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Racial Diversity, Racial Bias, and Students' Well-Being within Collegiate Micro-Clim

Eikenburg, Lindsey Brooke

Princeton, NJ : Princeton University

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RACIAL DIVERSITY, RACIAL BIAS, AND STUDENTS' WELL-BEING WITHIN COLLEGIATE MICRO-CLIMATES

Lindsey B. Eikenburg

A DISSERTATION

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Abstract

Disparities in health, belonging, and academic achievement still persist between racial/ethnic minority and White college students. While previous research has demonstrated that college students' experiences with their peers shape their well-being, most of this research has not investigated the larger social structures that minorities inhabit during college. Thus, this dissertation explores how the racial composition of and the racial bias within collegiate micro-climates—smaller, distinct groups within larger communities—are associated with students' mental and physical health, belonging, and academic outcomes. Chapter 1 examines how different conceptualizations of racial diversity, which have been conflated in previous research, are related to students' well-being. Specifically, I was interested in whether both minority and White students fare better in micro-climates where there is greater ingroup and minority representation, respectively. I examined the racial composition of dormitory halls (Study 1), dorm rooms (Studies 2a and 2b), and undergraduate student bodies (Study 3) and found that the racial composition of these micro-climates was associated with students' outcomes. While the evidence was mixed as to whether greater racial diversity was beneficial, the results did suggest that the way racial diversity is operationalized matters, particularly for minorities. Chapter 2 focuses on minorities and explores how being in a racially biased micro-climate may influence their well-being. I measured the racial attitudes of minority students' White hallmates to test whether hallmate bias was negatively associated with minorities' outcomes, above and beyond minorities' perceptions of bias (Study 4). I found almost no evidence of a relationship between hallmate racial bias and minorities' well-being. The unanticipated findings across both chapters highlight the need for more research examining how the various social groups minority students belong to may contribute to their mental and physical health, belonging, and academic success.

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Racial Diversity, Racial Bias, and Students' Well-Being in Collegiate Micro-Climates

Over the past 20 years, racial/ethnic minority enrollment in college, particularly that of Blacks and Latinos, has continued to increase. From 2000 to 2017, the percentage of Black Americans enrolled in college has increased from 31% to 36% and the percentage of Hispanic Americans enrolled has increased from 22% to 36% (McFarland et al., 2019). Despite the increased number of minority[1] students on college campuses, large gaps in academic achievement (e.g., Harackiewicz et al., 2016) and graduation rates (e.g., Eberle-Sudre et al., 2015) still persist between Whites and minorities, particularly Blacks and Latinos. Moreover, minority students experience more severe psychological symptoms (e.g., Kearney et al., 2005), are less likely to engage in health promoting behaviors, like exercising and seeing a doctor (e.g., Despues & Friedman, 2007), and report lower levels of belonging in college (e.g., Museus et al., 2017) than their White counterparts. These gaps in academic achievement, health, and belonging between minority students and White students are worrisome as they have implications for minorities' well-being and success in college but also their life post-college. Therefore, it is imperative to understand what about minorities' experiences on college campuses might be contributing to these disparities.

I am particularly interested in how minorities' experiences with other students whom they may encounter regularly is related to their health, belonging, and academic outcomes. College is an environment that fosters both learning and intellectual development (Antonio, 2004; Kuh, 1995) as well as development of one's identity and beliefs (Gurin, 1999). While time spent in the classroom and engaging with academic material is one way college fosters this development, previous research has found (Antonio, 2004; Renn & Arnold, 2003), and even students

[1] For the rest of the dissertation I will refer to racial/ethnic minorities as minorities unless otherwise specified.

themselves report (Kuh, 1995), that their time spent outside of the classroom with their peers plays a large role in this development. However, much of the research examining peer effects on college students has studied the impact of peers at the individual level (e.g., minorities' perceptions of their peers) (Billingsley & Hurd, 2019) and the interpersonal level (e.g., interactions with a single individual) (Shook & Clay, 2012). One critique of this research is that it overlooks the larger social structures within which minority college students are embedded, and thus overlooks how more macro-level factors (e.g., organizational policies) contribute to stigmatized group members' outcomes (Hatzenbuehler, 2016). Therefore, I am interested in investigating how different aspects of specific social groups that minority college students belong to, or micro-climates, impact minorities' health, belonging, and academic outcomes.

I define micro-climates as smaller, distinct groups within larger communities in which members have the opportunity to encounter each other. I believe the term micro-climate is apt because a specific group of people who may frequently come into contact with one another will likely create a unique social environment, or climate. Every micro-climate will then have its own set of norms for behavior and attitudes, and these norms will likely have downstream consequences for all members of that micro-climate. The idea that the specific social environments that individuals belong to can influence their outcomes is present in previous psychological theory. Urie Bronfenbrenner's (1993) concept of a microsystem entails that an individuals' relationship with the various "physical, social, and symbolic" aspects of a particular "face-to-face setting" can impact their development. However, microsystems incorporate many features of an environment, while micro-climates are focused on the social elements of these groups. Moreover, both Bronfenbrenner' ecological systems model (1977) and theories regarding structural stigma (Hatzenbuehler, 2016) emphasize the significance of factors outside of one's

immediate environment, like cultural norms, to an individuals' development and health outcomes. However, I believe the term micro-climate helps to emphasize that the smaller, distinct social groups that individuals belong to within a particular culture will also have their own characteristics and norms that the individuals within those groups must contend with.

One particular kind of micro-climate I am interested in are those in which the members of the micro-climates may choose to be part of that particular group, but they do not get to decide on who else joins the micro-climate, unlike with friendship groups. For example, students choose which college to attend but they do not choose who else attends their college. Employees choose where they work but they largely have no say in who their colleagues are. Nevertheless, they must try to successfully navigate this group as these are individuals with whom they are likely coming into contact with frequently. Belonging to and coping with various micro-climates likely constitutes a meaningful portion of college students' time and hence may have downstream consequences for their health, belonging, and academic outcomes.

The racial diversity of a micro-climate is one factor that may be related to minority students' well-being. In other words, how is the mere presence of members of particular racial/ethnic groups related to minority students' health, belonging, and academic outcomes. Previous research has demonstrated a link between racial diversity and minorities' mental health, physical health (Hutchinson et al., 2009; Rucinski et al., 2019), sense of belonging (Walsemann, Bell, & Maitra, 2011), and intellectual outcomes (Brodbeck et al., 2011; Gurin, 1999). However, there are several ways to operationalize racial diversity and previous research has generally conflated these different definitions of diversity. Some researchers have defined diversity using minority representation (Jayakumar, 2008; Walsemann, Bell, & Maitra, 2011) while others have focused on ingroup representation of particular minority groups (Hutchinson et al., 2009; Museus

et al., 2012). However, very few studies have included multiple measures of diversity, which makes it unclear how these different conceptualizations of diversity may be independently, or differentially, contributing to minorities' experiences. Moreover, much less research has examined how racial diversity is related to White students' outcomes, particularly their health, which may provide greater understanding as to how different kinds of racial diversity may benefit different groups. Thus, I want to extend previous research by examining how different conceptualizations of racial diversity, both ingroup and minority representation, are related to minority and White students' health, belonging, and academic outcomes.

I am interested in examining this question across 3 particular collegiate micro-climates: the undergraduate student body, dormitory halls, and dorm rooms. Previous research has demonstrated that other students at a university (Kuh, 1995; Renn & Arnold, 2003), hallmates (Boekeloo et al., 2009; Hoel et al., 2005), and roommates (Erb et al., 2014; Li & Guo, 2016) are linked to students' health, belonging, and academic outcomes. However, there is limited evidence regarding how the racial diversity of these 3 micro-climates is associated with these outcomes. Most of the research regarding the racial diversity of the collegiate student body has focused on academic outcomes (Gurin, 1999; Museus et al., 2012). Additionally, there are only a handful of studies that examine the association between the racial diversity of dormitory halls and dorm rooms and students' mental health (Trail et al., 2009), belonging (Shook & Clay, 2012), and academic outcomes (Shook & Clay, 2012; Shook & Fazio, 2008). Moreover, none of the previous research on racial diversity across these 3 micro-climates, to my knowledge, has examined how different conceptualizations of diversity are related to students' outcomes. In particular, the aforementioned studies on roommates have only examined roommate pairs, which makes it impossible to distinguish the independent effects of ingroup and minority representation

on students' outcomes. Examining 3 different micro-climates also enables me to test whether the impact of racial diversity differs across different micro-climates. Therefore, I will investigate how ingroup and minority representation of the student body, dormitory halls, and dorm rooms, are associated with minorities' health, belonging, and academic outcomes.

In addition to racial diversity, I am interested in examining how the racial attitudes (i.e., racial bias) of the members of a micro-climate are related to minorities' health, belonging, and academic outcomes. Minorities who report a greater frequency of racial discrimination suffer a host of adverse mental and physical health outcomes (Todorova et al., 2010), as well as report less academic engagement (Neblett et al., 2006) and a lower sense of belonging (Hurtado et al., 2007). However, much of this work utilizes self-reports and is criticized for only demonstrating that minorities who believe they have experienced bias, which could be all in their head, are worse off. Recent research has addressed this critique, as well as calls to examine structural contributions to racial disparities (Hatzenbuehler, 2016), by measuring aggregate levels of implicit and explicit bias. Aggregated levels of racial bias predict various racial disparities in health (Leitner et al., 2016; Orchard & Price, 2017) and education (Riddle & Sinclair, 2019). However, these studies have only examined the impact of bias on a societal level (e.g., counties, metropolitan areas), so it is important to test whether these results extend to other micro-climates. There is evidence that minorities report racist slights in their residence halls (Harwood et al., 2012), which suggests that dormitory halls would be an ideal context to explore whether racially biased micro-climates are associated with minority students' health, belonging, and academic outcomes.

Overview of Studies

This dissertation will examine how two aspects of collegiate micro-climates are related to minority students' mental health, physical health, belonging, and academic outcomes. The first chapter will explore whether the racial composition of micro-climates is associated with students' health, belonging, and academic outcomes across 4 studies. Specifically I will examine whether minority students fare better (mentally, physically, socially, academically) in micro-climates where there are a greater number of ingroup members and a greater number of minorities overall. It is also interesting to consider whether everyone, regardless of race, fares better when there are more members of their ingroup within a micro-climate or whether the importance of ingroup members is something specific to minorities as they are often the numerical minority on college campuses. Thus, I will investigate whether White students fare better (mentally, physically, socially, academically) in micro-climates where there are a greater number of ingroup members and a greater number of minorities overall. I will examine the racial composition of dormitory halls (Study 1), dorm rooms (Studies 2a and 2b), and the undergraduate student body (Study 3).

The second chapter will explore how the attitudes of the individuals within a micro-climate are associated with student's outcomes. In this chapter, I will narrow in on minorities' experiences and investigate whether being in a micro-climate with racially biased Whites, above and beyond perceptions of racial bias, is associated with minorities' mental health, physical health, belonging, and academic outcomes. I will only be examining the racial bias on students' dormitory halls because only Study 1 included measures of racial bias. Thus, Study 4 will utilize the same data set as Study 1 to test whether having racially biased White hallmates is associated with minorities' health, belonging, and academic outcomes.

Chapter 1: Racial Composition of Micro-Climates:

Health, Belonging, and Academic Implications for Minorities and Whites

After passage of the Civil Rights Act of 1964, institutions of higher learning were tasked with desegregating their institutions and integrating students of color (*United States v. Fordice*, 1992). In response, colleges and universities developed a number of policies, like affirmative action, that would help them achieve greater racial diversity. However, the policies that were designed to increase minority admission have received much criticism. In the landmark *Regents of University of California v. Bakke* (1978), Justice Powell argued that race can be used as one factor in admissions decisions as long as greater racial diversity contributes positively to students' educational experiences. Since then, many researchers have sought to examine whether greater racial diversity produces any educational benefits for students in primary to post-secondary schools. Additionally, researchers have also examined how racial diversity in other contexts, like workplaces and neighborhoods, is associated with other performance outcomes as well as mental and physical health. However, one important factor to consider when interpreting this research is how racial diversity is defined.

