in that it indicates that about half of the variance in the indicator is explained by the factor. I chose that value as a target because, 1) I want to clearly identify the constructs that are accurately measured by the instrument, 2) I want to reduce the number of items used to measure those constructs, and 3) most of the items used in the factor analysis are Likert or Likert-type items. I chose to keep some items with loadings less than .7 if it made conceptual sense to do so. Only in rare cases were items that loaded above .7 discarded for reasons of factor comprehensibility.

In general, these cut-off values are relatively arbitrary in much the same ways as ones commonly deemed acceptable for other statistical benchmarks, such as measures of reliability and effect size. In addition, even when an item loads highly on one factor, it may also co-load onto one or more other factors. Ideally, researchers prefer a simple factor structure, comprised of items that load highly onto one factor and not at all on others, but reality often fails to comply. This can be especially troublesome with obliquely rotated factors because their correlation to each other is exhibited through their items frequently co-loading onto multiple factors. In that

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2 Scale reliability is discussed in the subsequent section on reliability and validity, p. 36.
case, not only should the individual items be categorized based on their comprehensibility related to the underlying theory, the factor correlation matrix should also be examined to determine if any of the factors are too highly correlated with each other to justify their independent existence (Darlington, 2006). In addition, it is possible to retain an item on more than one factor, and, in fact, some methods of calculating the score of the resulting factors utilize the contribution of each item in the analysis to each factor. Regardless of which rotation method is used, one way to increase the validity of the meaning of the resultant factors is to incorporate feedback from an independent panel of researchers (Garson, 2010). When items loaded onto multiple factors, I assigned them based on the magnitude of the loading, the effect of keeping/discarding the item on the scale’s reliability, and professional judgment.

**Using Hierarchical Factor Analysis to Examine the Layered Nature of Campus Climate**

As indicated previously, the construct of interest, climate, is complicated to conceptualize and measure. The TTM and the work it was based upon stipulate that climate is based on three general areas: (a) one’s experiences, (b) one’s perceptions, and (c) the institution’s actions. However, recent factor analysis of an instrument used to study collegiate student-athletes which contains many of the items used in the TTM survey indicates the existence of subcategories of climate (Merson & Rankin, in preparation). Therefore, I will employ hierarchical factor analysis (HFA) to examine the relationships between the survey items and possible lower- and higher-order factors that comprise the construct of climate (Garson, 2010; Schmid & Leiman, 1957; StatSoft Inc., 2010; Wherry, 1984). Hierarchical factor analysis helps one to delineate multiple, correlated lower-order factors and determine how they combine to form higher-order factors that represent more general, subsuming theoretical categories. A relatively simple way to conduct an HFA is to first analyze the items and extract rotated factors that are oblique in nature (i.e.,
correlated to each other), then perform another factor analysis on the factor scores or the correlation matrix between those factors using an orthogonal rotation (Garson, 2010; StatSoft Inc., 2010; Wherry, 1984). The result is higher-order factors representing constructs that are composed of underlying factors.

**Factor Scale Score Calculations**

Just as the construct of climate cannot be directly measured, it also cannot be absolutely calculated. Factor analysis assists the researcher to home in on the best representation of the latent variables. Once acceptable factors are extracted, variables that represent those constructs must be built so they can be used in further description, examination, and analysis. There are two general classes of factor score calculation, “refined” and “non-refined” or “coarse” (DiStefano, et al., 2009; Grice, 2002). Refined methods produce scores that are approximately standardized (with a mean of zero and a standard deviation close to or equal to one) and are more exact than non-refined methods. Their primary benefit is their ability to contribute to the validity of the scale by producing scores that are relatively unbiased estimates of the true scores, while some also do a good job of retaining the relative correlations between the factors (DiStefano, et al., 2009; Grice, 2002). Coarse methods utilize a manual procedure of selecting items to include in the scale and combining those items to produce a scale score. They are simple to compute and interpret, are very common, especially in scale construction, and are generally believed to be more stable across independent samples of observations (DiStefano, et al., 2009; Grice, 2002). However, the factor scores obtained via these methods will be intercorrelated even when the factors are orthogonal, will not have unit variance, and will most likely correlate less with the factors themselves compared to any of the refined methods, thereby being less exact.
One of the goals of the current project is the development of a scale that institutions of higher education can use to assess and improve their climate. This dictates the use of a non-refined method of scale score calculation because the climate scale must be easy for the institution to calculate and the measure must be stable across many samples. In addition, it is easier for non-psychometricians to use the scales if they are in a form that is more familiar and easy to interpret. Finally, it’s important for the campus to be able to compare subscales and compare scores from different groups (such as students and faculty, women and men, education and engineering, etc.).

In addition, in order to compare scores they must be standardized (Allen & Yen, 1979; de Gruijter & van der Kamp, 2008; Suen, 2008). There are two general standardization procedures, “norm-referenced” and “criterion-referenced.” The former is based on the scores obtained from a comparable sample, whereas the latter is based on some independently determined criteria for “low,” “passing,” “average,” “good,” “excellent,” etc. (Suen, 2008). Climate is contextual and fluid, so it is impossible to make the claim that a climate “score” at one campus is truly better or worse than the score at another campus, or when compared to the score at the same campus at a different time. Therefore, any norm-referenced score must utilize the data from that location at that time. In addition, there is no commonly agreed upon quantification of what a “good” vs. “bad” climate is. This is especially true for the climate related to diversity. The tenets of Critical Theory and Action Research dictate that no score is perfect—every climate can and should be improved in some way—so there can be no absolute criterion on which to base a standardized score. Therefore, I created norm-referenced standardized factor scale scores using the following procedure:
1. Use only items that are determined to load onto the factor (based on factor loading, scale reliability, and theoretical comprehensibility) so that each subscale can be used by itself without calculating factor loadings for each factor.

2. Standardize metrics for the factor scale if they are different (3-point, 5-point, etc.) via a linear transformation (EBI, 2010; Sambandam, 2006).

3. Calculate the mean value instead of taking a simple sum so that individuals who do not answer each question in the scale contribute the same relative weight to the score as those who do (Armor, 1974). (This is moot since the dataset is imputed, but it would be part of the process an institution would use to calculate scale scores based on its own data collection).

4. Do not weight by factor loading so that each institution can use the scale for their own datasets without having to calculate factor loadings. This is important because a different dataset will produce different factor loadings. In fact, the use of different extraction and rotation methods may influence factor loadings in the same dataset (DiStefano, et al., 2009).

5. To make the factor scale scores comparable, standardize them to a Scaled Score (create a Z score, then multiply by 3 and add 10). This creates a score which will roughly range from zero to 20.

**Scale Testing**

The analysis I conducted was based on a set of data and, to an extent, is characteristic of those data. Even though the dataset contains responses from students from all academic units at multiple institutions of varying sizes, locations, and types, the resulting scales should be tested in
order to gain evidence of their reliability and validity for the purpose of campus climate assessment and enhancement.

**Reliability**

Rankin has examined correlations between sections of her campus climate survey for every iteration of the survey and for each institutional assessment (Rankin, 1994, 2003; Rankin, et al., 2009; Rankin & Reason, 2008), determining that those sections of the instrument show acceptable levels of internal reliability (Trochim, 2006). The reliability of instruments, in general, can be evaluated via several techniques encompassed by Classical, Generalizability, and Item Response Theory (de Gruijter & van der Kamp, 2008; DeVellis, 2003; Suen & Lei, 2007). However, the focus of this project is not to evaluate Rankin’s entire survey, which also includes a multitude of questions about individual characteristics, educational outcomes, and other things not directly subsumed under the construct of climate. Rather, my goal is to test the items that are claimed to represent campus climate (and establish an instrument consisting of those scales that reliably measure campus climate). Therefore, I evaluated the reliability of the individual scales and their subsequent use.

Cronbach’s alpha (Cronbach, 1951) is the most widely used measure of the internal consistency of a scale (Garson, 2008; Haertel, 2006). It is not a direct measure of the unidimensionality of a scale, which contributes limitations to its use (Sijtsma, 2009). As such, it should be calculated after the unidimensionality of the scale is first determined through factor analysis. It more accurately refers to the expected reliability of scores calculated from the scale.

Cronbach’s alpha is dependent on the similarity between item responses in the scale as well as the number of items, increasing as the number of items increases. The balancing act between these two dimensions is a part of scale construction. As previously mentioned, the
reliability of a scale should be considered as well as item factor loadings and factor comprehensibility. The reliability of a scale may increase if an item is removed. This typically corresponds with an item having a relatively low factor loading. However, the researcher may decide to keep the item if it greatly adds to the theoretical comprehensibility of the scale while at the same time does not result in an alpha value that is too low or a scale that is too long (all very subjective considerations). Acceptable values for alpha vary from approximately .6 to over .9, with the most generally acceptable value in social science research being either .7 or .8, but with some researchers accepting values as low as .5 (DeVellis, 2003; Garson, 2008; George & Mallery, 2003; Simon, 2008). As with most aspects of statistics and research, the acceptable value for Cronbach’s alpha is often dictated by the researcher in relation to other statistical, theoretical, and practical considerations.

Validity

Establishing validity requires presenting evidence that supports interpretation of the instrument’s results and subsequent decisions (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999; Kane, 2006). Over time, the notion of instrument validity has shifted from attempts to validate the test as a measure of some criterion to focusing on justifying the proposed uses of interpretations derived from the test (Kane, 2006). The latest joint standards from the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education (1999) suggest that sources of validity evidence include but not be limited to:

a. evidence based on test content (perhaps evaluated by a panel of experts),

b. evidence based on response processes (authenticity of the testing process),
c. evidence based on internal structure (using a nomonological net or comparing the structure to theoretical constructs through a technique such as factor analysis),

d. evidence based on relations to other variables (such as traditionally defined notions of predictive, concurrent, and criterion validity, or through the use of a nomological net), and

e. evidence based on consequences of testing (this is the most important, but the hardest to get information on until the test is in use, which might be too late).

The evidence required for one’s argument depends on the intended uses of the instrument. For example, the high-stakes MCAT test that greatly influences entrance to medical school should be validated with evidence about the potential consequences of using the test to individuals, society, and members of the public at large who may have to rely on that future doctor being knowledgeable and skilled enough to save lives. On the other hand, a process that determines one’s ability to play softball at Penn State may have serious consequences for the individual student-athlete, but less potential impact on society. In that case, however, one would expect the process to be an authentic representation of actual playing conditions. I provide evidence validating the scale I develop for use as a tool for agents of change at postsecondary institutions to assess and enhance the climate on their campuses based on the five sources of evidence listed above.

Using the factor analysis methods described in this chapter, I combined datasets from several institutions and analyzed the questions from the survey that pertain to students’ campus climate. I present the results of that analysis in the next chapter, and discuss their implications in the Discussion chapter.
Chapter 4

Understanding of the self only arises in relationship, in watching yourself in relationship to people, ideas, and things; to trees, the earth, and the world around you and within you. Relationship is the mirror in which the self is revealed. Without self-knowledge there is no basis for right thought and action. - Jiddu Krishnamurti