Definitions of Racial/Ethnic Diversity

Structural diversity refers to the actual numerical or proportional representation of a particular group in a context. However, researchers studying racial diversity have operationalized this term differently. Some researchers have operationalized structural diversity through the lens of greater heterogeneity (Chang, 1999; Jones, 2013). In these cases, contexts are more racially diverse when there is equal representation across all racial/ethnic groups. Other researchers have captured structural diversity by measuring the amount of minorities, not differentiated by race, or the amount of Whites within a context (Jayakumar, 2008; Walsemann, Bell, & Maitra, 2011).

Contexts with more minorities or less White are more diverse. Still, other research operationalizes structural diversity by measuring the number of same-race others members of particular minority groups have in a specific context (Hutchinson et al., 2009; Museus et al., 2012). As with the previous method, contexts are considered more diverse when there are greater numbers of same-race individuals of a particular minority group. Despite all of these different conceptualizations of racial diversity, researchers have largely found that greater racial diversity confers various academic performance, belonging, and health benefits.

Benefits of Racial/Ethnic Diversity

A large portion of the literature on the benefits of racial diversity has focused on its relationship to a variety of academic outcomes. Both correlational and experimental work has found that minority and White college students who attend colleges/universities or are in classes and task groups with greater racial diversity demonstrate higher levels of intellectual self-confidence (Chang, 1999; Gurin, 1999), greater integrative complexity (Antonio et al., 2004), gains in problem-solving skills (Terenzini et al., 2001), better task performance (Brodbeck et al., 2011), and greater likelihood of persistence in college (Museus et al., 2012). Additionally, minority students assigned to a White roommate have higher GPA's than those assigned to a same-race roommate (Shook & Clay, 2012; Shook & Fazio, 2008). Gurin (1999) posits that greater racial diversity is associated with positive academic outcomes through its positive relationship with interracial contact (Jones, 2013; Pike & Kuh, 2006). Interpersonal interactions with diverse others are positively related to cognitive development (Bowman, 2010) because being exposed to different opinions motivates people to reexamine their own perspective (Nemeth & Wachtler, 1983), which involves skills like recognizing (Nemeth et al., 1992) and integrating multiple perspectives (Gruenfeld et al., 1998). Thus, students in micro-climates with

greater racial diversity should be exposed to a greater variety of opinions and engage in more complex reasoning. Using these cognitive skills more often may cause this active mode of thought to become students' default way of thinking and benefit them in their academic endeavors. Therefore, students in micro-climates that are more racially diverse should have better academic outcomes because of diversity's positive impact on critical reasoning.

Racial diversity is also related to students' sense of belonging to their school. Not only is college students' sense of belonging related to their mental health (Civitci, 2015), it is also related to their academic performance (Walton & Cohen, 2007), which may be especially true for minority students (Murphy & Zirkel, 2015). Previous research has demonstrated that minorities are less interested in and trust fictional companies less when they are depicted to have lower racial diversity (Purdie-Vaughns et al. 2008) because they anticipate less belonging in these contexts (Lee & Park, 2011; Murphy et al., 2007; Murphy & Zirkel, 2015; Purdie-Vaughns et al., 2008). Additional research has demonstrated that minorities' intuition about a link between racial diversity and sense of belonging is well-founded with regards to educational contexts. Minority adolescents who attend more racially diverse schools are less likely to feel lonely (Juvonen et al., 2006, 2018), report a greater sense of belonging at school (Walsemann, Bell, & Maitra, 2011) and greater attachment to their school (Johnson et al., 2001). Similarly, minority college students often report feeling disconnected from other students (Davis et al., 2004) and that they don't fit in (Chavous et al., 2002) at Predominately White Institutions (PWI's), which are low in racial diversity. Moreover, minority college students with a White roommate feel a greater sense of belonging to their university than those with a same-race roommate (Shook & Clay, 2012). While greater racial diversity is related to a greater sense of belonging at school for minority students, the relationship between racial diversity and White students' sense of belonging is less

clear. Greater racial diversity at the school level is associated with lower levels of loneliness (Juvonen et al., 2018) and greater overall satisfaction with school (Chang, 1999) for Whites, but White college students also anticipate greater belonging in academic departments with fewer minorities (Murphy & Zirkel, 2015). Thus, racial diversity seems to be an important aspect of micro-climates that contributes not only to students' academic performance but also students' sense of belonging in college, particularly for minorities.

Lastly, there is research demonstrating a link between racial diversity and minorities' mental and physical health. Minority adolescents who attend schools with greater racial diversity have greater life satisfaction (Seaton & Yip, 2009), lower depressive symptoms, and report lower levels of somatic symptoms (e.g., feeling sick, sleep problems) (Walsemann, Bell, & Maitra, 2011). Racial diversity can serve as a cue as to whether or not a particular setting will be identity threatening, i.e., whether one will be treated negatively because of one's social identity (Purdie-Vaughns et al., 2008). This concern is believed to be stressful (Major & O'Brien, 2005) and research has shown that low levels of diversity can trigger a physiological stress response, like greater skin conductance and faster heart rate (Murphy et al., 2007). It is reasonable to suspect that undergoing these kinds of stress responses with any regularity would lead to long-term negative consequences to one's health. There is also evidence that minority students report more racial discrimination at colleges with lower racial diversity (Bécares et al., 2018; Davis et al., 2004), which is also associated with negative health outcomes (Pascoe & Smart Richman, 2009). Thus, it follows that greater racial diversity is associated with mental and physical health benefits for minorities due to lower levels of identity threat and less discrimination in diverse contexts.

As for Whites, there is again mixed evidence as to whether or not racial diversity is related to better health. Some studies have found that greater racial diversity in classrooms and

schools is negatively related to depression (Rucinski et al., 2019) and externalizing (Benner & Crosnoe, 2011) for White students, while others have found it positively related to Whites' depressive and anxiety symptoms (Fisher et al., 2014). Additionally, both White and minority students randomly assigned to an interracial roommate reported less positive emotions than students with a same-race roommate (Trail et al., 2009). Thus, while greater racial diversity should be related to positive outcomes for minority college students' mental and physical health, it is unclear whether greater racial diversity should be related to positive health outcomes for White students.

Importance of Ingroup Representation

As mentioned at the beginning of this literature review, previous research has operationalized racial diversity in several ways. Moreover, the literature largely demonstrates that greater racial diversity, operationalized in different ways, is associated with positive mental health, physical health, belonging, and academic outcomes. However, by not investigating the independent contributions of different definitions of diversity, it is unknown whether some conceptualizations of diversity may be more strongly associated with students' outcomes than others and whether this may differ for different racial/ethnic groups. Moreover, a context that meets one definition of racial diversity may not meet another definition of racial diversity, which makes it unclear what an optimally diverse environment looks like. Racial diversity measured in terms of greater minority representation means that a group is more racially diverse when there are more minorities and fewer Whites. However, having greater numbers of minorities in a social group may still result in a large number of outgroup members for individual members of a particular minority group. For example, a group of 8 people in which 2 people identify as White, 1 identifies as Asian, 2 identify as Black, and 3 identify as Latinx is racially diverse in terms of

minority representation, but some minorities have 0 or 1 fellow ingroup members in the group. Being in a diverse group where there are several members of your ingroup versus being in a diverse group where there are little to no members of your ingroup are likely very different experiences. While previous literature suggests that either experience is better than having few minorities or few ingroup members within a social group, it is unclear which experience may be better for students' health, belonging and academic outcomes.

Previous research suggests that the number of ingroup members within a particular context may be particularly relevant for minorities. Kanter's (2008) work on tokenism argues that an individual whose social category is underrepresented in a particular context will experience increased pressure to perform well, social isolation, and will be stereotyped due to their high visibility and noticeable dissimilarity from the rest of the group. Correlational studies on token status in existing social groups and experimental studies on solo status support these claims. Being a token woman or racial minority in the workplace is positively associated with greater perceptions of inequality, greater stress (King et al., 2010), greater perceived dissimilarity from one's peers, and lower job satisfaction (Niemann & Dovidio, 1998). Experimental studies on solo status have demonstrated similar findings. Solo women within a group of men perform worse than women in a group of other women (Inzlicht & Ben-Zeev, 2000, 2003; Sekaquaptewa & Thompson, 2002, 2003). Similarly, Black women in a group of White women scored lower on a learning task than Black women in a group of other Black women (Sekaquaptewa & Thompson, 2002). However, men and White women are unaffected by solo status regarding gender and race, respectively (Inzlicht & Ben-Zeev, 2000; Sekaquaptewa & Thompson, 2002, 2003). These findings suggest that members of underrepresented groups are uniquely affected by the presence, or absence, of ingroup members in a particular context.

However, the work on tokenism and solo status only compare environments that differ in terms of ingroup vs. dominant outgroup membership, and do not consider the presence of members of other underrepresented groups. Other research examining both ingroup and minority representation suggest that ingroup representation may be more important to minorities than minority representation. Minorities are more likely to think about their own group (Unzueta & Binning, 2010) and are only concerned with the hierarchical representation of their own group (Unzueta et al., 2012) than other minority groups when asked to think about diversity generally or when asked to characterize the diversity of a fictional company. Minorities also rate a team as more diverse when there are a greater number of ingroup members present than teams with an equal number of outgroup minority members (Bauman et al., 2014). If minorities are more likely to consider a group as diverse when there is greater ingroup representation, then greater ingroup representation may be more strongly related to minorities' well-being.

While very little research has compared how different measurements of racial diversity are associated with students' outcomes, the studies that do exist suggest that greater ingroup representation may provide an added benefit to or a stronger benefit than greater minority representation. While adolescents who were not members of the racial/ethnic majority group in their classroom were more likely to report loneliness, adolescents with a greater number of ingroup members in their class were protected against loneliness (Madsen et al., 2016). Moreover, racial diversity operationalized as greater heterogeneity was unrelated to loneliness (Madsen et al., 2016). A review on the effects of school-level racial composition on mental health surmised that although ingroup representation is related to protective effects for minorities' mental health, the evidence regarding the protective effects of greater racial heterogeneity is not as robust (DuPont-Reyes & Villatoro, 2019). There is also evidence that a greater number of ingroup members may provide unique benefits for minority college students'

academic outcomes. Minority business students performed best when they were low in individual racial dissimilarity from their classmates in racially heterogeneous work groups (Brodbeck et al., 2011). So not only do minorities consider their ingroup more when they conceptualize diversity, but they also seem to receive unique benefits related to being in environments with more members of their ingroup. However, there are only a couple of studies that examine how different conceptualizations of diversity are related to students' outcomes and these studies have only measured classroom/class diversity. Therefore, I wanted to test whether ingroup representation and minority representation in various collegiate micro-climates are related to students' health, belonging, and academic outcomes.

Current Studies

In this chapter I explored whether the racial composition of various collegiate micro-climates was associated with college students' health, belonging, and academic outcomes. Across 4 studies, racial composition was operationalized in 2 ways, proportion of ingroup students and proportion of minority students, in order to better discern how different conceptualizations of diversity are related to students' outcomes. I chose to incorporate these measures of racial composition because these methods are widely used in the diversity literature and they allow me to distinguish the individual contributions seeing one's group represented or seeing less of the majority group within a micro-climate may have for minorities. However, there are other ways to operationalize racial composition, which I will address in the general discussion. Therefore, my first research question assessed whether college students fared better (mentally, physically, socially, academically) in micro-climates where there were a greater number of ingroup members, and if this relationship was moderated by student race such that the effects were different for minority and White students. My second research question examined

whether students fared better in micro-climates where there were a greater number of minorities overall, and again if this relationship is different for minorities and Whites.

In Study 1, I investigated whether the racial composition of minority and White students' dormitory halls at a private, northeastern university was associated with various measures of mental health, physical health, belonging, and academic outcomes. Studies 2a and 2b explored if the racial composition of minority and White students' dorm rooms was associated with students' mental health, belonging, and academic outcomes. Study 2a was conducted at 6 American universities, including both private and public institutions, and only included measures of students' mental health. Study 2b was conducted at a public university on the West coast and only included measures of students' belonging and academic outcomes. Study 3 tested whether the racial composition of the undergraduate student bodies at 109 American universities, including both private and public institutions, was associated with minority and White students' mental health, physical health, and academic outcomes. See Table 1 for a summary of all of the measures included across the 4 studies.

While the samples used in each study differ in a few ways, there are several sample characteristics that remained consistent across each study. First, only first year undergraduate students who lived on campus were included. The effects of racial diversity are likely felt more poignantly among students who live on campus as they are fully enmeshed in campus life. Moreover, students' experiences in their first year are likely consequential to how they view and experience their subsequent years in college. Secondly, any participants who self-identified as bi-racial or multi-racial were excluded, as it is unclear who these individuals consider ingroup members. Lastly, only students who self-identified as Black, Latinx, and Asian were considered as minorities as these were the only minority groups that were present across all 4 studies.

While Black, Latinx, and Asian participants were included, race was dichotomized into minorities and Whites for all analyses, which were pre-registered. One reason I chose to collapse across race for minorities was to conserve power. However, I acknowledge that members of different minority groups likely have different experiences with regards to how their racial/ethnic identity impacts their experience in college. While there are some exceptions (Walsemann, Bell, & Goosby, 2011), the literature on racial diversity largely demonstrates that the effects of diversity are consistent across minority groups (Benner & Crosnoe, 2011; Chang, 1999; Felix & You, 2011; Gurin, 1999; Johnson et al., 2001; Juvonen et al., 2006, 2018; Mair et al., 2010; Museus et al., 2012; Rucinski et al., 2019; Terenzini et al., 2001). Moreover, members of different minority groups consider ingroup representation over other minority groups' representation when evaluating diversity (Bauman et al., 2014; Unzueta & Binning, 2010, 2012). These results suggest that there are no reliable differences in how racial diversity is related to the health, belonging, and academic outcomes for members of different minority groups and it is reasonable to collapse across race for minority participants. Nevertheless, additional analyses were conducted in which race was separated into 3 groups, which are included in the Appendix. See Table 2 for a summary of the 4 different samples.

Hypotheses

I hypothesized that the relationship between the number of ingroup members in a micro-climate and students' health, belonging, and academic outcomes would be moderated by the race of the student. I predicted that minority students would fare better (mentally, physically, socially, academically) in micro-climates where there were a greater number of ingroup members. Not only do minorities care about the representation of their ingroup when thinking about racial diversity (Bauman et al., 2014; Unzueta & Binning, 2010, 2012), but they also suffer negative

consequences when they are in groups with low ingroup representation (Niemann & Dovidio, 1998; Sekaquaptewa & Thompson, 2002). On one hand, previous research demonstrates that greater racial diversity is associated with educational benefits for White college students (Antonio et al., 2004; Jayakumar, 2008; Sommers et al., 2008), suggesting that having fewer ingroup members within a micro-climate may be beneficial for Whites. On the other hand, solo status is not as detrimental for members of high status groups, i.e. men and Whites (Inzlicht & Ben-Zeev, 2000; Sekaquaptewa & Thompson, 2002, 2003). Given there is much less research on the impact of racial diversity for Whites and the conflicting evidence from the research that does exist, I did not have any specific predictions as to whether or not the number of ingroup members would be associated with Whites' health, belonging, and academic outcomes.

I also predicted that the relationship between the number of minorities in a micro-climate and students' health, belonging, and academic outcomes would be moderated by the race of the student. I expected that minority students would fare better in micro-climates where there are a greater number of minorities overall. While there is some evidence that greater racial diversity may not always lead to positive outcomes for minorities (Trail et al., 2009; Walsemann, Bell, & Goosby, 2011), most of the research on racial diversity suggests that a greater number of minorities is related to a host of positive outcomes for minorities (Brodbeck et al., 2011; Chang, 1999; Coutinho et al., 2002; Crosnoe, 2009; Gurin, 1999; Johnson et al., 2001; Juvonen et al., 2018; Seaton & Yip, 2009; Terenzini et al., 2001). Again, I did not have specific predictions for Whites.

While the micro-climates included in these studies differ in a number of ways, I predicted that the association between racial composition and students' health, belonging, and academic outcomes would not vary across the different types of micro-climates included in this chapter.

Previous studies on the effects of racial diversity at the student body level (Benner & Crosnoe, 2011; Chang, 1999; Felix & You, 2011; Fink & Fink, 2019; Gurin, 1999; Juvonen et al., 2018; Walsemann, Bell, & Maitra, 2011), classroom level (Rucinski et al., 2019; Terenzini et al., 2001), and among work groups that only consist of 3-5 students (Antonio et al., 2004; Cox et al., 1991; McLeod & Lobel, 1992) have largely found positive effects of racial diversity. The few studies regarding the effects of the racial composition of roommates on students' health, belonging, and academic outcomes provide mixed findings: while minorities with a White roommate report less positive emotions (Trail et al., 2009) than those with same-race roommates, they also report higher GPA's (Shook & Clay, 2012; Shook & Fazio, 2008) and a greater sense of belonging to their university (Shook & Clay, 2012). However, these studies only examine roommate pairs, which may be meaningfully different from larger roommate groups. As there does not seem to be any consensus within the literature as to whether racial diversity impacts students differently across different social contexts, I did not predict any differences across studies.

Study 1

Study 1 investigated whether minority and White first year students fare better mentally, physically, socially, and academically on dormitory halls where there are a greater proportion of ingroup members and where there are a greater proportion of minorities overall. Study 1 examined these questions at a medium-sized, suburban, private university in the northeastern United States.

Method

Participants. Six hundred and ninety eight undergraduates participated in the study. All participants who did not self-identify as first year students (N = 36), who did self-identify as

multi-racial (N = 42), and who did not self-identify as Black, Latinx, Asian, or White (N = 50) were excluded from the sample. Any minority or White participants who did not complete any of the dependent measures were not included in the analyses (N = 16). This resulted in a final sample of 540 first year undergraduates distributed across 82 halls. The sample was composed of 297 females (55%), 242 males (45%), and 1 participant identified as transgender. As for race/ethnicity, 272 participants were White (50%) and 268 participants who were minorities: 60 participants were Black (11%), 40 participants were Latinx (7%), and 168 participants were Asian (31%). While a majority of participants were not international students (86%), 72 participants were international students (13%).

Procedure. At the university where this study was conducted, all first year students are required to live on campus in residence halls and belong to residential advising groups that are headed by an undergraduate student in their junior or senior year. These residential advising groups have weekly study breaks where students can socialize if they wish and all members of a residential advising group live in close proximity to one another. Given the close proximity and the frequency with which students see the other members of their residential advising group, I will refer to students who belong to the same residential advising group as hallmates for the sake of interpretation.

All first-year undergraduate students were recruited to participate at the beginning of the spring semester through an email sent by a member of the university's Office of Institutional Research.[2] The email contained a link to an online survey and explained that the purpose of the study was to examine how their social environment affected their first-year experience in

[2] The survey was also sent to the upperclassmen students who head the first year students' residential advising groups. However, I did not include them in my analyses as their hallmates are also their advisees, so the effects of the racial composition of their hallmates may not be the same as first year students.

college. Flyers advertising the study were posted on campus and a team of research assistants set up tables in the campus center and in the undergraduate dining halls as well as attended weekly residential advising group study breaks to advertise the study and explain how to participate. After clicking the link to the survey, participants provided their consent and then answered a series of questionnaires (described below).[3] At the end of the survey, participants were debriefed and paid. Due to concerns that questions about experiences during the fall semester would be too temporally distant to answer later in the school year, data collection ceased about halfway into the semester (early April) as planned. Once data collection was complete, the Office of Institutional Research also included the federal race/ethnicity and gender for each member of the first year class based on university records in the final data file, even if the student did not participate in the study.

Measures. After answering demographic questions, all participants then completed measures presented together under the subsequent headings in the following order: Belonging, Academic, and Mental and Physical Health, with the exception of Stereotype Threat. This measure was presented at the end of the survey to ensure students were not aware that the study was interested in race until the very end. Within each category, questionnaires were presented in a random order.

Belonging

Social Fit- University. Participants answered 6 items (Cronbach's α = .85) adapted from Walton and Cohen (2007) measuring how well they felt they fit in at college. Participants read the following items: "I feel like I belong as a student at (university)," "I feel like I fit in with the academic community at (university)," "If my parents were to visit me or when they have visited

[3] I will only describe the measures that were included in these analyses. See the Appendix for all measures included in this study.

me at (university), I would feel or have felt comfortable introducing them to my friends," "I feel part of the (university) community," "The social experience at (university) is difficult for me," and "I have a lot of friends at (university)." Then, they indicated how much they agreed with each item using a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7).

Social Fit- Hall. Participants answered a modified version of the previous 6 items (Cronbach's α = .95). Instead of measuring their level of social fit within their university, these items measured participants' level of social fit within their residential advising group (e.g., "I feel like I fit in with my zee group.") All items were answered using a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7).

Academic

Self-Reported GPA. Participants were asked to list each class they took the previous semester (Fall 2017) and then select the letter grade they received for each class. Using the scale provided by the university registrar's office, letter grades were converted into points and GPA was calculated by taking the mean of participants' scores.

Stereotype Threat. Participants answered 4 items (Cronbach's α = .81) adapted from Marx and Goff (2005) to assess their feelings of stereotype threat: "My professor's expectations for me are related to my race," "I worry that my ability to perform well on tests is affected by my race," "I worry that if I perform poorly on a test, my professors will think it is because of my race," and "I worry that my race will affect how smart people think I am." Participants rated how much they agreed with each item using the following scale: *strongly disagree* (1) to *strongly agree* (7).

Mental and Physical Health

CHIPS. Participants completed 13 items (Cronbach's α = .86) from the headache, gastrointestinal, cold/flu, and metabolic subscales of the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Sheldon Cohen & Hoberman, 1983) to assess their physical health. The items were chosen from these subscales as they map onto the kinds of symptoms commonly assessed in the perceived discrimination literature. Each item listed a specific physical symptom: "sleep problems (can't fall asleep, wake up in the middle of the night or early in the morning)," "weight change (gain or loss of 5 lbs. or more)," "constipation," "diarrhea," "constant fatigue," "headache," "indigestion," "upset stomach," "appetite change," "feeling low in energy," "stuffy head or nose," "muscle tension," and "cold or cough". For each item, participants indicated "how much that problem has bothered or distressed you during the past semester (Fall 2017)" with a 5-point scale ranging from *not been bothered by the problem* (1) to *an extreme bother* (5).

Perceived Stress Scale. The Perceived Stress Scale assessed the degree to which a person evaluates life events as stressful (Cohen & Williamson, 1988). This scale contained 10 items (Cronbach's α = .87) that asked participants "how often you felt or thought a certain way" over the past semester (e.g., "Over the past semester (Fall 2017), how often have you been upset because of something that happened unexpectedly?"). All items were answered using the following 5-point scale: *never* (1), *almost never* (2), *sometimes* (3), *fairly often* (4), and *very often* (5).

CES-D 10. Participants completed the 10 item (Cronbach's α = .85) Center for Epidemiologic Studies Short Depression Scale to measure depressive symptoms (CES-D 10; Kohout et al., 1993). Participants indicated "how often you have felt this way over the past semester (Fall 2017)." Each item contained a statement that might characterize how a participant

might "have felt or behaved" (e.g., I was bothered by things that usually don't bother me). This questionnaire used a 4-point scale: *rarely or none of the time* (1), *some or little of the time* (2), *occasionally or a moderate amount of time* (3), *all of the time* (4).

Racial Composition of Dormitory Halls

Proportion of Ingroup Hallmates. The Proportion of Ingroup Hallmates was calculated by summing the number of ingroup members on each participants' hall (e.g., for Black participants the number of other Black students that lived on the same hall were added together) and dividing that number by the total number of students on the hall (minus the participant). Self-identified primary race/ethnicity was used for hallmates who completed the study and federal race/ethnicity (as provided by the university) was used for hallmates who did not complete the study.[4]

Proportion of Minority Hallmates. The Proportion of Minority Hallmates was calculated by summing the number of non-White, non-Multi-racial, and non-Other Race students on the hall and dividing that number by the total number of students on the hall (minus the participant). Again, self-identified primary race/ethnicity was used for hallmates who completed the study and federal race/ethnicity (as provided by the university) was used for hallmates who did not complete the study.