RESULTS

Description of the Sample

This project was based on data collected at 23 institutions from 2005 through 2008. The names of the schools are not revealed so as to comply with the data collection and dissemination agreement with each institution. The sample contains many types of institutions that constitute the landscape of American higher education. There are four-year research universities, four-year comprehensive and liberal arts colleges, and two-year colleges of varying sizes throughout the Midwest and Northeast sections of the country. The institutions are both public and private, and are of varying sizes from urban, suburban, and rural areas. There is one religiously-affiliated institution. See Table 1 for details of the institutional characteristics.
<table>
<thead>
<tr>
<th>Dataset</th>
<th>Type</th>
<th>Control</th>
<th>Basic Carnegie Classification</th>
<th>Location</th>
<th>Degree of Urbanization</th>
<th>Religious Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>College One</td>
<td>4-year</td>
<td>Private</td>
<td>Baccalaureate Colleges – Arts and Sciences</td>
<td>Midwest</td>
<td>Town: Fringe</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Master's Colleges and Universities (smaller programs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College Two</td>
<td>4-year</td>
<td>Public</td>
<td>Master's Colleges and Universities (smaller programs)</td>
<td>Northeast</td>
<td>Suburb: Large</td>
<td>None</td>
</tr>
<tr>
<td>College Three</td>
<td>4-year</td>
<td>Public</td>
<td>Baccalaureate Colleges – Diverse Fields</td>
<td>Northeast</td>
<td>Town: Distant</td>
<td>None</td>
</tr>
<tr>
<td>College Four</td>
<td>4-year</td>
<td>Private</td>
<td>Associate's -- Public 2-year colleges under 4-year universities</td>
<td>Northeast</td>
<td>Suburb: Large</td>
<td>Interdenominational</td>
</tr>
<tr>
<td>College Five$^1$</td>
<td>2-year</td>
<td>Public</td>
<td>Research universities (high research activity)</td>
<td>Midwest</td>
<td>City: Midsize</td>
<td>None</td>
</tr>
<tr>
<td>University One</td>
<td>4-year</td>
<td>Private</td>
<td>Research universities (high research activity)</td>
<td>Northeast</td>
<td>Town: Remote</td>
<td>None</td>
</tr>
<tr>
<td>University Two</td>
<td>4-year</td>
<td>Public</td>
<td>Research universities (high research activity)</td>
<td>Midwest</td>
<td>City: Small</td>
<td>None</td>
</tr>
<tr>
<td>University Three</td>
<td>4-year</td>
<td>Private</td>
<td>Research universities (high research activity)</td>
<td>Northeast</td>
<td>City: Small</td>
<td>None</td>
</tr>
<tr>
<td>University Four</td>
<td>4-year</td>
<td>Public</td>
<td>Master's Colleges and Universities (larger programs)</td>
<td>Midwest</td>
<td>City: Small</td>
<td>None</td>
</tr>
<tr>
<td>University Five</td>
<td>4-year</td>
<td>Public</td>
<td>Research universities (high research activity)</td>
<td>Midwest</td>
<td>City: Large</td>
<td>None</td>
</tr>
<tr>
<td>University Six</td>
<td>4-year</td>
<td>Public</td>
<td>Master's Colleges and Universities (medium programs)</td>
<td>Midwest</td>
<td>Town: Distant</td>
<td>None</td>
</tr>
</tbody>
</table>

Note: Institutional information retrieved from the Integrated Postsecondary Education Data System (IPEDS). Location based on U.S. Census Bureau definitions.$^1$ Aggregate of 13 2-year colleges, combined to protect respondent anonymity.
There are 14,874 student respondents, which constitutes an overall response rate of approximately 15% based on student enrollment figures from the year the survey was administered on each campus. The response rates varied among the institutions. Survey response rates have been in decline for several decades (Baruch, 1999; Dey, 1997; T. W. Smith, 1995; Steeh, 1981) and web-based surveys often have relatively low response rates (Sax, et al., 2003; Zhang, 2000). The overall response rate, combined with the lack of minority-serving institutions or those located in the West or South prevent this sample from being nationally-representative. However, there are good responses from groups that typically respond at lower rates (Sax, et al., 2003; Underwood, Kim, & Matier, 2000), including men and Students of Color. The purpose of the assessments was to determine the climate on those campuses in relation to diversity, so the researchers worked to ensure responses from underrepresented groups, as described in the Methodology chapter. The final dataset contains approximately 15% Students of Color, 62% women students, and 9% who identify as lesbian, gay, bisexual, queer, or questioning (LGBQ). Detailed demographics are presented in Table 2.
Table 2. Description of the Individual and Merged Datasets

<table>
<thead>
<tr>
<th>Dataset</th>
<th>n</th>
<th>N</th>
<th>Response Rate</th>
<th>Percent Missing</th>
<th>POC</th>
<th>Women</th>
<th>LGBQ</th>
<th>Class Year</th>
<th>Over 19</th>
<th>Part-time</th>
<th>US Citizen</th>
<th>On-campus Disability</th>
<th>Christian</th>
<th>Athiest/Agnostic</th>
<th>No Affiliation</th>
<th>Other Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>College One</td>
<td>1056</td>
<td>1986</td>
<td>53%</td>
<td>23%</td>
<td>51</td>
<td>237</td>
<td>642</td>
<td>177</td>
<td>2.39</td>
<td>213</td>
<td>934</td>
<td>944</td>
<td>80</td>
<td>326</td>
<td>248</td>
<td>180</td>
</tr>
<tr>
<td>College Two</td>
<td>1547</td>
<td>5538</td>
<td>28%</td>
<td>25%</td>
<td>51</td>
<td>373</td>
<td>1021</td>
<td>136</td>
<td>N/A</td>
<td>121</td>
<td>957</td>
<td>1045</td>
<td>206</td>
<td>70</td>
<td>205</td>
<td>310</td>
</tr>
<tr>
<td>College Three</td>
<td>609</td>
<td>5859</td>
<td>10%</td>
<td>33%</td>
<td>51</td>
<td>107</td>
<td>67</td>
<td>N/A</td>
<td>19</td>
<td>337</td>
<td>596</td>
<td>448</td>
<td>120</td>
<td>346</td>
<td>53</td>
<td>86</td>
</tr>
<tr>
<td>College Four</td>
<td>564</td>
<td>2854</td>
<td>20%</td>
<td>33%</td>
<td>51</td>
<td>70</td>
<td>415</td>
<td>23</td>
<td>2.57</td>
<td>360</td>
<td>544</td>
<td>491</td>
<td>63</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>College Five</td>
<td>2137</td>
<td>9493</td>
<td>23%</td>
<td>22%</td>
<td>51</td>
<td>211</td>
<td>1414</td>
<td>N/A</td>
<td>1.74</td>
<td>1323</td>
<td>2080</td>
<td>67</td>
<td>171</td>
<td>1252</td>
<td>168</td>
<td>253</td>
</tr>
<tr>
<td>University One</td>
<td>656</td>
<td>2831</td>
<td>23%</td>
<td>13%</td>
<td>51</td>
<td>82</td>
<td>213</td>
<td>40</td>
<td>2.92</td>
<td>426</td>
<td>606</td>
<td>515</td>
<td>65</td>
<td>342</td>
<td>89</td>
<td>123</td>
</tr>
<tr>
<td>University Two</td>
<td>272</td>
<td>12321</td>
<td>2%</td>
<td>25%</td>
<td>51</td>
<td>46</td>
<td>144</td>
<td>N/A</td>
<td>N/A</td>
<td>255</td>
<td>45</td>
<td>22</td>
<td>42</td>
<td>161</td>
<td>17</td>
<td>68</td>
</tr>
<tr>
<td>University Three</td>
<td>2457</td>
<td>7048</td>
<td>35%</td>
<td>18%</td>
<td>51</td>
<td>578</td>
<td>1156</td>
<td>142</td>
<td>3.08</td>
<td>1420</td>
<td>2136</td>
<td>1494</td>
<td>222</td>
<td>1288</td>
<td>257</td>
<td>265</td>
</tr>
<tr>
<td>University Four</td>
<td>2468</td>
<td>12793</td>
<td>19%</td>
<td>24%</td>
<td>51</td>
<td>169</td>
<td>1649</td>
<td>N/A</td>
<td>3.31</td>
<td>2029</td>
<td>2407</td>
<td>755</td>
<td>159</td>
<td>1698</td>
<td>214</td>
<td>247</td>
</tr>
<tr>
<td>University Five</td>
<td>1641</td>
<td>29358</td>
<td>6%</td>
<td>24%</td>
<td>51</td>
<td>250</td>
<td>1153</td>
<td>N/A</td>
<td>3.89</td>
<td>1413</td>
<td>1568</td>
<td>186</td>
<td>103</td>
<td>900</td>
<td>197</td>
<td>234</td>
</tr>
<tr>
<td>University Six</td>
<td>1377</td>
<td>9128</td>
<td>15%</td>
<td>24%</td>
<td>51</td>
<td>132</td>
<td>928</td>
<td>N/A</td>
<td>2.77</td>
<td>867</td>
<td>1330</td>
<td>582</td>
<td>81</td>
<td>892</td>
<td>110</td>
<td>172</td>
</tr>
<tr>
<td>Merged Dataset</td>
<td>14784</td>
<td>99209</td>
<td>15%</td>
<td>23%</td>
<td>51</td>
<td>2260</td>
<td>8719</td>
<td>585</td>
<td>2.87</td>
<td>9501</td>
<td>13895</td>
<td>6624</td>
<td>1316</td>
<td>8167</td>
<td>1429</td>
<td>1783</td>
</tr>
</tbody>
</table>

Notes: Demographics were not imputed. Numbers in parentheses are "valid percent" not including missing values (except for Class Year where they represent the standard deviation). N/A indicates no student data for that school.

1 Transgender not reported due to small numbers at some campuses potentially threatening respondent anonymity.
2 LGBQ = Lesbian, Gay, Bisexual, Queer, and Questioning.
3 Mean and standard deviation based on a six-point scale from 1st year through graduate student.
4 Aggregate of 13 2-year colleges, combined to protect respondent anonymity.
Data Imputation

The merged database contained 14,784 cases and 370 variables potentially related to students’ campus climate. There were also a collection of approximately 40 demographic variables. I ran EM imputation using the MVA command in SPSS on two separate computers in two locations so I had a backup in case of a spring thunderstorm-induced power outage. Initially, I instructed the computers to impute the climate variables based upon both the climate variables and the demographics. The process ran for 12 hours before exiting with an error indicating it could not continue with the imputation using the demographic variables. Since the climate variables are the only ones to be entered in the factor analysis, I chose to remove the demographics and use a just-informed model containing only the climate variables (David R. Johnson & Young, 2008). The two processes ran for approximately 80 hours before each produced a complete, imputed dataset. One was used for analysis while the other was kept as a backup. After the imputation I decided to not use questions that asked students if they thought the climate would improve if there were optional or required diversity workshops on a list of topics. I reasoned that the climate is a measure of the current personality of the organization, not a prediction of what it may be like in the future. After eliminating these questions the dataset contained the 345 variables listed in Appendix A. Using these variables, the dataset contained 23% missing data, with proportions varying by institution from 13% to 33% (Table 2). There is no commonly accepted simple measure of the limit to the amount or proportion of a dataset that can be accurately imputed, but evidence suggests that modern imputation methods (like EM and MI) can handle a large amount of missing data (as much as 50%) without affecting the substantive conclusions drawn from the analysis (Choi, Nam, & Kwak, 2004; Graham, 2009; David R. Johnson & Young, 2008).
Initial Factor Analysis, Including Reliabilities

As stated in the Methodology chapter, I performed a Principle Axis Factoring (PAF) analysis with a Direct Oblimin oblique rotation, utilizing different values of delta to obtain the most comprehensible solution. The first analysis produced an ultra-Heywood case error (indicating the communality of a variable exceeded its variance) (SAS Institute Inc., 1999). In previous consultation, my committee member and methodologist Dr. Hoi Suen suggested running an image factor analysis. Instead of using the variable correlation or covariance matrix, an image analysis is based on the correlation matrix of variables predicted from the others using multiple regression (Garson, 2010). It proved to be successful.

In order to examine the structure of the climate constructs the instrument measures I included all of the items related to students’ campus climate in the initial factor analysis. Before the analysis I used headings imbedded in the original surveys to identify which questions were intended to tap the three aspects of climate Rankin had identified in her initial analysis: experiences, perceptions, and institutional action. In Appendix A I list the full set of climate questions entered into my analysis, organized by presumed climate construct. Unfortunately, when I entered all of the questions into the factor analysis the results were incomprehensible, with two items having factor loadings of greater than one and with none of the Yes-No follow-up questions asking about students’ experiences with harassment and sexual assault loading onto any of the factors. This is potentially due to the small number of students who answered those follow-up questions. I decided that knowing how a relatively small percentage of students reacted to instances of harassment or assault, while extremely important to the individual students involved, was not as important as whether or not they had the experience in the first place, and were also not so important as to risk compromising the rest of the analysis. Therefore,
I chose to remove those questions from subsequent analyses so I could get a clearer picture of the rest of the factors.

I re-ran a PAF analysis with a Direct Oblimin oblique rotation and a delta value of zero on the remaining 126 variables. I once again got an ultra-Heywood case error and therefore ran an image analysis. For each analysis using different values for delta I attempted to use PAF but got the same error each time (since the error is related to factor extraction, not rotation). Therefore, all subsequent results in this subsection are based on successful image factor analyses.

I based factor and item selection decisions on factor loadings, scale reliabilities, and theoretical comprehensibility, as described in the Methodology chapter.