Covariates. I controlled for students' international status[5], i.e., whether or not they were an international student. While an international student may belong to the same/racial ethnic group as one of their hallmates, they may not see them as an ingroup member because they are

[4] Self-identified race was used for participants who completed the study rather than federal race for everyone because the federal race provided by the university did not always match participants' self-identified primary race (77 out of 681 participants). As I am interested in the number of hallmates who belong to the same racial group as each participant, I think it's important to use the racial identification that participants actually identify with, if that information was available.

[5] The inclusion of this covariate was not in the pre-registered analyses.

not from the same country. Participants either responded "yes" or "no" to the following question: "Are you an international student?"

Results

Means, standard deviations, and correlations between the predictor and outcome variables are presented in Tables 3 and 4. Tables 3 and 4 contain descriptive statistics for minorities and Whites, respectively. For all analyses, multi-level modeling was used to control for participants who belonged to the same hall. Participants' hall ID was included as a random factor. I will present the results for proportion of ingroup members on the hall first and then present the results for proportion of minorities on the hall.

Proportion of Ingroup Hallmates

For minority participants, the proportion of ingroup hallmates ranged from 0 to .4 (M = .16, SD = .11).[6] For White participants, the proportion of ingroup hallmates ranged from .13 to .69 (M = .43, SD = .16). For all analyses within this section, participant race (dichotomized as White or minority), proportion of ingroup hallmates, and the interaction between race and proportion ingroup were included as predictors and students' international status was included as a covariate. Separate models were run for each outcome variable.[7] See Table 5 for estimates, standard errors, and p values.

[6] These values do differ slightly when comparing Black and Latinx students vs. Asian students. For Black and Latinx participants, the proportion of ingroup members on the hall ranged from 0 to .3 (M = .08, SD = .07). For Asian participants, the proportion of ingroup members on the hall ranged from 0 to .4 (M = .21, SD = .10).

[7] Confirmatory factor analyses were conducted to see whether the outcome variables under each heading could be combined into a single measure to reduce the number of analyses. However, these analyses suggested that these outcome measures should be kept separate.

Mental Health

Perceived Stress

There were no significant main effects of race (b = .08, p = .343) or proportion of ingroup hallmates (b = .13, p = .583) for perceived stress. There was a significant interaction between race and the proportion of ingroup hallmates for perceived stress (b = -1.11, p = .021). See Figure 1. For Whites, a greater proportion of ingroup hallmates was significantly associated with greater perceived stress (b = .66, p = .047), but the proportion of ingroup hallmates was not significantly related to minority students' levels of perceived stress (b = -.45, p = .195).

Depression

However, there was no significant main effect of race (b = .04, p = .558), main effect of proportion of ingroup hallmates (b = -.07, p = .722), or interaction between race and the proportion of ingroup hallmates (b = -.51, p = .218) for depressive symptoms.

Physical Health

There were no significant main effects of race (b = .04, p = .700) or proportion of ingroup hallmates (b = .15, p = .613) for physical health symptoms. There was a significant interaction between race and the proportion of ingroup hallmates for physical health symptoms (b = -2.23, p = .000). See Figure 2. For Whites, having a greater proportion of ingroup hallmates was associated with experiencing more physical health symptoms over the past semester (b = 1.24, p = .003). Minorities with a greater number of ingroup hallmates reported experiencing fewer physical health symptoms over the past semester (b = -.99, p = .020).

Belonging

Belonging to Hall

There were no significant main effects of race (b = -.01, p = .979) or interaction between race and the proportion of ingroup hallmates (b = .24, p = .869) for belonging to the hall. There was a significant main effect of proportion of ingroup hallmates for belonging to the hall (b = 1.27, p = .047). Both White and minority students with a greater proportion of ingroup hallmates felt a greater sense of belonging to their dormitory hall.

Belonging to University

There was a significant main effect of race for belonging to the university (b = -.34, p = .026), such that White students reported greater belonging to the university (M = 5.33, SD = 1.13) than minority students (M = 5.02, SD = 1.14). There was no significant main effect of proportion of ingroup hallmates (b = -.11, p = .804) or interaction between race and the proportion of ingroup hallmates (b = .32, p = .729) for belonging to the university.

Academic Outcomes

GPA

There was no significant main effect of proportion of ingroup hallmates for self- reported GPA (b = .20, p = .184). There was a significant main effect of race for self-reported GPA (b = .13, p = .017), but this was qualified by a significant interaction between race and the proportion of ingroup hallmates (b = .87, p = .004). See Figure 3. Greater proportions of ingroup hallmates was significantly related to higher self-reported GPA for minority students (b = .66, p = .003), but was unrelated to White students' self-reported GPA (b = -.21, p = .302).

Stereotype Threat

There were significant main effects of both race (b = .86, p = .000) and proportion of ingroup hallmates (b = -1.46, p = .000) for stereotype threat, but these effects were qualified by a significant interaction between race and the proportion of ingroup hallmates (b = -3.40, p = .000). See Figure 4. Greater proportions of ingroup hallmates was significantly related to lower endorsement of stereotype threat for minority students (b = -3.23, p = .000), but again was unrelated to White students' feelings of stereotype threat (b = .08, p = .765).

Summary of Proportion Ingroup Findings

The results regarding the association between proportion of ingroup hallmates and students' health and academic outcomes seem to suggest that not only is ingroup representation on the hall related to a variety of student outcomes, but this relationship differs for students who belong to different racial groups. While the proportion of ingroup hallmates was unrelated to minorities' perceptions of stress, depressive symptoms and sense of belonging to the university, greater ingroup representation on the hall was significantly related to lower endorsement of physical health symptoms, a greater sense of belonging to one's dormitory hall, higher self-reported GPA and lower perceptions of stereotype threat. For Whites, the results were also mixed. The proportion of ingroup hallmates was unrelated to White students' depressive symptoms, sense of belonging to the university, self-reported GPA, and feelings of stereotype threat. While a greater proportion of ingroup hallmates was related to a greater sense of belonging to one's dormitory hall, a greater proportion of ingroup hallmates was related to greater perceived stress and greater endorsement of physical health symptoms.

Exploratory analyses were also conducted such that the same models were run with race separated into 3 categories: Black and Latinx students, Asian students, and White students. See

Table A1 in the Appendix for estimates and p values. The results from these analyses largely support the results above. While the association between the proportion of ingroup hallmates and physical health symptoms only differed significantly among White and Asian students, simple slopes analyses revealed that the proportion of ingroup hallmates was significantly positively related to White students' physical health symptoms and was not significantly related to both Black and Latinx students' and Asian students' symptoms, although both coefficients were negative. These additional analyses suggest that the relationship between the proportion of ingroup hallmates and minority students' outcomes does not differ across different minority groups.

Proportion of Minorities Hallmates

For minority participants, the proportion of minority hallmates ranged from .14 to .75 (M = .43, SD = .13).[8] For White participants, the proportion of minority hallmates ranged from .21 to .75 (M = .44, SD = .11). For all analyses within this section, participant race (dichotomized as White or minority), proportion of minority hallmates, and the interaction between race and proportion minority were included as predictors and students' international status was included as a covariate. Separate models were run for each outcome variable. See Table 6 for estimates, standard errors, and p values.

Mental Health

Perceived Stress

There were no significant main effects of race (b = .04, p = .433) or proportion of minority hallmates (b = -.13, p = .556) for perceived stress and the interaction between race and

[8] These values are almost exactly the same when comparing Black and Latinx students vs. Asian students. For Black and Latinx participants, the proportion of minorities on the hall ranged from .19 to .75 (M = .43, SD = .14). For Asian participants, the proportion of minorities on the hall ranged from .14 to .75 (M = .43, SD = .13).

the proportion of minority hallmates for perceived stress was only marginally significant (b = .85, p = .062).

Depression

Similarly, there was no significant main effect of race (b = .06, p = .205), main effect of proportion of minority hallmates (b = -.21, p = .276), or interaction between race and the proportion of minority hallmates (b = .26, p = .505) for students' depressive symptoms.

Physical Health

There was a significant main effect of proportion of minority hallmates (b = -.77, p = .013) for physical health symptoms. A greater proportion of minority hallmates was associated with experiencing fewer physical health symptoms over the past semester for both Whites and minorities. There was no significant main effect of race (b = -.02, p = .71) or interaction between race and the proportion of minority hallmates (b = .84, p = .122) for physical health symptoms.

Belonging

Belonging to Hall

There was a significant main effect of race for sense of belonging to the hall (b = -.33, p = .022). White students reported a significantly greater sense of belonging to their dormitory hall (M = 4.69, SD = 1.69) than minority students (M = 4.34, SD = 1.72) There was no significant main effect of proportion of minority hallmates for belonging to the hall (b = .40, p = .649) and the interaction effect between race and the proportion of minority hallmates for belonging to the hall was only marginally significant (b = 1.98, p = .093).

Belonging to University

There was also a significant main effect of race for belonging to the university (b = -.30, p = .002), such that Whites reported a significantly greater sense of belonging to the university

(*M* = 5.33, *SD* = 1.13) than minorities (*M* = 5.02, *SD* = 1.14). There was no significant main effect of proportion of minority hallmates (b = .31, p = .473) or interaction between race and the proportion of minority hallmates (b = -1.08, p = .189) for students' belonging to the university.

Academic Outcomes

GPA

There was a significant main effect of race for self-reported GPA (b = .07, p = .034). Minority students reported higher GPA's (*M* = 3.52, *SD* = .38) than White students (*M* = 3.44, *SD* = .39). There was no significant main effect of proportion of minority hallmates (b = -.02, p = .906) and no significant interaction between race and the proportion of minority hallmates (b = -.27, p = .347) for GPA.

Stereotype Threat

There was a significant main effect of race for students' sense of stereotype threat (b = 1.25, p = .000). Minority students reported greater levels of stereotype threat (*M* = 2.51, *SD* = 1.39) than Whites (*M* = 1.26, *SD* = .55). There was no significant main effect of proportion of minority hallmates (b = -.11, p = .783) and no significant interaction between race and the proportion of minority hallmates (b = -.28, p = .712) for stereotype threat .

Summary of Proportion of Minorities Findings

The results for the impact of the proportion of minority hallmates provided mostly null results. The proportion of minority hallmates was unrelated to either White or minority students' perceived stress, depressive symptoms, sense of belonging to their hall or to the university, self-reported GPA, and feelings of stereotype threat. The proportion of minority hallmates was significantly related to students' reports of physical health symptoms, such that both White and

minority students with a greater number of minority hallmates reported experiencing fewer physical health symptoms over the past semester.

Exploratory analyses were conducted in which the same models were run with race being separated in 3 categories: Black and Latinx students, Asian students, and White students. See Table A2 in the Appendix for estimates and p values. There were several significant interactions between race and the proportion of minority hallmates. For the analyses regarding perceived stress, depression, and sense of belonging to the hall, there were significant differences in the relationship between the proportion of minority hallmates and Black and Latinx versus Asian students' outcomes. Analyses of the simple effects found that while the estimates for the effects were in different directions for Black and Latinx students and Asian students, most of these estimates were not significantly different from zero. However, a greater proportion of minority hallmates was significantly related to greater stress for Black and Latinx students and a greater sense of belonging to the hall for Asian students. While these results are exploratory, they suggest that minority student representation on the hall may be related to students' outcomes differently for members of different minority groups.

Study 1 Discussion

One goal of Study 1 was to examine whether minority students fared better (mentally, physically, socially, academically) on dormitory halls where there were a greater proportion of ingroup hallmates and a greater proportion of minority hallmates. The results provided partial support for my hypotheses. Living on a hall with a greater proportion of ingroup hallmates was associated with a greater sense of belonging to one's hall, higher self-reported GPA, and lower endorsement of stereotype threat for minorities, which aligned with my predictions. Minorities who lived on a hall with a greater proportion of ingroup and minority hallmates also endorsed

fewer physical health symptoms. Counter to predictions, the proportion of ingroup hallmates was unrelated to minorities' mental health or sense of belonging to their university and the proportion of minority hallmates was unrelated to minorities' mental health, belonging, or academic outcomes.