The image analysis with a delta value of zero produced a factor structure indicating the existence of approximately 14 factors. The Kaiser criterion dictated accepting a maximum of 14 factors that explained 71.9% of the variance. The scree plot (Figure 3) was difficult to read due to the number of variables. It seemed to indicate the existence of six, eight, ten, 14, or 17 factors. The pattern matrix showed four to 19 factors, depending on the factor loading cut-off value I chose (from .4 to .7), and the structure matrix indicated 14 to 19 factors. I also conducted a parallel analysis to determine the number of factors to extract. However, the procedure failed to produce a meaningful result, instead indicating the existence of 97 factors. I have experienced this before with the code used to run a parallel analysis, especially when there are a large number of variables. The syntax I obtained to run in PASW either gives an unreasonably high number of factors or it fails to converge (the real data eigenvalues never drop below their corresponding random data counterparts). As appealing as parallel analysis is, I believe the major statistical packages have to natively implement it before it can be widely and reliably used by researchers.
I chose to retain 14 factors based on the Kaiser criterion, the scree plot, factor loadings of individual items, scale reliabilities, and theoretical comprehensibility, as described below.

![Scree Plot](image)

**Figure 3.** Scree Plot of Eigenvalues for PAF Analysis of Student Climate Questions

The 14 factors extracted from the analysis are summarized in Table 3 below. Tables listing the questions included in each factor and their loadings are in Appendix B (Tables B1-B14). I initially kept all items with a loading of at least .7, and most others with lower loadings that conceptually fit the factors. Items with a loading less than .4 were dropped, as well as single
item factors. Based on this process, seven items were dropped initially: 1) “Have you observed or personally been made aware of any conduct (harassing behavior) directed toward a person or group of people at [college/university] that you believe has created an offensive, hostile, exclusionary, or intimidating working or learning environment?” 2) “I fear sexual victimization (harassment/assault).” 3) “Have you ever been a victim of sexual assault?” 4) “Course content at [college/university] includes materials, perspectives, and/or experiences of people from historically underrepresented/marginalized groups.” 5) “Using a scale of 1-5, please rate the overall campus climate at [college/univ] on the following: (Native American)” 6) “How would you rate the overall campus climate for persons from the following racial/ethnic backgrounds? (Other)” 7) “College/university proactively addresses (takes actions designed to prevent) discrimination related to: (Other).”

After eliminating items as described above, I identified 19 potential factors in the structure matrix, even though some of them made little conceptual sense. I calculated the Cronbach’s Alpha reliability of each factor and examined their descriptive statistics. I then eliminated factors based on that information, as well as the relative strength of the factor loadings of the items, and the theoretical comprehensibility of the factors. Through this process I eliminated five factors, resulting in 14. That result is consistent with the number of factors suggested by the Kaiser criterion and the scree plot.

As I calculated the reliability of each factor, I shortened and strengthened factors by eliminating items when doing so would 1) increase the reliability and 2) improve the comprehensibility of the factor. I eliminated ten items (one of which was a member of a factor that was subsequently dropped). The final factors and items are listed in Tables B1-B14, Appendix B. I created factor scale scores using the method described in the Methodology.
chapter. Most of the resulting scales look approximately normal, with minimum skew and varying amounts of kurtosis (Figures B1-B14, Appendix B). Those statistics are listed in the factor summary table (Table 3).

Table 3. Summary of Scale Statistics

<table>
<thead>
<tr>
<th>Scale</th>
<th># of items</th>
<th>Skewness$^1$ (SE)</th>
<th>Kurtosis$^1$ (SE)</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Satisfaction with Collegiate Experience</td>
<td>2</td>
<td>-0.759</td>
<td>1.342</td>
<td>.764</td>
</tr>
<tr>
<td>Interaction with Majority Faculty</td>
<td>3</td>
<td>-3.085</td>
<td>17.095</td>
<td>.836</td>
</tr>
<tr>
<td>Comfort Interacting with Diverse Faculty</td>
<td>7</td>
<td>-1.816</td>
<td>9.167</td>
<td>.934</td>
</tr>
<tr>
<td>Institutional Climate for Diversity</td>
<td>5</td>
<td>-0.249</td>
<td>-0.562</td>
<td>.908</td>
</tr>
<tr>
<td>Welcoming/Personal Climate</td>
<td>7</td>
<td>-0.597</td>
<td>0.511</td>
<td>.905</td>
</tr>
<tr>
<td>Class is Welcoming</td>
<td>14</td>
<td>-0.330</td>
<td>0.135</td>
<td>.965</td>
</tr>
<tr>
<td>Climate for Underrepresented Identities</td>
<td>11</td>
<td>-0.184</td>
<td>0.542</td>
<td>.950</td>
</tr>
<tr>
<td>Climate for Underrepresented Racial/Ethnic Identities</td>
<td>7</td>
<td>0.068</td>
<td>0.146</td>
<td>.925</td>
</tr>
<tr>
<td>Accessibility</td>
<td>4</td>
<td>-0.186</td>
<td>0.068</td>
<td>.923</td>
</tr>
<tr>
<td>Climate for Non-American Cultures</td>
<td>5</td>
<td>-0.087</td>
<td>-0.045</td>
<td>.915</td>
</tr>
<tr>
<td>Visible Leadership</td>
<td>12</td>
<td>-0.595</td>
<td>1.356</td>
<td>.969</td>
</tr>
<tr>
<td>Student-Related Leadership</td>
<td>4</td>
<td>-0.653</td>
<td>0.785</td>
<td>.927</td>
</tr>
<tr>
<td>Takes Action Related to Main Social Identities (Race/Ethnicity, Gender, LGBT, Religion)</td>
<td>7</td>
<td>-0.799</td>
<td>1.719</td>
<td>.932</td>
</tr>
<tr>
<td>Takes Comprehensive Action</td>
<td>10</td>
<td>-0.455</td>
<td>1.200</td>
<td>.955</td>
</tr>
</tbody>
</table>

Note: 1. (.020) – Standard deviation of Skewness and (.040) – Standard deviation of Kurtosis
Hierarchical Factor Analysis, Including Reliabilities

The hierarchical factor analysis involved putting the lower-level factor scores obtained with the oblique rotation into a new PAF analysis with an orthogonal rotation (in this case, Varimax because it produces the clearest picture by maximizing the differences in factor loadings across items for each factor (separating the factors as much as possible)). Doing so resulted in three higher-order factors that explained 64.7% of the variance, but the comprehensibility of those factors was mixed. To get a stronger picture of the hierarchical structure I followed the same procedure as above. Reliability calculations indicated each factor would be stronger if one or more items (lower-level factors) were removed from each factor. I did so for the same reasons as before: it produced stronger factors that were more comprehensible. The resulting three factors and their items are described in Table 4 and their histograms are in Appendix B (Figures B15-B17).

Finally, I used two procedures to test the existence of a possible third-level factor. First, I conducted the same PAF analysis with Varimax rotation on the lower-level factors as before, but this time I requested a single factor. All of the items loaded onto that factor except three of the four that I had dropped to produce the final three second-order factors (Interaction with Majority Faculty, Climate for Underrepresented Racial/Ethnic Identities, and Comfort Interacting with Diverse Faculty). The fourth factor that I had dropped loaded relatively weakly on the factor (Personal Satisfaction with Collegiate Experience at .473). Secondly, I took the factor scale scores from the three second-level factors and entered them into a PAF analysis with Varimax rotation. One factor that explained 75.8% of the variance naturally emerged, with all of the second-level factors loading. Reliability calculations indicated that the reliability would increase
from .837 to .903 without the Visible Leadership factor. However, I chose to keep the factor because the reliability is still very good with it and conceptually the solution suffers from dropping the factor. The results of these two procedures provide evidence of the existence of an overarching factor I call “Perceptions of Climate.” Scale statistics are listed in Table 4 and Figure B18 in Appendix B.

<table>
<thead>
<tr>
<th>Scale</th>
<th># of items</th>
<th>Skewness (SE)</th>
<th>Kurtosis (SE)</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptions of Climate</td>
<td>3</td>
<td>-0.163</td>
<td>0.350</td>
<td>.837</td>
</tr>
<tr>
<td>Actively Welcoming Institution</td>
<td>4</td>
<td>-0.375</td>
<td>0.603</td>
<td>.869</td>
</tr>
<tr>
<td>Climate for Members of Underrepresented Groups</td>
<td>4</td>
<td>-0.159</td>
<td>0.102</td>
<td>.845</td>
</tr>
<tr>
<td>Visible Leadership</td>
<td>2</td>
<td>-0.601</td>
<td>0.938</td>
<td>.932</td>
</tr>
</tbody>
</table>

Note: 1. (.020) – Standard deviation of Skewness and (.040) – Standard deviation of Kurtosis

Validity

Recall that AERA, APA, and NCME suggest that researchers collect evidence regarding the interpretation and uses of an instrument in the following areas:

f. evidence based on test content (perhaps evaluated by a panel of experts),
g. evidence based on response processes (authenticity of the testing process),
h. evidence based on internal structure (using a nomonological net or comparing the structure to theoretical constructs through a technique such as factor analysis),
i. evidence based on relations to other variables (such as traditionally defined notions of predictive, concurrent, and criterion validity, or through the use of a nomological net), and
j. evidence based on consequences of testing (this is the most important, but the hardest to get information on until the test is in use, which might be too late).

I will address each of these areas in order.

The original test content was developed by Rankin, a nationally-recognized expert in diversity and social justice, based on previous research on campus diversity and climate, and reviewed by experts in diversity, two Higher Education researchers (M. Lee Upcraft and Patrick T. Terenzini), and members of underrepresented constituent groups. Variations of the instrument have subsequently been used at almost 100 institutions where it has been examined, vetted, and modified by faculty and staff members, as well as administrators and students, to determine if the questions “make sense” – modifying them if not. In this dissertation I am not contributing to this already well-established area of validity evidence.

The authenticity of the response process is open for interpretation. Authenticity of the testing process is more relevant when applied to a test of concrete skill, ability, or knowledge, as described in the Literature Review chapter. How do students authentically exhibit their opinion of their campus climate? The most direct evidence comes from the survey data collection process. Great care is taken to ensure that people may respond anonymously. The survey URL is open, so no numbered invitations are used and no electronic personally identifiable information is collected (such as IP address). Respondents may choose to not respond to a question and they are assured repeatedly that their responses will be kept confidential to the research team and only reported in aggregate form. In addition, there are several open-ended questions which give them the opportunity to describe, explain, or reflect on the quantitative questions. All of these steps help to ensure an unencumbered process whereby the respondents may reflect upon and share their thoughts and experiences regarding potentially upsetting
incidents or perspectives. Reflecting on these experiences and perceptions may evoke authentic emotions and memories, which will hopefully be authentically relayed through the protected data collection process.

The internal structure of the instrument is primarily what I examined in this dissertation. In the Discussion chapter I will go into more detail on how the structure compares to the proposed and previously identified theoretical constructs. In addition, I examined the correlations between the factors to determine if they were so highly correlated as to not be able to discriminate between the theoretical concepts they measure. Garson (2010) suggests a possible value of .85. One instance just met that threshold. Visible Leadership and Student-Related Leadership were correlated at .873. This is not surprising since they are both related to visible leadership. I examined them closely as I conducted the hierarchical factor analysis. They both loaded highly onto the same second-level factor. It appears as if the 14 factors show the ability to discriminate the theoretical constructs, except perhaps for the topic of leadership visibility. More work on new datasets should be done to examine the validity of this particular measure.

Unfortunately, evidence based on relations to other variables does not currently exist for this instrument. It has been used in the auspices of single-institution campus climate assessment. The development of these scales is one step towards being able to compare them to other measures of campus climate. Future administrations of this survey should be accompanied by other instruments that also claim to measure the perceptions of climate.

In terms of the proposed use of the instrument, versions of it have been successfully used at almost 100 institutions. It is intended to be used to examine campus climate and how it varies for different groups. So far, organizations have been happy with the survey’s ability to describe
their climate, and many have since requested follow-up assessments. Even though the purpose of this dissertation is not to examine group differences, a preliminary analysis of the mean differences between students who reported experiencing harassment versus those who did not show that the perceptions of overall climate, perceptions of an actively welcoming campus, perceptions of the climate for underrepresented groups, and perceptions of visible leadership of those who have experienced harassment are 1/2 to 1 standard deviation lower than those who have not. This indicates that the new instrument should be able to distinguish differences in perceived climate between groups. Results from the administration of this new instrument in the field will add evidence as to its validity when used to assess and improve the campus climate for diverse constituents.

**Limitations**

As with any secondary analysis of data, the results are based on characteristics of the data collection of which I had no control, such as the development of the questions, the recruitment of participants, and even the order and layout of the questions on the survey. As such, there are certain areas where additional questions may have allowed a concept to be retained. One example is in relation to the institution’s curriculum. I will talk about this in greater detail in the Discussion chapter.

Related to this is the limited generalizability of the results. The overall response rate, combined with the lack of minority-serving institutions or those located in the West or South of the country, prevent this sample from being nationally-representative. In addition, Table 2 clearly shows that the overall sample consists of students who identify as White, heterosexual, full-time, US citizens, or without a disability. However, there are good percentages of groups that typically respond at lower rates, including men and Students of Color. Of course, this is not
an uncommon profile in many institutions of higher education, even though it is changing. Of
more importance to the conceptualization of climate than the representativeness of the sample is
how the students’ perspectives may affect the factor structure. Do the results describe the
perception of climate for all students, or just those in the majority? The purpose of the campus
assessments was to determine the climate in relation to diversity, so the researchers worked to
ensure responses from underrepresented groups, as described in the Methodology chapter. In
addition, it’s obvious that the open, anonymous, population sampling technique used by Rankin
allows for the introduction of self-selection bias. It’s understandable that students would be
more likely to complete the survey if they had a particular reason to—if it was important to them.
That, combined with the relatively higher frequencies of Students of Color and LGBQ students
than one typically would expect from an open survey suggests that the resulting factor structure
may represent the majority less so than one might expect from a population survey. However,
this is essentially an empirical question. The next step should be to split the sample into a series
of majority and minority identities and re-run the analysis to see if there are differences. Such an
analysis performed on the measure of the psychological climate from Hurtado, et al.’s model of
campus racial climate indicated the existence of differences based on gender, ethnicity, and
educational level (Hutchinson, et al., 2008).

Another limitation is the nature of the survey being an assessment tool to examine the
lives of campus members of many identities, especially traditionally underrepresented ones.
Most of the questions were geared to obtain a comprehensive survey of the experiences and
perceptions for as many people as possible, so the survey includes as many specific identities as
possible (See the survey in Appendix A). The strength of this approach is the ability to
understand in detail the circumstances for individuals who may be overlooked. The limitation is
the sheer number of similar questions. Since factor analysis looks at how respondents answer questions in similar ways, questions that are presented in clusters on the survey may factor together not only because they refer to the same concept, but also because they are presented together as a “unit” on the survey. The questions regarding the accessibility of aspects of campus for people with disabilities may be an example of this. On the positive side, questions that break away from their group provide extra evidence that they measure a different construct, as opposed to simply being interpreted by respondents as being part of the same question. This was the case for the “Takes Action” questions that split between majority and underrepresented identities, and for the Student-Related Leadership factor splitting from the rest of the questions regarding visible leadership (as detailed in the Discussion chapter). This provides convincing evidence that the climate for underrepresented populations and the visibility of leadership related to students are important to consider.

A fourth limitation is related to the data imputation process. As explained in the methodology chapter, I reconciled the survey question response items that differed among schools or were not asked at all schools. Some of the cases in the dataset are missing data for response items because they did not have those questions on their survey. This pattern of missing data is not random—it varies based on institution. The EM imputation method works well when the data are either missing at random (MAR) or not missing at random (NMAR) but with a correct model that explains the distribution of missing data (Allison, 2001). I originally intended to impute the climate variables based on not only themselves, but also the demographics. I believed this would allow the imputation process to take individual difference into account when completing the dataset. Unfortunately, when the process ended with an error I had to limit the imputation to being based only on the climate variables. Including these
auxiliary variables may have led to a more accurate imputation. In addition, including the mechanism of missingness (institution) may have reduced bias and made the MAR assumption more plausible and appropriate for EM imputation (Allison, 2001), though simulation studies suggest that it’s more important to use auxiliary variables that are correlated with other variables in the model than ones that are related to the pattern of missingness (Collins, Schafer, & Kam, 2001). Validation work done on data collections from other institutions should balance the potential increase in accuracy gained by using the demographic variables when imputing with the exponential increase in the amount of time necessary to run the imputation as more variables are added.

Finally, the nature of hierarchical factor analysis leads one to solutions that explain increasingly smaller proportions of the total variance. The original, first-level 14 factor solution explained 72% of the variance in the individual items. The second-level hierarchical factor analysis explained 68% of the variance in the 14 factors, or 68% of the original 72%, which equals 49% of the variance in the original items. My final one-factor solution explained 76% of the variance of the three second-level factors. So, the proportion of the variance in the original items explained by the single overarching factor is 37%. This decline in percentages is not surprising since the first-level factor analysis solution did not include several of the original items and the second-level solution contained 10 of the 14 first-level factors. In addition, the primary purpose of Principle Axis Factoring, as opposed to Principle Components Analysis, is to explain the correlations between the items, not their variance. For the purpose of scale development, the goal is typically to find a parsimonious solution that identifies a relatively small number of items that are strongly related to a small number of latent variables which explain an important amount of the variance, rather than trying to explain as much variance as
possible (DeVellis, 2003). However, some researchers may have less confidence in the completeness of a factor solution that explains less than a certain percentage of the total variance, whether that level be 60%, 50%, 40%, etc. Researchers should weigh the amount of variance explained by the upper-level solutions with the other evidence presented to determine the efficacy of those solutions.

In all, the results indicate the existence of several aspects of climate, beyond experiences, perceptions, and institutional actions. The 14 factors were organized into three groups that were different from the previously established structure. In addition, I found evidence for the existence of the overarching concept of “Perceptions of Climate.” In the next chapter I will discuss the details of this different structure and how it can be leveraged to measure campus climate, as well as the policy, practice, and research implications.
Chapter 5

Let us rise up and be thankful, for if we didn't learn a lot today, at least we learned a little, and if we didn't learn a little, at least we didn't get sick, and if we got sick, at least we didn't die; so, let us all be thankful.
– Attributed to The Buddha, Siddhārtha Gautama

DISCUSSION

Institutional climate has wide and varied influences on student outcomes. Negative campus climates hinder educational attainment and healthy development, whereas students who experience a campus as supportive are more likely to experience positive learning outcomes (Milem, 2003; Pascarella & Terenzini, 2005; Reason, et al., 2006). Much of the research on campus climate has been focused on the racial climate and limited to single-institution studies (Hurtado, et al., 2008). This dissertation contributes to the literature on the measurement of campus climate by offering an empirically tested instrument, the *Perceptions of Climate Instrument (PCI)*, based on a statistical analysis of the survey used in Rankin’s *Transformational Tapestry Model*, which can be used by institutions to measure and compare students’ perceptions of their climate.

**How the Perceptions of Climate Instrument Measures Climate**

The items I analyzed fractured along somewhat different lines than Rankin’s original analysis that produced experiences, perceptions, and institutional actions. The list of survey questions, organized by construct as they were on the original surveys, is in Appendix A. I removed all of the questions pertaining to experiences at different levels of the analysis. Three of the four main experiences questions regarding observing harassment, fearing sexual assault, and experiencing sexual assault did not load onto any of the original 14 factors. The question regarding experiencing harassment originally loaded with the three questions pertaining to comfort with the campus, academic department, and class climate, but dropping it improved the
reliability of the factor. I eventually removed it entirely because it wasn’t strong enough to be included with the other 14 lower-level factors. Also, recall that I removed all of the follow-ups to these four experiences questions after the first analysis because they did not load onto any factors and made the results incomprehensible.

The other questions identified as experiences pertained to students’ satisfaction with their academic career, as well as students taking classes from, and feeling comfortable requesting help from, faculty of various identities. These factors were part of the original 14, but I removed them from the second-level factors in the hierarchical factor analysis in order to improve their reliability and comprehensibility. The final structure contained no questions originally identified as pertaining to the experiences of college students.

The perceptions variables were numerous and varied. Most of them were included in the final hierarchical solution, combining to form a second-level factor named Climate for Members of Underrepresented Groups. They did not all cluster into their own second-level factor though. Two of the perceptions factors, Welcoming/Personal Climate and Climate for Non-American Cultures, joined two of the “Institutional Actions” factors to comprise the second-level factor called Actively Welcoming Institution. The other two “Institutional Actions” factors combined to form their own second-level factor: Visible Leadership. Even though four of the lower-level factors are based on questions that had been tagged as related to perceptions of institutional action, it is clear that they are, in essence, simply perceptions. Therefore, all of the remaining factors reflect the respondents’ perceptions of their climate, hence the name of the overarching factor: “Perceptions of Climate.”

The overall focus of the Perceptions of Climate Instrument on perceptions is consistent with the definitions of climate I examined in the literature review. In the field of business the
climate is defined as both the psychological climate (individuals’ perceptions of their work environment) and the organizational climate (shared perceptions of a work environment). Both of those aspects rely on perceptions. In higher education, common definitions of climate include perceptions, in addition to objective measures of activity and structure elements. Even Rankin’s original analysis of her survey relied on perceptions, as well as individuals’ experiences and what she called their perceptions of institutional actions. Her analysis distinguished between general perceptions and those specifically related to institutional action, whereas mine showed that the distinctions in the current version of the TTM survey are more nuanced. I also showed that the survey, as it is now, does not effectively measure students’ experiences as a component of climate.

There are other differences between the Perceptions of Climate Instrument and the higher education climate models I reviewed. The PCI more comprehensively measures students’ perceptions than work based on Hurtado et al.’s models up to this point because it includes more than just the campus racial climate. Those models also include institutional history, measures of structural diversity, and a structural element, but those aspects focus on the racial climate as well. I look forward to examining their new work that strives to incorporate the overall climate for diversity on campus as well as institutional practices and student outcomes. In looking at the campus climate for multiple identities, the PCI differentiates among sets of identities so that campuses can identify and examine relative strengths and weaknesses for different members of their campus community. Also, by focusing on students’ perceptions of the climate, it concentrates the analysis of campus climate more than Rankin’s TTM, which also includes questions about students’ experiences while at the university.
Figures 4 and 5 illustrate the similarities and differences between Rankin’s initial framework of campus climate and my model. Figure 4 shows the original 14 first-level factors organized as they would be based on Rankin’s survey. Figure 5 shows the hierarchical nature of the *Perceptions of Climate Instrument*, clearly showing that “perceptions” and “institutional actions” split among multiple factors, and “experiences” were removed altogether. The resulting instrument can be used to create a profile for the institution based on any of the three levels, though an overall campus climate “score” has little utility. I suggest that institutions use the *Perceptions of Climate Instrument* to assess the climate at the lower level, then combine those scores to obtain measures of the second-level concepts.
### Experiences
- Personal Satisfaction with Collegiate Experience
- Interaction with Majority Faculty
- Comfort Interacting with Diverse Faculty

### Perceptions
- Institutional Climate for Diversity
- Welcoming/Personal Climate
- Climate for Underrepresented Identities
- Climate for Underrepresented Racial/Ethnic Identities
- Accessibility
- Climate for Non-American Cultures

### Institutional Actions
- Visible Leadership
- Student-Related Leadership
- Takes Action Related to Main Social Identities (Race/Ethnicity, Gender, LGBT, Religion)
- Takes Comprehensive Action

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**Figure 4.** Rankin’s Original Framework

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**Figure 5.** Merson’s Conceptual Model of the Perceptions of Climate Instrument Based on Hierarchical Factor Analysis
A rough example of an upper-level Campus Climate Profile (CCP) that would be produced by the PCI is illustrated in Figure 6. In this hypothetical example, the three perceptions of climate are broken down by gender to show the relatively more positive and more negative perceptions of climate reported by women and men. Recall that the standardized scale scores have a mean of ten and a standard deviation of three, making the scales range from approximately zero to 20. The profile can be produced for virtually any group the institution is interested in, whether it be an identity or an organizational unit, such as the college of business. A more detailed profile can also be produced containing all, or any subset, of the ten first-level factors. This can be especially useful if the institution wishes to focus on one or more of those perceptions of climate, such campus accessibility or student-related leadership, for example.

Figure 66. An Upper-Level Campus Climate Profile
Potential Aspects of Climate We Lost Along the Way

Responses to Harassment

None of the follow-up questions regarding harassment or sexual assault loaded onto any factor in the initial analysis. These are dichotomous variables, so the amount of variance they can explain is limited, but other dichotomous variables regarding taking classes with faculty did stay in and factored together to create two of the original 14 first-level factors. Perhaps a different type of factor analysis that is more tailored to dichotomous variables might show a pattern. Or, perhaps the specifics of harassing experiences are less important than having the experience in the first place. It’s more likely, however, that there were so few cases in which respondents answered yes to these questions that there wasn’t much variation to begin with.