Study 1 found that minorities fared better physically, socially (with respect to their hall), and academically when they resided on dormitory halls with more ingroup members. This adds to the existing literature that minorities whose neighborhoods, classrooms, and workplaces have greater numbers of ingroup members also have better physical health (Bécares et al., 2012), greater belonging (Madsen et al., 2016; Niemann & Dovidio, 1998), and better performance outcomes (Brodbeck et al., 2011; Sekaquaptewa & Thompson, 2002). By having greater ingroup representation, minorities likely perceive themselves to be more similar and less visible to their hallmates (Kanter, 2008), allowing them to feel less performance pressure and more included, which likely has downstream consequences for their physical health. While previous research has demonstrated that greater minority representation is also associated with greater belonging (Juvonen et al., 2018) and academic performance (Benner & Crosnoe, 2011), the lack of a significant relationship between the proportion of minority hallmates and minorities' sense of belonging to their hall and academic outcomes in Study 1 suggests that ingroup representation may be particularly important for minorities' well-being. Several studies demonstrate that greater ingroup representation provides additional benefits for minority students' sense of belonging (Madsen et al., 2016) and academic outcomes (Brodbeck et al., 2011) on top of those associated with greater racial heterogeneity. Study 1 provides additional evidence that greater racial diversity may not benefit minorities if it is not coupled with greater ingroup representation.

Study 1 also found that the racial composition of minority students' dormitory halls was unrelated to their mental health and sense of belonging to their university. Previous research finds that greater ingroup (Bécares et al., 2018; Niemann & Dovidio, 1998) and minority representation (Benner & Crosnoe, 2011; Walsemann, Bell, & Maitra, 2011) are associated with better mental health and greater belonging to one's school for minorities. There are several factors, not measured in this study, that may explain these conflicting findings. If minorities with few ingroup or minority hallmates spend more time outside of their dormitory hall, they may be reminded less about their lack of representation on their hall, which may buffer them from the negative mental health outcomes associated with low diversity. These students may also join race-based affinity groups at the university, which have been shown to positively impact minorities students' adjustment to college (Patton, 2006). This could also explain why hallmate racial composition was unrelated to minorities' sense of belonging to their university. Dormitory halls could be psychologically distinct from the larger university and other factors, like membership to race-based affinity groups, may be more influential for minority students' sense of belonging to their university. It is also possible that the factors that impact how racial diversity is related to mental health are different from those related to physical health, which may explain why only the relationship between hallmate racial composition and minorities' physical health was significant. For example, norms regarding alcohol may moderate the relationship between diversity and physical health. Considering White students often report more permissive attitudes towards alcohol (Gardner et al., 2020), minorities with more ingroup and minority hallmates may not be exposed to these harmful norms, which would insulate their physical but not mental health. Thus, it is feasible that other factors may moderate how micro-climate racial diversity is related to minority college students' mental health and belonging to their university.

Study 1 also sought to examine how the racial composition of students' dormitory halls related to White students' mental and physical health, belonging, and academic outcomes. While I had no predictions for Whites, there was some evidence that the racial composition of their hallmates was related to their well-being. For Whites, a greater proportion of ingroup hallmates was associated with greater perceived stress and a greater sense of belonging to their hall, while a greater proportion of minority hallmates/lower proportion of ingroup hallmates was associated with lower endorsement of physical health symptoms. However, neither measure of racial composition was related to Whites' depressive symptoms, sense of belonging to their university, GPA, or feelings of stereotype threat. The proportion of minority hallmates was also unrelated to Whites' perceived stress and sense of belonging to their hall.

These results provide some mixed evidence regarding whether or not racial diversity is associated with better outcomes for White students, which reflect the mixed evidence in the existing literature regarding the impact of racial diversity for White students. While there is evidence of a positive association between racial diversity and Whites' academic performance (Museus et al., 2012; Terenzini et al., 2001), other research on solo status finds that the performance of members of high status groups, e.g., Whites and men, are unaffected by group racial or gender composition (Sekaquaptewa & Thompson, 2002, 2003). The results of the current study align with the latter, implying that a lack of ingroup representation is not likely to arouse the same levels of concern about one's academic performance for Whites as it does for minorities. However, the findings from Study 1 do suggest that greater racial diversity is positively related to Whites' mental and physical health but negatively related to their sense of belonging to their hall. Again, this is supported by previous findings that White students who attend more racially diverse schools have better mental health (Rucinski et al., 2019), but also

anticipate belonging less in academic departments with greater diversity (Murphy & Zirkel, 2015). The findings from Study 1 suggest that White students, like minorities, do not feel included in social groups in which there are few ingroup members, but that the presence of ingroup members isn't exclusively associated with positive outcomes for Whites. One explanation involves Whites' reports of a greater pressure to conform with group members' opinions when in racially homogenous groups (Gaither et al., 2018). The added pressure to assimilate with their White hallmates may be taxing for White students, which may contribute to poorer mental and physical health. It is also possible that other demographic characteristics, like social class, become more salient for Whites when they have more White hallmates and these heightened differences may counteract the positive effects of ingroup representation. Nevertheless, more research is needed to understand when and how racial diversity is related to White students' health and belonging.

Overall, Study 1 suggests that greater racial diversity is related to positive outcomes for both minority and White students, albeit in different ways. For minorities, greater ingroup representation was related to positive physical health, belonging, and academic outcomes and may be more important than greater minority representation. For Whites, greater racial diversity was beneficial, although it may also be associated with costs to their belonging. It is possible that the results from Study 1 are specific to this university and potentially specific to this micro-climate. The next set of studies attempted to address these particular limitations.

Studies 2a and 2b

Study 1 provided some evidence that the racial diversity of a micro-climate, specifically a dormitory hall, is associated with minority and White students' mental health, physical health, belonging, and academic outcomes. However, it is important to examine whether racial diversity

is associated with the same outcomes in the same manner across different micro-climates. While dorm rooms are much smaller micro-climates, students are probably encountering their roommates more frequently than other students on their hall. Therefore, in Studies 2a and 2b I sought to explore whether the racial composition of students' dorm rooms is associated with students' mental health, belonging, and academic outcomes. Studies 2a and 2b also contain data collected from multiple universities within a single study and from a single university that differs from the university in Study 1 in a number of ways, respectively. Hence, I was able to test my research questions across a variety of samples to ensure that any findings were not a product of a particular college/university context.

Study 2a

Study 2a tested whether minority and White first year students fare better mentally in dorm rooms where there are a greater proportion of ingroup members and where there are a greater proportion of minorities overall. Study 2a examined these questions using data obtained from the Campus Life in America Student Survey (CLASS) Study, a 3-wave longitudinal study conducted at 6 different American universities.

Method

Participants. Twelve thousand and eleven students participated in the study. However, the measures needed to conduct my analyses appeared across waves 1 and 2 (See Procedure section for explanation). Therefore, only participants who participated in both waves 1 and 2 could be included in the sample (N = 2,678). All participants who were not in their first year during wave 1 (N = 40), were not full-time students during their first year (N = 25), and did not live in on-campus residence halls or dormitories during their first year (N = 210) were excluded from the sample. Participants who identified as multi-racial (N = 86), who did not provide

information regarding whether or not they were multi-racial (N = 124), and who did not identify as Black, Latinx, Asian or White (N = 83) were also excluded from the sample. Participants who did not indicate how many roommates they had during their freshman year (N = 57) and did not complete either of the dependent measures (N = 167) during wave 2 were excluded from the sample.

As I am interested in the racial-composition of micro-climates, all participants who indicated that they had 0 (N = 46) or 1 roommate (N= 1,195) during their first year were excluded from the sample. Lastly, due to the method in which roommate race/ethnicity was assessed, I was only able to calculate the full range of proportion ingroup and minority variables for participants with 2 roommates. Thus, all participants who indicated that they had 3 or more roommates were excluded from the sample (N = 351).[9] I believe that having 2 roommates is psychologically distinct from having 1 because the feelings associated with not getting along with a single roommate are not equivalent to feeling socially isolated from 2 roommates. One additional participant was excluded because they indicated that their roommates belonged to 3 different racial/ethnic groups, but they only indicated that they had 2 roommates. This resulted in a final sample of 293 participants. Over half of the sample (66%) were women (N = 194). As for the racial/ethnic background, there were 158 White participants (54%) and 135 minority participants: 12 participants were Black (4%), 16 participants were Latinx (6%), and 107 participants were Asian (37%). While a majority of participants were US citizens (92%), 13

[9] Additional analyses were conducted in which racial composition was operationalized as 2 dichotomous variables: presence of ingroup roommate and presence of minority roommate. Participants were separated into those who indicated that they had a roommate that was a member of their ingroup or a member of a minority group and those who did not indicate they had an ingroup roommate or minority roommate. This method allowed me to include all participants who indicated that they had more than 1 roommate in the sample (N = 644). The descriptive statistics, estimates, standard errors, and p values for these analyses can be found in the Appendix (Tables A3-A7).

participants indicated they were permanent residents aliens (4%) and 12 participants indicated they were neither a citizen or permanent resident alien (4%).

The final sample of participants were distributed across the 6 participating schools. About 80% of the sample came from 2 universities (N = 237). Table 7 provides the distribution of participants by race across the 6 universities. Half of the universities were public and half were private. See Table 8 for additional descriptive statistics about the colleges/universities that are included in the sample.

Procedure. During wave 1 (2004-2005) of data collection, first year and third year undergraduate students at 6 American universities were asked a variety of questions, including demographic information and questions assessing several aspects of mental health (described below). Two years later in wave 2 of data collection (2006-2007), students who completed the wave 1 interview during their first year were contacted again to complete an additional interview. While the questions in wave 2 were almost identical to those in wave 1, wave 2 included additional questions regarding the number of roommates students had during their first year (wave 1) and the race/ethnicity of those roommates (described below).

Measures. Participants completed the mental health measures during wave 1 of data collection. Therefore, these measures assessed participants' mental health during their first year of college. Participants completed the information about their roommates during wave 2 of data collection. While participants answered questions about their roommates during their 3rd year of college, the information they provided was about their first year roommates. Therefore, I was able to evaluate whether the racial composition of participants' roommates during their first year was related to their mental health during their first year.

Mental Health

Perceived Stress. Participants answered 4 items (Cronbach's α = .78) from the Perceived Stress Scale (Cohen & Williamson, 1988) to measure how stressful they perceived their life to be. The questions asked participants about "how you feel about what has been going on in your life during the last month." Participants saw the following items: "In the past month, how often have you felt that you were unable to control the important things in your life?", "In the past month, how often have you felt that you were effectively coping with important changes that were occurring in your life?", "In the past month, how often have you felt confident about your ability to handle your personal problems?", and "In the past month, how often have you felt difficulties were piling up so high that you could not overcome them?" All items were answered using the following 5-point scale: *never* (1), *almost never* (2), *sometimes* (3), *fairly often* (4), and *very often* (5).

Life Satisfaction. Life satisfaction was measured using 1 item. Participants were asked, "Again, with regard to how you feel about what has been going on in your life during the last month, in general how satisfied have you been with your life as a whole?" Participants answered using the following 5-point scale: *very satisfied* (1), *somewhat satisfied* (2), *neither satisfied or dissatisfied* (3), *somewhat dissatisfied* (4), *very dissatisfied* (5).

Racial Composition of Roommates

Number and Race/Ethnicity of Roommates. Participants indicated the total number of roommates they had during their first year of college. Participants selected a number between 0 and 10. Then participants were asked to indicate the primary race/ethnicity of those roommates. Participants were asked to choose from the following racial/ethnic categories: "Native American," "Asian," "Black," "Hispanic," "Hawaiian," "White," and "Other Race." Participants

responded either "Yes" or "No" for each category to indicate whether they had any roommates who they believed belonged to a particular racial/ethnic group.

Proportion of Ingroup Roommates. The Proportion of Ingroup Roommates was calculated by taking the number of ingroup roommates participants indicated having (e.g., for Black participants this number was the number of Black roommates they indicated having) and dividing that number by their total number of roommates.

Proportion of Minority Roommates. The Proportion of Minority Roommates was calculated by taking the number of number of non-White, non-Multi-racial, and non-Other Race roommates participants indicated having and dividing that number by their total number of roommates.