I also removed the other dichotomous variables related to experiencing harassment, observing harassment, fearing sexual assault, and experiencing sexual assault because they did not strongly load onto any of the factors. These variables suffered the same limitations as the response questions. It is disappointing though that these experiences are not measured in the PCI. These experiences and observations are important to the people involved, and reports of such actions can have an impact on a community. Consider, for example, the student who reads in the paper that someone who takes the same route to and from class was sexually assaulted, or the residence hall student who hears that someone in their hall—their home—had a Nazi Swastika drawn on their door. Just hearing about these impactful experiences can influence one’s perception of the campus climate. It is also something that institutions are interested in addressing, and can be a possible entree into institutional change. For these reasons alone I imagine these questions may remain on the TTM survey, even if they don’t serve to directly measure students’ perceptions of climate.
A Few Important Identities

One of the questions about Native Americans was removed at the first stage of analysis because it did not load onto a factor. There was a large amount of missing data on that question in the original pre-imputation dataset. It is my belief that students simply don’t know what the climate is like for Native Americans due to their severely underrepresented nature on most college campuses. This is also discouraging because this group is often cited as being the most underserved, the least noticed, the least successful, and highly underrepresented in the literature, with the lowest educational attainment of any ethnic group (Pewewardy & Frey, 2004). This is a group that needs more attention, not less.

In addition, I removed questions related to people of low socio-economic status, parents, men, military veterans and active duty personnel, and Christians. One reason may, again, have to do with extreme numbers and whether an identity is a core part, or a fringe element, of the dominant campus culture. There are relatively few students who are parents or active duty/veterans, and people of low SES are typically ostracized from society in general, whereas men and Christians are dominant identities on most college campuses. These questions may be unnecessary for the overall measure of campus climate, but they are potentially valuable to researchers who want to learn more about these students’ collegiate experiences, as well as administrators who wish to improve those experiences.

Individual questions pertaining to student taking classes from a faculty member with a disability, or from one who is out as LGBT, did not load onto any factors. Both of these identities are relatively rare among the faculty at most colleges and universities, especially in academic areas that are not related to their identity. They are also identities that tend to make
some people uncomfortable, regardless of the course content. For example, White students might not care that their Physics professor is Black (though it's a great example and role model for Students of Color), but people of several ethnicities, religions, and nationalities may be uncomfortable with an openly gay, transgendered, or disabled professor teaching any subject, except, perhaps, for ones directly related to their identity. The fight for equality in relation to sexual orientation has built upon women's rights and the civil rights movement and has emerged as its own civil rights issue, with disability and gender expression movements making inroads on the same path as well. I do not believe in a hierarchy of oppression where certain oppressions are worse than others, but some are certainly less acknowledged and challenged, and it's still shockingly acceptable, for example, for someone to make fun of, dismiss, or discriminate against a person with such marginalized conditions and identities. The experiences of these faculty members should be examined so as to promote diversity in the academy. One way to do that is by examining students’ experiences with and perceptions of them. While the number of faculty members with a disability and the number of out LGBT faculty members are still quite small, they, like Native American college students, should not be ignored.

**Curricular Diversity**

Finally, diversity in course content also did not load onto any of the factors. I discuss specifics of this important part of students’ collegiate experience in the “Areas for Future Research” section below.

**Policy and Practice Suggestions**

**Perceptions**

Perception is the basis of how we interact with the world, and individual’s perceptions are their lived reality. The literature offers that one’s perceptions are the core of how climate is
defined and measured in business-based organizational theory and in higher education. These perceptions are also important because they are related to individuals’ performance and success. Therefore, an institution’s administrators should not only know about the events that have happened on campus, they should also incorporate efforts to measure the students’ perceptions of those events into their strategic planning and their responses to critical incidents. Administrators should not assume to know what students think about things—they should ask.

Institutions should also remember that these perceptions likely extend beyond the campus gates. Stories of incidents that occur in the “Ivory Tower” are not contained to its walls. Colleges and universities are open systems (Katz & Kahn, 1966; Scott & Davis, 2007) and external forces have an important impact on the organization (Harcleroad & Eaton, 2005), especially when one considers that potential future students and their parents make the decision of whether or not to attend a college in part based on their perception of what they read in the newspaper.

How welcoming the institution seems to its students and those who may be outsiders is important. If, as Gurin et al. claim, institutional efforts to foster opportunities for quality interactions and learning from diverse others promotes “active thinking and personal development” (2002, p. 338), then this study indicates that those institutional actions have the power to shape students’ perceptions of their climate.

Visible Leadership

Visible acts of leadership by members of the academic community were an important part of students’ perception of the campus climate. Typically when we think of university leadership we picture its president. The person in that role is seen as a symbolic leader who sets priorities, values, and expectations for the institution (Mortimer & Sathre, 2007). As such, what
the president says and does, or fails to say or do, plays a large part in how not only students, but also staff, faculty, and members of the public view the institution. That said, only one of the questions relating to visible leadership pertained directly to the president. Respondents also recognized actions taken by people at all levels and sectors of the institution, from academic leadership to academic support and from the faculty to the athletics department. Unsurprisingly, questions referring to the vague designation “staff” and the often perceived insulated elite “board of trustees” were the only ones that did not load onto the leadership factors. This indicates that the students’ see “the school” as being everyone and everything. Any person in the organization is seen as a representative of “it” or “they.” One recommendation is for institutions to use training, media, public addresses (such as convocations and state of the university speeches), policy, and symbolic cultural representations to instill in their members the value of diversity and a welcoming environment, and to encourage them to take action to make those things a reality on their campus.

**Things to Consider When Using the Perceptions of Climate Instrument**

**Institutional Type**

There are a couple of cautions to consider when using the PCI in addition to the ones already discussed in the limitations section of the Results chapter. First of all, this instrument has not been tested at minority-serving institutions, such as Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), and Tribal Colleges and Universities (TCUs). The second factor, Climate for Members of Underrepresented Groups, may play out differently on campuses where traditionally underrepresented groups are the majority. It’s possible that it will still be viable since 1) it encompasses many groups, most of which would still be underrepresented at those schools, and 2) these groups have traditionally
been, and still are, underrepresented in higher education in general. The instrument should be administered at these schools and analyzed to determine if the factor structure is consistent.

Validation work should also be done on other institutions not included in this merged dataset, including schools in the Western and Southern sections of the country, as well as private for-profit institutions. In addition, the dataset contained only one religiously-affiliated institution, which is another area that should be examined. In fact, there may be differences based on the type of religious affiliation, since Catholic colleges infuse faith into the curriculum by requiring courses in theology and promoting a classroom environment that encourages religious discussion, while Protestant institutions tend to separate faith from the curriculum and concentrate it into academic departments of divinity (Trainor, 2006). This instrument was based on a diverse collection of institutions, but the untested full diversity of the American system of higher education is even greater.

**Areas for Future Research**

**The Importance of Visible Leadership, Especially Related to Students**

Student leadership is an important and distinct aspect of visible leadership. It should not be forgotten that, of course, the respondents are all students. Therefore, their responses reflect their perspective. Future research should focus separately on both staff and faculty to determine if the factor structure varies based on this important role in the organization.

**Experiences and Perceptions of Both Staff and Faculty**

This study focused on the climate for students, but faculty members, staff members, and administrators also work, and sometimes live, on campus. Their experiences and perceptions should also be examined to get a full picture of the campus climate. This is important because evidence indicates that the personal and professional development of faculty members,
administrators, and staff members are influenced by their climate. Specifically in terms of gender, a study by Settles, Cortina, Malley, and Stewart (2006) provided evidence that sexual harassment and gender discrimination have a significant negative impact on the overall attitudes of women faculty toward employment in the academic sciences. Recall that Parker et al.’s (Parker, et al., 2003) meta-analytical SEM analysis showed that employees’ work attitudes mediated the effect of their perceptions of climate on their motivation and performance.

Research on other industries find similar results: “token” women (women in an environment of less than 15% women) in a variety of professions tend to perceive their organizational climates to be inequitable for women, and women in the construction industry who perceive a climate of gender inequity report more job stress and less job satisfaction, have higher turnover intentions, show lower affective commitment to the organization, and exhibit less helping behavior toward co-workers (King, et al., 2010).

Research has also examined the effects of race and negative organizational perceptions on employment turnover (McKay et al., 2007). In addition, Sears and Williams (1997) found that LGB faculty members who judge their campus climate more positively are more likely to feel personally supported and perceive their work unit as more supportive of hiring and promoting LGB faculty members than those who view their campus climate more negatively.

The influence of campus climate on overall employee satisfaction and subsequent productivity is further substantiated by research on how workplace discrimination and prejudice lead to lower health and well-being (i.e., anxiety, depression, and lower life satisfaction and physical health) and greater occupation dysfunction (i.e., organizational withdrawal and lower satisfaction with work, coworkers, and supervisors) (Silverschanz, et al., 2007; Waldo, 1999). These are not isolated research results; a large number of studies indicate that individuals’
perceptions of a negative work environment influence their work attitudes, motivation, and performance (Parker, et al., 2003).

This brief review of the effect of climate on the experiences of staff and faculty members illustrates both the overall lack of research in this area focused on higher education and the need for easily administrated survey instruments that can be used to collect information on these important populations. There are some questions related to hiring, promotion, and other employment practices on the TTM survey. In addition, faculty members answer the same questions regarding class climate as the students do. I would like to extend the work I began in this dissertation to create an instrument that measures staff and faculty perceptions of climate.

The Curriculum

There was one question about the curriculum in the survey: “Course content at [college/university] includes materials, perspectives, and/or experiences of people from historically underrepresented/marginalized groups.” Unfortunately, it did not load onto any of the factors, possibly because it was the only question about the curriculum. This is unfortunate because the educational practice is the core purpose and activity of higher education. Faculty, in general, report positive views on incorporating diversity into the classroom (Maruyama & Moreno, 2000), and research indicates that when an institution does incorporate diversity-related topics into its curriculum students perceive that it’s able to create a positive climate for diversity (Mayhew, Grunwald, & Dey, 2005). More questions should be added to try to examine this important experience. Maybe the question will better describe the climate if paired with others about the curriculum, in terms of culturally relevant pedagogy (Ladson-Billings, 1995) and culturally responsive teaching (Gay, 2002). The curriculum is such a core part of the collegiate experience that it must be assessed. Importantly, diversity in course content and among both the
faculty itself and the student body (i.e., structural diversity) are vital aspects of the educational enterprise that are under direct control of the institution through the faculty (American Association of University Professors, 2001; "Sweezy v. New Hampshire," 1959).

**The Climate for Majority Groups When It’s Distinct from the Majority Climate**

In general, questions related to the climate for dominant groups separated from their counterparts that focused on various groups that are traditionally underrepresented. This is most likely due to the fact that the majority sees that climate as natural and good because the climate reflects the majority. However, one factor persistently threatened to separate out during different iterations of the initial factor analysis when I adjusted the Oblimin delta value to try to obtain a cleaner factor structure. That factor was comprised of two questions: “How would you rate the overall campus climate for people who are Men?” and “How would you rate the overall campus climate for people who are Veterans or Active Military?” I conjectured that this factor was tapping into the perceived climate for “traditional masculinity” since the military and its members are typically seen as being masculine, even if the soldier is female.

What is many times lost in discussion of power, privilege, and difference is the effect of the persistent sexist or racial system on members of the dominant group, especially for those who do not, or do not wish to, conform to the stereotypical characteristics of the group. Or, perhaps in this case, the members of the organization are singling out as distinct one of the dominant characteristics of the environment: masculinity. This is interesting considering that women are enrolling in college at higher rates than men and the sample is 62% women. Regardless, members of the American armed forces live a juxtaposition between being called upon and appreciated vs. being criticized, misunderstood, and ostracized, especially when returning from active engagement. In addition, the news contains reports of the military facing resistance when
recruiting at college campuses, despite the long history of ROTC programs in American higher education (Thelin, 2004). These two simple survey questions may be beginning to tap into some aspects of the military and masculinity on college campuses, campuses which have a tenuous and varied relationship with the armed forces and are becoming more increasingly populated by women. This is an area that I have personal interest in, but have never studied. I look forward to reading more about the climate on college campuses for veterans and active duty military, as well as aspects of changing perspectives on traditional masculinity.
Conclusion

None of us truly live in isolation. We all live our lives through interacting with things, places, and other people. College students live and learn in the collegiate environment, whether they engage in a spirited conversation in a graduate seminar, commute to a technical college to take night classes to earn their certification, or chant “We Are…” at a football game with over 100,000 other people. How they perceive the institution has an influence on their learning and developmental outcomes. The findings from this dissertation suggest that an instrument widely used to assess campus climate, in actuality, specifically taps into students’ perceptions of the climate through their perceptions of three areas: the climate for members of underrepresented groups, how actively welcoming the institution is, and visible leadership at the institution. The Perceptions of Climate Instrument can help colleges and universities to examine their climate and identify areas for improvement, so that students can get the most out of their college education and continue on to be positive and effective citizens in our increasingly complicated and diverse world.
REFERENCES


Sijtsma, K. (2009). On the use, the misuse, and the very limited usefulness of Cronbach’s Alpha. *Psychometrika, 74*(1), 107-120. doi: 10.1007/S11336-008-9101-0


Department of Commerce.


Appendix A

SURVEY
Experiences

Overall, how comfortable are you with the climate (1=Very Uncomfortable 2=Uncomfortable 3=Neither 4=Comfortable 5=Very Comfortable)
1. at [college/university]
2. in your academic department/work unit
3. in your classes

Have you personally experienced any offensive, hostile, exclusionary, or intimidating conduct (harassing behavior) that has interfered with your ability to work or learn at? (0=Yes 1=No)

If yes, answer the following questions (Mark all that apply): (0=Yes 1=No)

1. What do you believe this conduct was based upon?
   1 = age
   2 = country of origin
   3 = educational level
   4 = English level proficiency
   5 = ethnicity
   6 = gender/gender identity
   7 = learning/cognitive disability
   8 = military/verteran status
   9 = parental status
   10 = psychological disability
   11 = physical characteristics
   12 = physical disability
   13 = political views
   14 = race
   15 = religion/spirituality
   16 = sexual orientation
   17 = socioeconomic class
   18 = status (faculty, staff, student)
   19 = immigrant status
   20 = gender expression
   88 = other

2. How did you experience this conduct?
   1 = I was the target of racial/ethnic profiling
   2 = I was the target of graffiti (e.g., event advertisements removed or defaced)
   3 = I received written comments
   4 = I received threatening phone calls
   5 = I received threats of physical violence
   6 = I received threats through e-mails
   7 = I was the target of physical violence
   8 = I observed others staring at me
   9 = I felt I was deliberately ignored or excluded
   10 = I was the target of derogatory remarks
11 = I felt intimidated/bullied
12 = I feared for my physical safety
13 = Someone assumed I was admitted or hired because of my identity
14 = I was the victim of a crime
15 = I feared getting a poor grade because of a hostile classroom environment
16 = I received a low performance evaluation or pay raise
17 = I was singled out as the “resident authority” due to my identity
18 = I felt isolated or left out when work was required in groups
19 = I felt isolated or left out because of my socioeconomic class
88 = other

3. Where did this conduct occur?
1 = at a campus event
2 = in a campus office
3 = in a class or lab
4 = in a faculty member’s office
5 = in a fraternity/sorority/Greek housing
6 = in a meeting with a group of people
7 = in a meeting with one other person
8 = in a public space on campus
9 = in a residence hall
10 = in athletic facilities
11 = in College dining facility
12 = in off-campus housing
13 = local community
14 = while walking on campus
15 = while working at a university/college job
88 = other

4. Who was the source of this conduct?
1 = academic advisor
2 = academic department chair
3 = administrator
4 = athletic staff
5 = Campus Safety officer
6 = Community member
7 = dining services staff
8 = don’t know source
9 = Faculty
10 = Member of a fraternity/sorority
11 = person that I supervise
12 = residence life staff
13 = student
14 = media
15 = student organization advisor
16 = supervisor/manager
17 = Teaching/Graduate Assistant
88 = other
5. Please describe your reactions to experiencing this conduct.
   1 = I felt embarrassed
   2 = I told a friend
   3 = I avoided the person who harassed me
   4 = I ignored it
   5 = I left the situation immediately
   6 = I confronted the harasser at the time
   7 = I didn’t know who to go to
   8 = I confronted the harasser later
   9 = I made a complaint to a employee/official
   10 = I felt somehow responsible
   11 = I didn’t report it for fear of retaliation
   12 = It didn’t affect me at the time
   13 = I sought support from counseling/advocacy services
   14 = I felt angry
   15 = I felt afraid
   16 = I did report it but my complaint was not taken seriously
   17 = I didn’t report it for fear that my complain would not be taken seriously
   88 = other

Have you observed or personally been made aware of any conduct (harassing behavior) directed toward a person or group of people at college/university that you believe has created an offensive, hostile, exclusionary, or intimidating working or learning environment? (0=Yes 1=No)

If yes, answer the following questions (Mark all that apply): (0=Yes 1=No)

1. What do you believe were the bases for this conduct?
   1 = age
   2 = country of origin
   3 = educational level
   4 = English level proficiency
   5 = ethnicity
   6 = gender/gender identity
   7 = learning/cognitive disability
   8 = military/verteran status
   8 = military/verteran status
   88 = other
   9 = parental status
   9 = parental status
   11 = physical charateristics
   12 = physical disability
   13 = political views
   10 = psychological disability
   14 = race
   15 = religion/spirituality
   88 = other
16 = sexual orientation
14 = race
17 = socioeconomic class
15 = religion/spirituality
18 = status (faculty, staff, student)
15 = religion/spirituality
19 = immigrant status
20 = gender expression

2. What forms of conduct have you observed or personally been made aware of?
   1 = Someone being racially/ethnically profiled
   2 = Graffiti (e.g., event advertisements removed or defaced)
   3 = Someone receiving derogatory written comments because of his/her identity
   4 = Someone receiving derogatory phone calls because of his/her identity
   5 = Someone receiving threats of physical violence
   6 = Someone receiving derogatory/unsolicited e-mails because of his/her identity
   7 = Someone being the victim of physical violence because of his/her identity
   8 = Someone being stared at because of his/her identity
   9 = Someone being deliberately ignored or excluded because of his/her identity
  10 = Someone receiving derogatory remarks because of his/her identity
  11 = Someone being intimidated/bullied because of his/her identity
  12 = Someone fearing for their physical safety because of his/her identity
  13 = The assumption that someone was admitted or hired because of his/her identity
  14 = Someone being the victim of a crime b/c of his/her identity
  15 = Someone receiving a poor grade because of a hostile classroom environment
  16 = Someone receiving a low performance evaluation or pay raise
  17 = Someone singled out as the “resident authority” due to his/her identity
  18 = Someone isolated or left out when work was required in groups because of his/her identity
  19 = Someone isolated or left out at college/univ because of his/her socioeconomic class
  88 = other

3. Where did this conduct occur?
   1 = at a campus event
   2 = in a campus office
   3 = in a class or lab
   4 = in a faculty member’s office
   5 = in a fraternity/sorority/Greek housing
   6 = in a meeting with a group of people
   7 = in a meeting with one other person
   8 = in a public space on campus
<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>in a residence hall</td>
</tr>
<tr>
<td>10</td>
<td>in athletic facilities</td>
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<tr>
<td>11</td>
<td>in College dining facility</td>
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<tr>
<td>12</td>
<td>in off-campus housing</td>
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<tr>
<td>13</td>
<td>local community</td>
</tr>
<tr>
<td>14</td>
<td>while walking on campus</td>
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<tr>
<td>15</td>
<td>while working at a university/college job</td>
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<tr>
<td>88</td>
<td>other</td>
</tr>
</tbody>
</table>

4. Who was the source of this conduct?

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>academic advisor</td>
</tr>
<tr>
<td>2</td>
<td>academic department chair</td>
</tr>
<tr>
<td>3</td>
<td>administrator</td>
</tr>
<tr>
<td>4</td>
<td>athletic staff</td>
</tr>
<tr>
<td>5</td>
<td>Campus Safety officer</td>
</tr>
<tr>
<td>6</td>
<td>Community member</td>
</tr>
<tr>
<td>7</td>
<td>dining services staff</td>
</tr>
<tr>
<td>8</td>
<td>don’t know source</td>
</tr>
<tr>
<td>9</td>
<td>Faculty</td>
</tr>
<tr>
<td>10</td>
<td>Member of a fraternity/sorority</td>
</tr>
<tr>
<td>11</td>
<td>person that I supervise</td>
</tr>
<tr>
<td>12</td>
<td>residence life staff</td>
</tr>
<tr>
<td>13</td>
<td>student</td>
</tr>
<tr>
<td>14</td>
<td>media</td>
</tr>
<tr>
<td>15</td>
<td>student organization advisor</td>
</tr>
<tr>
<td>16</td>
<td>supervisor/manager</td>
</tr>
<tr>
<td>17</td>
<td>Teaching/Graduate Assistant</td>
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<tr>
<td>88</td>
<td>other</td>
</tr>
</tbody>
</table>

5. Please describe your reactions to observing this conduct.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I felt embarrassed</td>
</tr>
<tr>
<td>2</td>
<td>I told a friend</td>
</tr>
<tr>
<td>3</td>
<td>I avoided the harasser</td>
</tr>
<tr>
<td>4</td>
<td>I ignored it</td>
</tr>
<tr>
<td>5</td>
<td>I left the situation immediately</td>
</tr>
<tr>
<td>6</td>
<td>I confronted the harasser at the time</td>
</tr>
<tr>
<td>7</td>
<td>I didn’t know who to go to</td>
</tr>
<tr>
<td>8</td>
<td>I confronted the harasser later</td>
</tr>
<tr>
<td>9</td>
<td>I made a complaint to an employee/official</td>
</tr>
<tr>
<td>10</td>
<td>I felt somehow responsible</td>
</tr>
<tr>
<td>11</td>
<td>I didn’t report it for fear of retaliation</td>
</tr>
<tr>
<td>12</td>
<td>It didn’t affect me at the time</td>
</tr>
<tr>
<td>13</td>
<td>I sought support from counseling/advocacy services</td>
</tr>
<tr>
<td>14</td>
<td>I felt angry</td>
</tr>
<tr>
<td>15</td>
<td>I was afraid</td>
</tr>
<tr>
<td>16</td>
<td>I did report it but my complaint was not taken seriously</td>
</tr>
<tr>
<td>17</td>
<td>I didn’t report it for fear that my complain would not be taken seriously</td>
</tr>
</tbody>
</table>
88 = other

I fear sexual victimization (harassment/assault) (0=Yes 1=No)

Have you ever been a victim of sexual assault? (0=Yes 1=No)

If yes, answer the following questions (Mark all that apply): (0=Yes 1=No)

1. Who was the offender? (Mark all that apply)
   1 = acquaintance
   2 = staff
   3 = student
   4 = faculty
   5 = current partner/spouse
   6 = Administrator
   7 = ex-partner/spouse
   8 = friend
   9 = relative
   10 = stranger
   88 = other

2. Where did this incident(s) occur? (Mark all that apply)
   1 = On Campus
   2 = Off Campus
   8 = Other

3. Please describe your response? (Mark all that apply)
   1 = I sought support from off-campus hot-line advocacy service
   2 = I told a friend
   3 = I told a family member
   4 = I told my resident assistant
   5 = I sought support from a university resource
   6 = I sought medical services
   7 = I contacted campus safety/security
   8 = I contacted local police
   9 = I sought support from a staff person
   10 = I sought support from a faculty member
   11 = I sought information on-line
   12 = I did nothing
   13 = I contacted my union
   88 = Other

As a student, I have had classes with the following: (1=Yes 0=No)

1. Faculty of Color
2. Faculty with a Disability
3. Female Faculty
4. International Faculty
5. Male Faculty
6. White Faculty
7. “Out” professor

As a student, I am comfortable requesting help from a: (1=Strongly Disagree 2= Disagree 3=Neither 4=Agree 5= Strongly Agree)
1. Faculty of Color
2. Faculty with a Disability
3. Female Faculty
4. International Faculty
5. Male Faculty
6. White Faculty
7. “Out” professor

As a student, how satisfied are you with your education at [college/univ]? (1=Highly Dissatisfied 2= Dissatisfied 3=Neither 4= Satisfied 5= Highly Satisfied)

As a student, how satisfied are you with the way your academic career has progressed at [college/univ]? (1=Highly Dissatisfied 2= Dissatisfied 3=Neither 4= Satisfied 5= Highly Satisfied)

Perceptions

The classroom climate is welcoming for students based on their: (1=Strongly Disagree 2= Disagree 3=Neither 4=Agree 5= Strongly Agree)
1. Age
2. Country of origin
3. Ethnicity
4. Psychological disability
5. Gender
6. Learning disability
7. Physical characteristics
8. Physical disability
9. Political views
10. Race
11. Religion
12. Sexual orientation
13. Socioeconomic status
14. Religion
15. Veterans/active military