Covariates.[10] As with Study 1, I controlled for students' international status. Participants were asked, "What is your citizenship status?" and indicated whether they were a "U.S. Citizen," "permanent resident alien (green card)," or "Neither." In addition to students' international status, I controlled for several university characteristics to ensure that any differences in quality, resources, or size across schools did not impact the results. Therefore, I obtained the admission rate, average SAT of admitted students, in- and out-of-state tuition, 6 year graduation rate, endowment, and number of full-time degree-seeking undergraduates enrolled for the 2004-2005 school year for each university in this data set from the Integrated PostSecondary Education Data System (IPEDS) collected by the U.S. Department of Education.

Results

Means, standard deviations, and correlations between the predictor and outcome variables for minorities and Whites are presented in Tables 9 and 10, respectively. For all analyses, multi-

[10] The inclusion of these covariates was not in the pre-registered analyses.

level modeling was used to control for participants who attended the same university. The university students attended was included as a random factor. I will present the results for proportion of ingroup roommates first and then the results for proportion of minority roommates.

Proportion of Ingroup Roommates

For minority participants, the proportion of ingroup roommates ranged from 0 to 1 (M = .42, SD = .39).[11] For White participants, the proportion of ingroup roommates ranged from 0 to 1 (M = .63, SD = .39). For all analyses within this section, participant race (dichotomized as White or minority), proportion of ingroup roommates, and the interaction between race and proportion ingroup were included as predictors and students' international status and the 7 university variables were included as covariates. Separate models were run for each outcome variable.[12] See Table 11 for estimates, standard errors, and p values.

Perceived Stress

There was a significant main effect of race for perceived stress (b = .25, p = .024), such that minority students reported greater perceived stress (M = 2.77, SD = .74) than White students (M = 2.55, SD = .74). There was no significant main effect of proportion of ingroup roommates (b = -.07, p = .564) or interaction between race and the proportion of ingroup roommates (b = .01, p = .697) for perceived stress.

Life Satisfaction

There were no significant main effects of race (b = -.22, p = .159) or proportion of ingroup roommates (b = .18, p = .285) for life satisfaction. There was a significant interaction

[11] These values do differ slightly when comparing Black and Latinx students vs. Asian students. For Black and Latinx participants, the proportion of ingroup roommates ranged from 0 to 1 (M = .21, SD = .32). For Asian participants, the proportion of ingroup roommates ranged from 0 to 1 (M = .48, SD = .38).

[12] Confirmatory factor analyses were conducted to see whether the two mental health variables could be combined into a single measure to reduce the number of analyses. However, these analyses suggested that these outcome measures should be kept separate.

between race and the proportion of ingroup roommates for life satisfaction (b = -.76, p = .029). See Figure 5. Greater proportions of ingroup roommates was related to greater life satisfaction (b = .58, p = .020) for Whites, but was not significantly related to minorities' level of life satisfaction (b = -.19, p = .428).

Exploratory analyses were also conducted such that the same models were run with race separated into 3 categories: Black and Latinx students, Asian students, and White students. See Table A8 in the Appendix for estimates and p values. There were several significant interactions between race and the proportion of ingroup roommates. The association between the proportion of ingroup roommates and students' perceived stress was significantly different for Black and Latinx students as compared to both Asian and White students. While simple slopes analysis revealed that the proportion of ingroup roommates was not significantly related to Asian or White students' perceived stress, a greater proportion of ingroup roommates was significantly associated with greater perceived stress for Black and Latinx students. With regards to life satisfaction, the results largely mirrored those from the main analyses. These additional analyses provide mixed evidence for whether the relationship between the proportion of ingroup roommates and students' mental health differs for members of different racial/ethnic groups.

Proportion of Minority Roommates

For minority participants, the proportion of minority roommates ranged from 0 to 1 (M = .61, SD = .36).[13] For White participants, the proportion of minority roommates ranged from 0 to 1 (M = .31, SD = .38). For all analyses within this section, participant race (dichotomized as White or minority), proportion of minority roommates, and the interaction between race and

[13] These values do differ slightly when comparing Black and Latinx students vs. Asian students. For Black and Latinx participants, the proportion of minority roommates ranged from 0 to 1 (M = .54, SD = .36). For Asian participants, the proportion of minority roommates ranged from 0 to 1 (M = .63, SD = .37).

proportion minority were included as predictors and students' international status and the 7 university variables were included as covariates. Separate models were run for each outcome variable. See Table 12 for estimates, standard errors, and p values.

Perceived Stress

There was a significant main effect of race for perceived stress (b = .24, p = .027), such that minority students reported greater perceived stress (M = 2.77, SD = .74) than White students (M = 2.55, SD = .74). There was no significant main effect of proportion of minority roommates (b = .09, p = .488) or significant interaction between race and the proportion of minority roommates (b = -.12, p = .634) for perceived stress.

Life Satisfaction

There was a significant main effect of proportion of minority roommates for life satisfaction (b = -.45, p = .014). For all students, a greater proportion of minority roommates was associated with lower life satisfaction. There was no significant main effect of race (b = -.20, p = .211) or significant interaction between race and the proportion minority roommates (b = .20, p = .561) for life satisfaction.

Exploratory analyses were conducted such that the same models were run with race separated into 3 categories: Black and Latinx students, Asian students, and White students. See Table A9 in the Appendix for estimates and p values. The results from these analyses do not differ from those above. There were no significant interactions between race and the proportion of minority roommates for either students' perceived stress or life satisfaction. White students' levels of perceived stress were significantly and marginally lower than Black and Latinx students' perceived stress and Asian students' perceived stress, respectively. Moreover, the main effect of proportion of minority roommates for students' life satisfaction was significant. These

results suggest that at the roommate level, the relationship between the proportion of minority roommates and students' mental health does not differ across different racial/ethnic groups.

Study 2a Discussion

The first objective of Study 2a was to examine whether minority students fared better mentally in dorm rooms with a greater proportion of ingroup roommates and a greater proportion of minority roommates. However, the results did not support my hypotheses. The proportion of ingroup roommates was unrelated to minorities' perceived stress and life satisfaction. The proportion of minority roommates was also unrelated to minorities' perceived stress. However, a greater proportion of minority roommates was associated with lower life satisfaction, which was the opposite direction of what I predicted.

Study 2a found that roommate racial composition was unrelated to minorities' mental health, with the exception of the proportion of minority roommates and minorities' life satisfaction. These null results do not align with a large body of literature demonstrating benefits of ingroup (Bécares et al., 2018) and minority (Benner & Crosnoe, 2011) representation for minorities' mental health. This inconsistency hints that there may be additional factors, like frequency of interaction with roommates or membership to race-based affinity groups, that moderate the relationship between racial diversity and minorities' mental health. However, the detrimental association between proportion of minority roommates and minority students' life satisfaction contradicts previous findings that greater racial diversity is associated with greater life satisfaction for minorities (English et al., 2014; Seaton & Yip, 2009). Even so, most of this research, as well as the studies referenced earlier, explored racial diversity in much larger micro-climates. Work on roommate racial diversity has found that minority students with a White roommate report less daily positive emotions than those with a same-race roommate (Trail et al.,

2009). The results from Study 2a do not necessarily uphold this finding, but they suggest that outgroup roommates that are not White may also be detrimental for minorities. It is also important to note that the minority sample in this study was overwhelmingly Asian, so it is possible that the conflicting findings from Study 2a reflect something specific about Asian students and this particular micro-climate. Thus, Study 2a highlights that greater racial diversity may not always benefit minorities' mental health.

Study 2a also examined whether White students fared better mentally in dorm rooms with a greater proportion of ingroup roommates and a greater proportion of minority roommates. Again, I had no specific predictions for Whites but the results demonstrated that the racial composition of Whites' roommates was associated with their life satisfaction. While the proportion of ingroup roommates was unassociated with Whites' perceived stress, White students with a greater proportion of ingroup roommates reported greater life satisfaction. Similarly, the proportion of minority roommates was unrelated to Whites' perceived stress, but Whites with a greater proportion of minority roommates reported lower life satisfaction.

Study 2a found that while roommate racial composition was unrelated to some facets of Whites' mental health, greater roommate racial diversity was detrimental to other facets of Whites' mental health. There is evidence that racial diversity is unrelated to White students' mental health (Coutinho et al., 2002) as well as evidence that White students who attend more racially diverse schools have poorer mental health outcomes (Fisher et al., 2014). Moreover, another study found that White students with a cross-race roommate reported less daily positive emotions than those with a same-race roommate but no difference in daily negative emotions (Trail et al., 2009). Thus, Study 2a provides additional evidence that having cross-race roommates may not be a positive experience for Whites but they may not be entirely negative.

For example, cross-race roommate interactions are often marked by anxiety (West et al., 2009), but Whites also report greater social self-confidence after interracial interactions (Antonio, 2001). However, there is also evidence that greater racial diversity is associated with mental health benefits for Whites (Rucinski et al., 2019), so more research is needed to disentangle when racial diversity is beneficial for Whites.

The results from Study 2a suggest that the racial composition of students' dorm rooms is largely unrelated to students' mental health. However, there is evidence that greater racial diversity among students' roommates is associated with some facets of students' mental health and this relationship may not be beneficial for either minority or White students. These findings also contradict the overall findings from Study 1, which I will address in the general discussion. Study 2b builds upon Study 2a by examining how the racial composition of students' roommates is associated with their belonging and academic outcomes.

Study 2b

Study 2b tested whether minority and White first year students fare better socially and academically in dorm rooms where there are a greater proportion of ingroup members and in dorm rooms where there are a greater proportion of minorities overall. Study 2b examined these questions using data obtained from a 6-wave longitudinal study conducted at a large, urban, public university located on the West coast of the United States.

Method

Participants. Two thousand six-hundred and seventeen undergraduates participated in the study. As I am interested in first year students, only participants who participated in wave 2 were considered for the sample (N = 2,438) (See Procedure section for explanation). All participants who did not indicate where they lived during their first year (N = 422) or who did

not indicate that they lived in on-campus residence halls during their first year (N = 299) were excluded from the sample. All participants who identified as bi-racial (N = 169) or who did not identify as Black, Latinx, Asian or White (N = 85) were also excluded from the sample. Given that I am interested in the racial-composition of micro-climates, all participants who indicated that they had 1 roommate their first year (N= 870) were excluded from the sample. Unlike Study 2a, Study 2b included a measure that indicated whether or not participants' roommates were randomly assigned. As I am interested in micro-climates in which participants do not get to choose who they share the micro-climate with, all participants who indicated that they chose their roommates (N = 66) or their roommates were both randomly assigned and chosen (N = 35) were excluded from the sample.

While the method used to capture roommate race/ethnicity in this study did not limit my ability to calculate the full range of proportion of ingroup or minority roommate values, I only included participants who had 2 roommates during their first year in order to keep the roommate group sizes consistent across Studies 2a and 2b.[14] Thus all participants who indicated they had more than 2 roommates were excluded from the sample (N = 112). This resulted in a final sample of 380 participants (M_{age} = 18.84, *SD* = .46). Over half of the sample (62%) were women (N = 234). As for the racial/ethnic background, there were 127 White participants (33%) and 253 minority participants: 25 participants were Black (7%), 95 participants were Latinx (25%), and 133 participants were Asian (35%). Students also indicated when they enrolled at the university: 271 participants said they were enrolled in the Fall semester (71%), 39 participants said they were enrolled in the Winter but not the Fall (10%), 11 participants said they were not enrolled in

[14] Additional analyses were conducted in which all participants who indicated that they had more than 1 randomly assigned roommate were included in the sample (N = 488). The estimates, standard errors, and p values for these analyses can be found in the Appendix (Tables A10-A14).

either the Winter or Fall (3%), and 59 participants said they were unsure when they enrolled (16%).

Procedure. Wave 1 participants were recruited through a summer orientation program for incoming students during the summer (1996) before their first year of college. A written questionnaire was provided to all students who attended the orientation. All participants who participated in wave 1 were recruited to complete the wave 2 survey via telephone interview during the spring semester of their first year (1997). There was also an additional recruiting effort for wave 2. Due to the low number of Black and Latinx students who completed wave 1, the researchers retrieved the contact information for all Black and Latinx students who did not complete wave 1 from the registrar. These students were added to the eligible recruitment population for wave 2. For each subsequent wave (3-6), participants who completed the previous wave were recruited to complete the next survey via telephone interview during the spring of each subsequent year. The surveys during waves 1 and 2 contained demographic and other background questions. Surveys across all waves contained a variety of academic measures as well as questions regarding students' current living situation (described below).