How would you rate the accessibility of the campus for people with disabilities? (1 to 5)
1. Buildings
2. Physical Access
3. Course
4. Services/Co-Curricular
5. Other

How would you rate the overall campus climate for persons from the following racial/ethnic backgrounds? (1=Not at all Respectful 2=Moderately Disrespectful 3=Neither 4=Moderately Respectful 5= Very Respectful)
1. African/African American/Black
2. Asian/Asian American
3. Pacific Islander/Filipino/Hawaiian
4. Native American/Alaskan Native
5. Latino(a)s/Hispanics
6. Middle Eastern
7. Caucasian/White
8. Multiracial
9. Other

How would you rate the overall campus climate for people who are… (1=Not at all Respectful 2=Moderately Disrespectful 3=Neither 4=Moderately Respectful 5= Very Respectful)
1. From other than Christian Religion
2. From Christian affiliations
3. GLBT
4. International students/employees
5. Men
6. Non-native English speakers
7. People with children
8. People who provide care for other than a child (e.g., elder care)
9. Physically, mentally, emotionally challenged
10. Returning/non-traditional students
11. Socioeconomically disadvantaged
12. Women
13. Veterans/active military
14. Other

Using a scale of 1-5, please rate the overall campus climate at [college/univ] on the following: (1 to 5)
1. Accessible/inaccessible
2. Concerned/Indifferent
3. Cooperative/Uncooperative
4. Friendly/hostile
5. Improving/Regressing
6. Positive/Not positive (Christian)
7. Positive/Not positive (international)
8. Positive/Not positive (Jewish)
9. Positive/Not positive (LGBT)
10. Positive/Not Positive (low SES)
11. Positive/Not positive (Native American)
12. Positive/Not positive (non-native English speakers)
13. Positive/Not positive (other than Christian)
14. Positive/Not positive (raising children)
15. Postive/Not positive (Islamic)
16. Respectful/Disrespectful
17. Welcoming/non-welcoming

Using a scale of 1-5, please rate the overall campus climate at [college/univ] on the following dimensions: (1 to 5)
   1. Non-racist/Racist
   2. Non-sexist/Sexist
   3. Non-homophobic/Homophobic
   4. Not age biased/Age biased
   5. Not classist/Classist (SES)

**Perceptions of Institutional Actions**

[College/university] proactively addresses (takes actions designed to prevent) discrimination related to: (1=Strongly Disagree 2= Disagree 3=Neither 4=Agree 5= Strongly Agree)
   1. Age
   2. Employee status
   3. Ethnicity
   4. Gender
   5. International status
   6. Learning disability
   7. Non-native english speakers
   8. Parental status
   9. Physical characteristics
   10. Physical disability
   11. Psychological disability
   12. Race
   13. Religion
   14. Sexual orientation
   15. Socioeconomic class
   16. Veteran/active military
   17. Other

There is visible leadership that fosters inclusion of diverse members of the campus community from: (1=Strongly Disagree 2= Disagree 3=Neither 4=Agree 5= Strongly Agree)
   1. Senior Administration
   2. Academic Leadership
   3. Advocacy Units
   4. Student Services (undifferentiated)
   5. Enrollment Management/Admissions
   6. Human Resources
7. Religious/Spiritual Centers
8. Athletics
9. Board of Trustees
10. Campus Safety & Campus Security (Police Services)
11. Faculty Senate
12. Faculty
13. Academic Services/Support
14. Staff
15. Student Government
16. Student Organization
17. Development/Alumni
18. Academic Units
19. Other

Course content at [college/university] includes materials, perspectives, and/or experiences of people from historically underrepresented/marginalized groups. (1=Strongly Disagree 2= Disagree 3=Neither 4=Agree 5= Strongly Agree)

I believe that [college/university] values my involvement in diversity initiatives on campus. (1=Strongly Disagree 2= Disagree 3=Neither 4=Agree 5= Strongly Agree)
Appendix B

FACTOR TABLES AND HISTOGRAMS
<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Satisfaction with Collegiate Experience</td>
<td>0.764</td>
</tr>
</tbody>
</table>

**Variables** | Factor Loading | Mean | Standard Deviation |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>As a student, how satisfied are you with the way your academic career has progressed at [college/university]?</td>
<td>0.643</td>
<td>3.76</td>
<td>0.827</td>
</tr>
<tr>
<td>As a student, how satisfied are you with your education at [college/university]?</td>
<td>0.613</td>
<td>4.01</td>
<td>0.692</td>
</tr>
</tbody>
</table>

*Note: Scale for all items is 1=Highly Dissatisfied 2=Dissatisfied 3=Neither 4=Satisfied 5=Highly Satisfied.*

**Figure B. 1.** Histogram of Personal Satisfaction with Collegiate Experience
Table B. 2. *Factor Analysis for Interaction with Majority Faculty*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction with Majority Faculty</td>
<td>0.836</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have taken courses with: White Faculty</td>
<td>0.793</td>
<td>0.92</td>
<td>0.225</td>
</tr>
<tr>
<td>I have taken courses with: Male Faculty</td>
<td>0.760</td>
<td>0.94</td>
<td>0.203</td>
</tr>
<tr>
<td>I have taken courses with: Female Faculty</td>
<td>0.729</td>
<td>0.87</td>
<td>0.242</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Yes 0=No.

Figure B. 2. Histogram of Interaction with Majority Faculty

Mean = 10.00
Std. Dev. = 3.00
n = 14,784
Table B. 3. *Factor Analysis for Comfort Interacting with Diverse Faculty*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am comfortable requesting help: Faculty of Color</td>
<td>0.880</td>
<td>4.43</td>
<td>0.538</td>
</tr>
<tr>
<td>I am comfortable requesting help: Female Faculty</td>
<td>0.874</td>
<td>4.50</td>
<td>0.496</td>
</tr>
<tr>
<td>I am comfortable requesting help: White Faculty</td>
<td>0.860</td>
<td>4.51</td>
<td>0.505</td>
</tr>
<tr>
<td>I am comfortable requesting help: Faculty with a Disability</td>
<td>0.838</td>
<td>4.31</td>
<td>0.581</td>
</tr>
<tr>
<td>I am comfortable requesting help: Male Faculty</td>
<td>0.791</td>
<td>4.42</td>
<td>0.593</td>
</tr>
<tr>
<td>I am comfortable requesting help: International Faculty</td>
<td>0.747</td>
<td>4.25</td>
<td>0.649</td>
</tr>
<tr>
<td>I am comfortable requesting help: Out LGBT Faculty</td>
<td>0.737</td>
<td>4.22</td>
<td>0.619</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Strongly Disagree 2=Disagree 3=Neither 4=Agree 5=Strongly Agree.

Figure B. 3. Histogram of Comfort Interacting with Diverse Faculty
### Table B. 4. *Factor Analysis for Institutional Climate for Diversity*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Climate for Diversity</td>
<td>0.908</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate the overall campus climate: Sexist</td>
<td>0.819</td>
<td>3.72</td>
<td>1.036</td>
</tr>
<tr>
<td>Rate the overall campus climate: Racist</td>
<td>0.805</td>
<td>3.70</td>
<td>1.045</td>
</tr>
<tr>
<td>Rate the overall campus climate: Homophobic</td>
<td>0.783</td>
<td>3.49</td>
<td>1.108</td>
</tr>
<tr>
<td>Rate the overall campus climate: Classist (SES)</td>
<td>0.731</td>
<td>3.55</td>
<td>1.076</td>
</tr>
<tr>
<td>Rate the overall campus climate: Age Biased</td>
<td>0.665</td>
<td>3.82</td>
<td>0.960</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1 to 5 (for example, 1=Non-sexist to 5=Sexist).

### Figure B. 4. Histogram of Institutional Climate for Diversity
Table B. 5. *Factor Analysis for Welcoming/Personal Climate*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate the overall campus climate: Welcoming</td>
<td>0.766</td>
<td>4.01</td>
<td>0.890</td>
</tr>
<tr>
<td>Rate the overall campus climate: Respectful</td>
<td>0.764</td>
<td>3.91</td>
<td>0.886</td>
</tr>
<tr>
<td>Rate the overall campus climate: Cooperative</td>
<td>0.723</td>
<td>3.81</td>
<td>0.873</td>
</tr>
<tr>
<td>Rate the overall campus climate: Friendly</td>
<td>0.704</td>
<td>4.08</td>
<td>0.808</td>
</tr>
<tr>
<td>Rate the overall campus climate: Concerned</td>
<td>0.640</td>
<td>3.47</td>
<td>1.028</td>
</tr>
<tr>
<td>Rate the overall campus climate: Improving</td>
<td>0.640</td>
<td>3.75</td>
<td>0.877</td>
</tr>
<tr>
<td>I believe that [college/university] values my</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>involvement in diversity initiatives on campus</td>
<td>0.484</td>
<td>3.65</td>
<td>0.780</td>
</tr>
</tbody>
</table>

Note: Scale for items 1 through 6 is 1 to 5 (for example, 1=Non-welcoming to 5=Welcoming). Scale for the last item is 1=Strongly Disagree 2=Disagree 3=Neither 4=Agree 5=Strongly Agree.

Figure B. 5 Histogram of Welcoming/Personal Climate
Table B. 6. *Factor Analysis for Class is Welcoming*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class is Welcoming</td>
<td>0.965</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The classroom climate is welcoming for students based on their:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-0.855</td>
<td>3.80</td>
<td>0.850</td>
</tr>
<tr>
<td>Country of Origin</td>
<td>-0.848</td>
<td>3.85</td>
<td>0.793</td>
</tr>
<tr>
<td>Race</td>
<td>-0.819</td>
<td>3.76</td>
<td>0.952</td>
</tr>
<tr>
<td>Physical Characteristics</td>
<td>-0.749</td>
<td>3.73</td>
<td>0.872</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.741</td>
<td>3.99</td>
<td>0.797</td>
</tr>
<tr>
<td>Physical Disability</td>
<td>-0.738</td>
<td>3.68</td>
<td>0.865</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td>-0.721</td>
<td>3.66</td>
<td>0.903</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td>-0.690</td>
<td>3.60</td>
<td>0.942</td>
</tr>
<tr>
<td>Religion</td>
<td>-0.685</td>
<td>3.70</td>
<td>0.916</td>
</tr>
<tr>
<td>Age</td>
<td>-0.680</td>
<td>3.92</td>
<td>0.769</td>
</tr>
<tr>
<td>Veterans/Active Military</td>
<td>-0.667</td>
<td>3.82</td>
<td>0.816</td>
</tr>
<tr>
<td>Learning Disability</td>
<td>-0.664</td>
<td>3.62</td>
<td>0.869</td>
</tr>
<tr>
<td>Psychological Disability</td>
<td>-0.663</td>
<td>3.56</td>
<td>0.879</td>
</tr>
<tr>
<td>Political Views</td>
<td>-0.617</td>
<td>3.59</td>
<td>0.946</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Strongly Disagree 2=Disagree 3=Neither 4=Agree 5=Strongly Agree.
Figure B. 6. Histogram of Class is Welcoming
### Table B. 7. Factor Analysis for Climate for Underrepresented Identities

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate for Underrepresented Identities</td>
<td>0.950</td>
<td>Rate the overall campus climate for people who are:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Returning/Non-traditional</td>
<td></td>
<td>- Returning/Non-traditional</td>
<td>-0.775</td>
<td>3.09</td>
<td>0.595</td>
</tr>
<tr>
<td>English as a second language</td>
<td></td>
<td>- English as a second language</td>
<td>-0.771</td>
<td>3.00</td>
<td>0.662</td>
</tr>
<tr>
<td>Disability</td>
<td></td>
<td>- Disability</td>
<td>-0.756</td>
<td>3.02</td>
<td>0.647</td>
</tr>
<tr>
<td>SES</td>
<td></td>
<td>- SES</td>
<td>-0.751</td>
<td>2.99</td>
<td>0.705</td>
</tr>
<tr>
<td>Parental Status</td>
<td></td>
<td>- Parental Status</td>
<td>-0.750</td>
<td>3.10</td>
<td>0.599</td>
</tr>
<tr>
<td>International</td>
<td></td>
<td>- International</td>
<td>-0.749</td>
<td>3.15</td>
<td>0.601</td>
</tr>
<tr>
<td>Caregiver (other than children)</td>
<td></td>
<td>- Caregiver (other than children)</td>
<td>-0.733</td>
<td>3.13</td>
<td>0.598</td>
</tr>
<tr>
<td>Other than Christian</td>
<td></td>
<td>- Other than Christian</td>
<td>-0.697</td>
<td>3.14</td>
<td>0.606</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td>- Women</td>
<td>-0.663</td>
<td>3.23</td>
<td>0.607</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>- Other</td>
<td>-0.633</td>
<td>3.12</td>
<td>0.542</td>
</tr>
<tr>
<td>GLBT</td>
<td></td>
<td>- GLBT</td>
<td>-0.618</td>
<td>2.87</td>
<td>0.780</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Not at all Respectful 2=Moderately Disrespectful 3=Neither 4=Moderately Respectful 5=Very Respectful.
Figure B. 7. Histogram of Climate for Underrepresented Identities
Table B. 8. Factor Analysis for Climate for Underrepresented Racial/Ethnic Identities

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate for Underrepresented Racial/Ethnic Identities</td>
<td>0.925</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate the overall campus climate for persons from the following racial/ethnic backgrounds:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latino/Hispanic</td>
<td>0.828</td>
<td>3.40</td>
<td>0.921</td>
</tr>
<tr>
<td>Multi-Racial</td>
<td>0.819</td>
<td>3.52</td>
<td>0.901</td>
</tr>
<tr>
<td>Asian/Asian American</td>
<td>0.803</td>
<td>3.42</td>
<td>0.832</td>
</tr>
<tr>
<td>African/African American/Black</td>
<td>0.790</td>
<td>3.35</td>
<td>0.871</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>0.788</td>
<td>3.44</td>
<td>1.027</td>
</tr>
<tr>
<td>Native American/Alaskan Native</td>
<td>0.737</td>
<td>3.64</td>
<td>0.974</td>
</tr>
<tr>
<td>Pacific Islander/Filipino/Hawaiian</td>
<td>0.700</td>
<td>3.88</td>
<td>0.915</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Not at all Respectful 2=Moderately Disrespectful 3=Neither 4=Moderately Respectful 5=Very Respectful.

Figure B. 8. Histogram of Climate for Underrepresented Racial/Ethnic Identities
Table B. 9. *Factor Analysis for Accessibility*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>0.923</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate the accessibility of: Courses</td>
<td>-0.854</td>
<td>2.83</td>
<td>0.718</td>
</tr>
<tr>
<td>Rate the accessibility of: Physical access</td>
<td>-0.835</td>
<td>2.77</td>
<td>0.691</td>
</tr>
<tr>
<td>Rate the accessibility of: Buildings</td>
<td>-0.821</td>
<td>2.77</td>
<td>0.748</td>
</tr>
<tr>
<td>Rate the accessibility of: Services</td>
<td>-0.797</td>
<td>2.99</td>
<td>0.646</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1 to 5 (for example, 1=Not Accessible to 5=Accessible).

*Figure B. 9.* Histogram of Accessibility
### Table B. 10. Factor Analysis for Climate for Non-American Cultures

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive for Muslims</td>
<td>0.813</td>
<td>3.49</td>
<td>0.799</td>
</tr>
<tr>
<td>Positive for non-Christians</td>
<td>0.810</td>
<td>3.67</td>
<td>0.776</td>
</tr>
<tr>
<td>Positive for non-native English speakers</td>
<td>0.779</td>
<td>3.51</td>
<td>0.917</td>
</tr>
<tr>
<td>Positive for International people</td>
<td>0.761</td>
<td>3.74</td>
<td>0.881</td>
</tr>
<tr>
<td>Positive for Jews</td>
<td>0.730</td>
<td>3.84</td>
<td>0.726</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1 to 5 (for example, 1=Not Positive to 5=Positive).

### Figure B. 10. Histogram of Climate for Non-American Cultures
Table B. 11. *Factor Analysis for Visible Leadership*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible Leadership</td>
<td>0.969</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is visible leadership that fosters inclusion from:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development</td>
<td>-0.871</td>
<td>3.43</td>
<td>0.950</td>
</tr>
<tr>
<td>Academic Leadership</td>
<td>-0.857</td>
<td>3.46</td>
<td>0.933</td>
</tr>
<tr>
<td>Religious-Other</td>
<td>-0.827</td>
<td>3.48</td>
<td>0.879</td>
</tr>
<tr>
<td>Religious-HR</td>
<td>-0.807</td>
<td>3.46</td>
<td>0.918</td>
</tr>
<tr>
<td>Academic Support</td>
<td>-0.801</td>
<td>3.60</td>
<td>0.820</td>
</tr>
<tr>
<td>Senior Administration</td>
<td>-0.798</td>
<td>3.42</td>
<td>0.948</td>
</tr>
<tr>
<td>Enrollment Services</td>
<td>-0.778</td>
<td>3.54</td>
<td>0.862</td>
</tr>
<tr>
<td>Advocacy Units</td>
<td>-0.771</td>
<td>3.65</td>
<td>0.880</td>
</tr>
<tr>
<td>Faculty</td>
<td>-0.770</td>
<td>3.66</td>
<td>0.903</td>
</tr>
<tr>
<td>Academic Unit</td>
<td>-0.731</td>
<td>3.71</td>
<td>0.967</td>
</tr>
<tr>
<td>Athletics</td>
<td>-0.707</td>
<td>3.49</td>
<td>0.920</td>
</tr>
<tr>
<td>Safety</td>
<td>-0.649</td>
<td>3.43</td>
<td>0.871</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Strongly Disagree 2=Disagree 3=Neither 4=Agree 5=Strongly Agree.
Figure B.11. Histogram of Visible Leadership
Table B. 12. *Factor Analysis for Student-Related Leadership*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student-Related Leadership</td>
<td>0.927</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Organizations</td>
<td>-0.858</td>
<td>3.79</td>
<td>0.859</td>
</tr>
<tr>
<td>Student Government</td>
<td>-0.843</td>
<td>3.53</td>
<td>0.962</td>
</tr>
<tr>
<td>Senate</td>
<td>-0.812</td>
<td>3.50</td>
<td>0.894</td>
</tr>
<tr>
<td>Student Services</td>
<td>-0.789</td>
<td>3.58</td>
<td>0.891</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Strongly Disagree 2=Disagree 3=Neither 4=Agree 5=Strongly Agree.

Figure B. 12. Student-Related Leadership
Table B. 13. *Factor Analysis for Takes Action Related to Main Social Identities (Race/Ethnicity, Gender, LGBT, Religion)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takes Action Related to Main Social Identities (Race/Ethnicity, Gender, LGBT, Religion)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Institution] proactively addresses (takes actions designed to prevent) discrimination related to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.785</td>
<td>3.77</td>
<td>0.760</td>
</tr>
<tr>
<td>Race</td>
<td>0.765</td>
<td>3.86</td>
<td>0.782</td>
</tr>
<tr>
<td>Gender Expression</td>
<td>0.747</td>
<td>3.81</td>
<td>0.822</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td>0.715</td>
<td>3.70</td>
<td>0.823</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.707</td>
<td>3.82</td>
<td>0.759</td>
</tr>
<tr>
<td>International Status</td>
<td>0.673</td>
<td>3.84</td>
<td>0.704</td>
</tr>
<tr>
<td>Religion</td>
<td>0.662</td>
<td>3.65</td>
<td>0.781</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Strongly Disagree 2=Disagree 3=Neither 4=Agree 5=Strongly Agree.
Figure B. 13. Histogram of Takes Action Related to Main Social Identities (Race/Ethnicity, Gender, LGBT, Religion)
<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological Disability</td>
<td>0.854</td>
<td>3.60</td>
<td>0.730</td>
</tr>
<tr>
<td>Parental Status</td>
<td>0.818</td>
<td>3.50</td>
<td>0.708</td>
</tr>
<tr>
<td>Learning Disability</td>
<td>0.802</td>
<td>3.68</td>
<td>0.714</td>
</tr>
<tr>
<td>Physical Disability</td>
<td>0.800</td>
<td>3.73</td>
<td>0.754</td>
</tr>
<tr>
<td>Physical Characteristics</td>
<td>0.795</td>
<td>3.58</td>
<td>0.756</td>
</tr>
<tr>
<td>Age</td>
<td>0.721</td>
<td>3.49</td>
<td>0.730</td>
</tr>
<tr>
<td>Veterans/Active Military</td>
<td>0.713</td>
<td>3.46</td>
<td>0.738</td>
</tr>
<tr>
<td>English as a second language</td>
<td>0.711</td>
<td>3.63</td>
<td>0.738</td>
</tr>
<tr>
<td>Status at University</td>
<td>0.683</td>
<td>3.63</td>
<td>0.702</td>
</tr>
<tr>
<td>SES</td>
<td>0.679</td>
<td>3.43</td>
<td>0.830</td>
</tr>
</tbody>
</table>

Note: Scale for all items is 1=Strongly Disagree 2=Disagree 3=Neither 4=Agree 5=Strongly Agree.
Figure B.14. Histogram of Takes Comprehensive Action
Table B. 15. *Factor Analysis for Actively Welcoming Institution*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actively Welcoming Institution</td>
<td>0.869</td>
</tr>
<tr>
<td>Welcoming/Personal Climate</td>
<td>Factor Loading</td>
</tr>
<tr>
<td>Welcoming/Personal Climate</td>
<td>0.724</td>
</tr>
<tr>
<td>Takes Action Related to Main Social Identities (Race/Ethnicity, Gender, LGBT, Religion)</td>
<td>0.594</td>
</tr>
<tr>
<td>Takes Comprehensive Action</td>
<td>0.562</td>
</tr>
<tr>
<td>Climate for Non-American Cultures</td>
<td>0.545</td>
</tr>
</tbody>
</table>

Note: All scales are continuous variables.

Figure B. 15. Histogram of Actively Welcoming Institution
Table B. 16. *Factor Analysis for Climate for Members of Underrepresented Groups*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate for Members of Underrepresented Groups</td>
<td>0.845</td>
</tr>
<tr>
<td>Climate for Underrepresented Identities</td>
<td>0.785</td>
</tr>
<tr>
<td>Institutional Climate for Diversity</td>
<td>0.599</td>
</tr>
<tr>
<td>Class is Welcoming</td>
<td>0.551</td>
</tr>
<tr>
<td>Accessibility</td>
<td>0.495</td>
</tr>
</tbody>
</table>

Note: All scales are continuous variables.

Figure B. 16. Histogram of Climate for Members of Underrepresented Groups
Table B. 17. *Factor Analysis for Visible Leadership*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
<th>Visible Leadership</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible Leadership</td>
<td>0.932</td>
<td>Yes</td>
<td>0.825</td>
<td>10.00</td>
<td>3.000</td>
</tr>
<tr>
<td>Student-Related Leadership</td>
<td></td>
<td>Yes</td>
<td>0.811</td>
<td>10.00</td>
<td>3.000</td>
</tr>
</tbody>
</table>

Note: All scales are continuous variables.

![Histogram of Visible Leadership](image)

Figure B. 17. Histogram of Visible Leadership
Table B. 18. *Factor Analysis for Perceptions of Climate*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach’s α</th>
<th>Perceptions of Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>Factor</td>
<td>Mean</td>
</tr>
<tr>
<td>Actively Welcoming Institution</td>
<td>0.970</td>
<td>10.00</td>
</tr>
<tr>
<td>Climate for Members of Underrepresented Groups</td>
<td>0.849</td>
<td>10.00</td>
</tr>
<tr>
<td>Visible Leadership</td>
<td>0.589</td>
<td>10.00</td>
</tr>
</tbody>
</table>

Note: All scales are continuous variables.

*Figure B. 18.* Histogram of Perceptions of Climate
EDUCATION

Doctor of Philosophy: Higher Education
The Pennsylvania State University (PSU) University Park, PA
August 2011

Master of Arts: Higher Education
The University of Michigan (UM) Ann Arbor, MI
April 2008

Master of Education: Counselor Education, College Student Personnel
The Pennsylvania State University (PSU) University Park, PA
May 1998

Bachelor of Science: Psychology
Kansas State University (KSU) Manhattan, KS
May 1996

SCHOLARSHIPS & FELLOWSHIPS

Doris M. Niebel Scholarship in Education, PSU
2010 - 2011

National Summer Data Policy Institute Fellowship
June 2010

Glenn and Nancy Gamble Endowed Scholarship in Education, PSU
1997 - 1998

CURRENT EMPLOYMENT

Graduate Student Research Assistant & Teaching Assistant
The Center for the Study of Higher Education, PSU
Spring 2009 – present

PAPERS/PRESENTATIONS

Referred Journal Articles and Conference Proceedings


Referred Conference Papers and Posters