Measures

Belonging

Social Fit- University Level. Participants' perception of their social fit at the university was assessed using a single item: "To what degree do you experience a sense of exclusion or belonging at [*school name*]?" Participants responded using a 7-point scale ranging from *strong sense of exclusion* (1) to *strong sense of belonging* (7).

Social Fit- Dormitory Level. Participants' perception of their social fit within their dormitory was assessed using a similar single item: "To what degree do you experience a sense

of exclusion or belonging in the dormitory?" Participants responded using a 7-point scale ranging from *strong sense of exclusion* (1) to *strong sense of belonging* (7).

Academic

Self-Reported GPA. Participants reported their cumulative GPA using a single open-ended question.

Stereotype Threat. One item was used to measure participants' feelings of stereotype threat. Participants read the following statement: "I think about whether my academic performance will affect how others evaluate my ethnic group," and answered with the degree to which they agreed using a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7).

Racial Composition of Roommates

Number and Race/Ethnicity of Roommates. Using a single, open-ended item, participants indicated the number of roommates they currently had. For participants who indicated that they had 3 roommates or less, participants were asked individual questions regarding the race of each roommate: "What is your first roommate's ethnicity?", "What is the ethnicity of your second roommate?", and "What is the ethnicity of your third roommate?" Participants responded with one of the following racial/ethnic categories: *biracial/mixed [specify]*, *African American/Black*, *Asian American/Pacific Islander*, *Caucasian/White*, *Latino/Hispanic*, *Middle Eastern [specify]*, *Native American*, and *Other [specify]*. For participants who indicated that they had more than 3 roommates, participants were asked 4 open ended questions regarding how many of their roommates belonged to the following racial categories: "How many of your roommates are Asian American? African American? Latino? Caucasian?"

Proportion of Ingroup Roommates. The Proportion of Ingroup Roommates was calculated by summing the number of ingroup roommates participants indicated having (e.g., for

Black participants the number of other Black roommates were added together) and dividing that number by their total number of roommates.

Proportion of Minority Roommates. The Proportion of Minority Roommates was calculated by summing the number of non-White, non-Multi-racial, and non-Other Race roommates participants indicated having and dividing that number by their total number of roommates.

Covariates.[15] In this study, I wanted to control for the semester in which students enrolled at the university, as this was the only variable that captured students' year in school. Participants indicated whether they enrolled in the Fall semester, the Winter semester, neither semester, or they were unsure of when they enrolled. As it was unclear what it meant for students to indicate that they were not enrolled in either semester, as this university does not have part-time students, I decided to control for this variable as opposed to not including these participants in the sample.

Results

Means, standard deviations, and correlations between the predictor and outcome variables for minorities and Whites are presented in Tables 13 and 14, respectively. For all analyses, multiple regression was used. First, the results for proportion of ingroup roommates will be presented and then the results for proportion of minority roommates.

Proportion of Ingroup Roommates

For minority participants, the proportion of ingroup roommates ranged from 0 to 1 (M = .28, SD = .36).[16] For White participants, the proportion of ingroup roommates ranged from 0 to 1 (M = .34, SD = .37). For all analyses within this section, participant race (dichotomized as White

[15] The inclusion of this covariate was not in the pre-registered analyses.

[16] These values do differ slightly when comparing Black and Latinx students vs. Asian students. For Black and Latinx participants, the proportion of ingroup roommates ranged from 0 to 1 (M = .13, SD = .26). For Asian participants, the proportion of ingroup roommates ranged from 0 to 1 (M = .42, SD = .39).

or minority), proportion of ingroup roommates, and the interaction between race and proportion ingroup were included as predictors and the semester in which students enrolled was included as a covariate. Separate models were run for each outcome variable. See Table 15 for estimates, standard errors, and p values.

Belonging

Belonging to Dorm

There was no significant main effect of race (b = -.01, p = .968), main effect of proportion of ingroup roommates (b = -.08, p = .686), or interaction between race and the proportion of ingroup roommates (b = -.36, p = .413) for sense of belonging to the dorm.

Belonging to University

There was a significant main effect of proportion of ingroup roommates for sense of belonging to the university (b = -.41, p = .028). All students, regardless of race, with a greater proportion of ingroup roommates reported a lower sense of belonging to the university. There was no main effect of race (b = .18, p = .216) or interaction between race and the proportion of ingroup roommates (b = -.31, p = .426) for belonging to the university.

Academic Outcomes

GPA

There was a significant main effect of race for self-reported GPA (b = -.14, p = .006). White students reported significantly higher GPA's (M = 3.24, SD = .42) than minority students (M = 3.09, SD = .46). There was no significant main effect of proportion of ingroup roommates (b = .02, p = .781) or interaction between race and the proportion of ingroup roommates (b = .21, p = .141) for self-reported GPA.

Stereotype Threat

There was a significant main effect of race for feelings of stereotype threat (b = 1.62, p = .000). Minority students reported greater feelings of stereotype threat (M = 3.94, SD = 1.86) than White students (M = 2.31, SD = 1.52). The main effect of proportion of ingroup roommates for feelings of stereotype threat was only marginally significant (b = -.49, p = .053) and the interaction between race and the proportion of ingroup roommates for feelings of stereotype threat was not significant (b = .01, p = .986).

Summary of Proportion Ingroup Findings

The results regarding the relationship between the proportion of ingroup roommates and students' belonging and academic outcomes were largely null. The proportion of ingroup roommates was not significantly related to either minority or White students' sense of belonging to their dorm, self-reported GPA, and feelings of stereotype threat. However, a greater proportion of ingroup roommates was related to a lower sense of belonging to the university for both minority and White students.

Exploratory analyses were also conducted such that the same models were run with race separated into 3 categories: Black and Latinx students, Asian students, and White students. See Table A15 in the Appendix for estimates and p values. The results from these analyses closely resemble the analyses described above. There were no significant interactions between race and the proportion of ingroup roommates for any of the outcomes variables, which means that the relationship between the proportion of ingroup roommates and students' sense of belonging, GPA, and stereotype threat did not differ for Black and Latinx students, Asian students and White students. The main effect for proportion of ingroup roommates for students' sense of belonging to the university was only marginal when race was separated into 3 groups. Thus,

these results suggest that the association between the proportion of ingroup roommates and students' sense of belonging and academic outcomes does not differ for members of different racial/ethnic groups.

Proportion of Minority Roommates

For minority participants, the proportion of minority roommates ranged from 0 to 1 (M = .58, SD = .37).[17] For White participants, the proportion of minority roommates ranged from 0 to 1 (M = .55, SD = .37). For all analyses within this section, participant race (dichotomized as White or minority), proportion of minority roommates, and the interaction between race and proportion minority were included as predictors and the semester in which students enrolled was included as a covariate. Separate models were run for each outcome variable. See Table 16 for estimates, standard errors, and p values.

Belonging

Belonging to Dorm

There was no significant main effect of race (b = .00, p = .980), main effect of proportion of minority roommates (b = -.20, p = .315), or interaction between race and the proportion of minority roommates (b = .576, p = .175) for sense of belonging to the dorm.

Belonging to University

There was no significant main effect of race (b = .21, p = .156), only a marginally significant main effect of proportion of minority roommates (b = -.34, p = .059), and no significant interaction between race and the proportion of minority roommates (b = .32, p = .402) for sense of belonging to the university.

[17] These values do differ slightly when comparing Black and Latinx students vs. Asian students. For Black and Latinx participants, the proportion of minority roommates ranged from 0 to 1 (M = .54, SD = .36). For Asian participants, the proportion of minority roommates ranged from 0 to 1 (M = .61, SD = .38).

Academic Outcomes

GPA

There was a significant main effect of race for self-reported GPA (b = -.15 p = .005). White students reported significantly higher GPA's (M = 3.24, SD = .42) than minority students (M = 3.09, SD = .46). There was no significant main effect of proportion of minority roommates (b = .04, p = .536) or interaction effect between race and the proportion of minority roommates (b = -.06, p = .651) for self-reported GPA.

Stereotype Threat

There was a significant main effect of race for stereotype threat (b = 1.63, p = .000). Minority students reported greater feelings of stereotype threat (M = 3.94, SD = 1.86) than White students (M = 2.31, SD = 1.52). There was no significant main effect of proportion of minority roommates (b = .13, p = .585) or interaction effect between race and the proportion of minority roommates (b = -.07, p = .887) for feelings of stereotype threat.

Summary of Proportion Minority Findings

The results regarding the proportion of minority roommates suggest that there is no relationship between the proportion of minority roommates and students' sense of belonging and academic outcomes. For both minority and White students, the proportion of minority roommates was unrelated to their sense of belonging to their dorm and to the university, their self-reported GPA, and their feelings of stereotype threat.

Exploratory analyses were also conducted such that the same models were run with race separated into 3 categories: Black and Latinx students, Asian students, and White students. See Table A16 in the Appendix for estimates and p values. The results of these analyses were identical to the results from the main analyses. The relationship between proportion of minority

roommates and students' sense of belonging to their dorm and the university, their GPA, and feelings of stereotype threat did not differ between Black and Latinx students, Asian students, and White students. This suggests that the association between the proportion of minority roommates and students' sense of belonging and academic outcomes does not differ across different racial/ethnic groups.

Study 2b Discussion

My first goal for Study 2b was to investigate whether minority students fared better socially and academically in dorm rooms with a greater proportion of ingroup roommates and a greater proportion of minority roommates. My hypotheses were not supported. Contrary to predictions, the proportion of ingroup roommates and the proportion of minority roommates were unrelated to minority students' sense of belonging to the dorm, their self-reported GPA, and their feelings of stereotype threat. The proportion of minority roommates was also unrelated to minorities' sense of belonging to their university. Moreover, the relationship between the proportion of ingroup roommates and minorities' sense of belonging to their university was in the opposite direction of what I predicted: minorities with a greater proportion of ingroup roommates reported a lower sense of belonging to their university.

Study 2b found that roommate racial composition was unrelated to minorities' academic outcomes and sense of belonging to their dorm, but that having more minority roommates was related to minorities feeling less belonging at their university. Thus, Study 2b diverges from the large body of evidence that greater racial diversity is related to greater academic achievement (Brodbeck et al., 2011; Kivlighan, 2008) and a greater sense of belonging (Murphy & Zirkel, 2015; Purdie-Vaughns et al., 2008) for minorities. However, these studies examine the racial composition of larger micro-climates (e.g., academic departments, schools, companies) and

studies examining the racial composition of roommate pairs find a different pattern of results. Minority students who have a White roommate have higher GPA's (Shook & Clay, 2012; Shook & Fazio, 2008) and report a greater sense of belonging to their university (Shook & Clay, 2012) than those with a same-race roommate. This suggests that ingroup roommates may be disadvantageous for minorities' academic and belonging outcomes. Thus, in larger roommate groups there may be competing effects of outgroup and ingroup roommates on minorities' academic outcomes, which may explain the null results from Study 2b. On the other hand, the findings from Study 2b replicate previous research on the relationship between roommate racial composition and minority students' sense of belonging to their university. Having more ingroup roommates may allow minority students to have greater access to other ingroup students at the cost of making them less connected to the student body at large. However, minority students may have other close relationships with other members of their dormitory, which may explain why roommate racial composition was unrelated to their belonging to their dorm. Nevertheless, Study 2b indicates that having more ingroup and minority roommates may not always be better for minorities socially and academically.

My second goal concerned whether White students fared better socially and academically in dorm rooms with a greater proportion of ingroup roommates and a greater proportion of minority roommates. I had no specific predictions for Whites but the results were identical to those for minority students. Neither measure of racial composition was associated with White students' sense of belonging to their dormitory, their GPA, or their feelings of stereotype threat nor was the proportion of minority roommates associated with Whites' sense of belonging to their university. However, Whites with a greater proportion of ingroup roommates reported a lower sense of belonging to their university.

In this study, the racial composition of Whites' roommates was unrelated to their academic and belonging outcomes, with the exception of their sense of belonging to their university. This null relationship between racial composition and Whites' academic outcomes further supports the theory that racial diversity is not strongly related to Whites' academic performance because they are a high status group that is not historically underrepresented in academic contexts (Sekaquaptewa & Thompson, 2002). Moreover, previous research finds that the racial composition of Whites' roommates is unrelated to their GPA (Shook & Clay, 2012; Shook & Fazio, 2008). However, the significant negative association between the proportion of ingroup roommates and Whites' sense of belonging to their university contradicts evidence that roommate racial diversity is unrelated to White students' sense of belonging to their university (Shook & Clay, 2012). Conversely, other research has demonstrated that all students, regardless of race, benefit socially from greater racial diversity (Juvonen et al., 2018). Having few outgroup roommates may lower Whites' opportunities for interracial interactions, which have been shown to increase White students' social self-confidence (Antonio, 2001) and may promote better connections with other students at their university. Again, Study 2b suggests that more work is needed to recognize when and how racial diversity is related to Whites' sense of belonging.

Study 2b's results largely demonstrated that the racial composition of students' roommates is not related to their belonging and academic outcomes. However, a greater proportion of ingroup roommates was associated with lower levels of belonging to the university for minority and White students. Overall, the results from Studies 2a and 2b provided some evidence that the racial composition of students' dorm rooms is associated with students' mental health, belonging, academic outcomes. However, the directions of these effects differed from those found in Study 1, which I will address in the general discussion. One limitation of Studies

1, 2a, and 2b is that they only examine two, relatively small micro-climates of the many that college students belong to. Study 3 expands outward from students' individual dorm rooms and dormitory halls and examines the racial composition of a much larger micro-climate using a more representative sample from numerous universities.

Study 3

Studies 1, 2a, and 2b explored whether the racial composition of college students' dormitory halls and dorm rooms was associated with students' mental health, physical health, belonging, and academic outcomes. The findings suggested that racial diversity may be associated with minority and White students' outcomes differently across different kinds of micro-climates. Both dormitory halls and dorm rooms are relatively small in size and likely do not provoke a strong sense of identity, so the racial composition of the student body may not be related to students' well-being in the same way. In Study 3, I aimed to explore how the racial composition of the student body was associated with first year students' mental health, physical health, and academic outcomes, specifically whether both minority and White students fared better when they are in micro-climates with a greater number of ingroup members and in micro-climates with a greater number of minorities overall.

Study 3 tested these questions using data obtained from the Healthy Minds Study (HMS), an annual web-based survey involving undergraduate and graduate students at higher and post-secondary institutions, both in the United States and abroad. Thus, Study 3 allowed me to examine how the racial composition of collegiate micro-climates was related to student outcomes using a more representative sample. Study 3 also incorporated data obtained from the Integrated Postsecondary Education Data System (IPEDS), which contains various kinds of postsecondary institutional data submitted annually to the National Center for Education Statistics.

Method

Participants. One hundred and fifty five thousand, three hundred and forty three students participated in the study. In order to make sure that the schools included across all of the studies were similar, all participants who attended colleges/universities that were community colleges, located in Canada, or single-sex institutions were excluded from the sample (N = 27,772). All participants who indicated that they were currently pursuing no degree (N = 2,318), pursuing more than one degree type, e.g., Bachelors, Masters, (N = 2,494), or the degree they were pursuing was not their Bachelor's degree (N = 36,932) were excluded from the sample. All participants who did not indicate their year in school (N = 2,440), who were not in their first year (N = 63,211), were not full-time students (N = 408), and did not live on campus (N = 3,338) were excluded from the sample. Participants who identified as multi-racial (N = 2,364), did not indicate their race (N = 27), and participants who did not identify as Black, Latinx, Asian or White (N = 238) were also excluded from the sample. Participants who did not complete any of the dependent measures (N = 40) were not included in the analyses. This resulted in a final sample of 14,159 participants (M_{age} = 18.52, *SD* = .79). The sample was composed of 9,476 females (67%), 4,342 males (31%), 79 people who identified as transgender, 192 who identified as genderqueer, and 62 who identified as other. As for the racial/ethnic background, there were 10,843 White participants (77%) and 3,316 minority participants: 697 participants were Black (5%), 723 participants were Latinx (5%), and 1,896 participants were Asian (13%). While almost all participants were not international students (94%), 876 participants were international students (6%).

The final sample of participants attended 109 unique colleges and universities. Moreover, this data was collected across 3 different academic years: 2017-2018, 2016-2017, 2015-2016[18]. Across each data collection year, here are the number of schools and participants included in the sample: 2017-2018: 7,149 participants, 50 colleges/universities; 2016-2017: 3,869 participants, 46 schools; 2015-2016: 3,141 participants, 13 schools. The average number of participants who are included in the sample per school is 130 (*SD* = 132.46). Approximately half of the colleges/universities were public (N = 57) and half were private (N = 52). See Table 17 for additional descriptive statistics about the colleges/universities that are included in the sample.

Procedure

HMS. Participating institutions were recruited through advertisements that included but were not limited to listservs, the Healthy Minds Network (healthymindsnetwork.org), and research briefs. Online surveys were sent out at the participating university's request each year, from 2015-2018. At institutions with equal to or greater than 4,000 students, 4,000 enrolled students were invited to participate in the study through email by the HMS team. At institutions with less than 4,000 students, all enrolled students were invited to participate in the study through email by the HMS team. Invited students first received a "pre-notification" email to increase the chances of participation. Two to three days later, invited students received an official recruitment email with the link to the online survey. Students received up to 3 reminder emails, each separated by 5-7 days. All surveys contained measures of demographics, mental health status, and mental health service utilization/help-seeking. Participating institutions also had the option to select up to 2 of the following elective modules: substance use, sleep, eating

[18] These years were chosen as they were the most recent years of data available when this project commenced. Additionally, simulation studies (Maas & Hox, 2005) have suggested that standard errors for level 2 variance components in multi-level models are underestimated when there are fewer than 100 groups. Thus, I wanted to include as many years as needed in order to have over 100 unique schools.

and body image, sexual assault, overall health, knowledge and attitudes about mental health and mental health services, upstander/bystander behaviors, mental health climate, climate for diversity and inclusion, competition, resilience and coping, persistence and retention, financial stress, and attitudes about mobile resources.

IPEDS. Each year, postsecondary institutions within the United States submit data regarding 12-month and fall enrollment, academic libraries, admissions, completions, finance, graduation rates, human resources, institutional characteristics, student financial aid, and award status to the National Center for Education Statistics across 3 collections cycles (Fall, Winter, Spring).

Measures

Mental Health (HMS)

Depression. Participants completed the 9-item (Cronbach's α = .89) Patient Health Questionnaire-9 to measure depressive symptoms (PHQ-9; Kroenke et al., 2001). Participants were asked "Over the last 2 weeks, how often have you felt bothered by any of the following problems?" Each item contained a symptom included in the diagnosis of DSM IV depressive disorders (e.g., "Little interest or pleasure in doing things," "Feeling bad about yourself or that you are a failure or have let yourself or your family down"). This questionnaire used a 4-point scale: *not at all* (1), *several days* (2), *more than half the days* (3), *nearly every day* (4).

Anxiety. To assess participants' anxiety symptoms, participants completed the 7-item (Cronbach's α = .91) Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006). Participants were asked "Over the last 2 weeks, how often have you felt bothered by any of the following problems?" Each item contained a symptom of GAD or a known symptom of anxiety (e.g., "Feeling nervous, anxious, or on edge," "Worrying too much about different things").

Participants indicated how often they were bothered by each item using a 4-point scale: *not at all* (1), *several days* (2), *more than half the days* (3), *nearly every day* (4).

Flourishing. Participants answered the 8-item (Cronbach's α = .92) Flourishing Scale (Diener et al., 2010) in order to capture an overall measure of their psychological well-being. Participants were asked to indicate the degree to which they agreed or disagreed with various statements (e.g., "I am engaged and interested in my daily activities," "I am a good person and live a good life"). Participants answered using the following 7-point scale: *strongly disagree* (1), *disagree* (2), *slightly disagree* (3), *mixed or neither agree nor disagree* (4), *slightly agree* (5), *agree* (6), and *strongly agree* (7).

Physical Health (HMS)

Average Sleep on Weekdays. Participants answered two items regarding their sleep habits on weekdays. Participants were asked, "During this school year, at approximately what time have you typically gone to sleep on weekdays?:" and "During this school year, at approximately what time have you typically woken up on weekdays?:" For each question, participants chose 1 out of the following choices: *12pm*, *1pm*, *2pm*, *3pm*, *4pm*, *5pm*, *6pm*, *7pm*, *8pm*, *9pm*, *10pm*, *11pm*, *12am*, *1am*, *2am*, *3am*, *4am*, *5am*, *6am*, *7am*, *8am*, *9am*, *10am*, and *11am*. Only participants who indicated that they fell asleep between 8pm and 5am on weekdays and indicated that they woke up between 4am and 1pm on weekdays were included in the analyses.[19] These intervals were selected based on the distribution of the data in addition to past research that

[19] The initial means regarding average sleep on weekdays and weekends were higher than expected (10.8 hours for weekdays and 11.7 on weekends). Upon inspection of the frequency distributions for each question, it became apparent that while 74% to 89% (depending on the question) of eligible participants reported bedtimes and wake times that reflected the range of average bedtimes and wake times of college students reported in past research, there was a portion of the sample that indicated bedtimes and wake times outside of this range, which resulted in the high average sleep values. While it is likely that these participants did not pay attention to whether or not their response included "am" or "pm," I did not want to assume that this was the case. Thus, cutoffs were set such that these participants were not included in the analyses.

provides the average range of bedtimes and wake times of college students (Eliasson et al., 2010; Forquer et al., 2008; Lund et al., 2010; Taylor & Bramoweth, 2010). Then, the bedtimes and wake times were used to calculate participants' average amount of sleep on weekdays.

Average Sleep on Weekends. Participants were asked a modified version of the previous 2 questions. Instead of asking about the approximate times they had gone to sleep and woken up on weekdays, these questions asked about the approximate time they had gone to sleep and woken up on weekends. For each question, participants chose 1 out of the following choices: *12pm*, *1pm*, *2pm*, *3pm*, *4pm*, *5pm*, *6pm*, *7pm*, *8pm*, *9pm*, *10pm*, *11pm*, *12am*, *1am*, *2am*, *3am*, *4am*, *5am*, *6am*, *7am*, *8am*, *9am*, *10am*, and *11am*. Only participants who indicated that they fell asleep between 9pm and 7am on weekends and indicated that they woke up between 5am and 4pm on weekends were included in the analyses. These intervals were selected based on the distribution of the data in addition to past research that provides the average range of bedtimes and wake times of college students (Eliasson et al., 2010; Forquer et al., 2008; Lund et al., 2010; Taylor & Bramoweth, 2010). Then, the bedtimes and wake times were used to calculate participants' average amount of sleep on weekends.

Academic (HMS)

Self-Reported GPA. In the surveys distributed in the 2017-2018 and 2016-2017 cycle, participants were asked to report their current overall GPA. Participants selected one of the following choices: *A+*, *A*, *A-*, *B+*, *B*, *B-*, *C+*, *C*, *C-*, *D+ or below*, and *No grade or don't know*. For the survey distributed in the 2015-2016 cycle, participants were asked to select an answer that "best describes your grade point average this year" from the following choices: *A*, *A-*, *B+*, *B*, *B-*, *C+*, *C*, *C-*, *D+ or below*, and *No grade or don't know*. Due to the fact that the surveys from the 2017-2018 and 2016-2017 included *A+* while 2015-2016 did not, responses were re-coded

such that *A+* now received the same value as *A* such that values could be combined across years. In order to calculate GPA, responses *A* through *C-* were re-coded using the scoring system utilized in Study 1. For *D+ or below*, all responses were re-coded to the value of a *D+* in the scoring system utilized in Study 1.[20]

Racial Composition of Student Body (IPEDS)

Fall Enrollment by Race. In the Fall cycle of IPEDS data collection in 2015, 2016, and 2017, institutions provided the total number of undergraduate, degree/certificate-seeking, full-time students enrolled that fall. Institutions also partitioned this number into the total number of students enrolled from the following racial categories: *American Indian or Alaska Native*, *Asian*, *Black or African American*, *Hispanic*, *Native Hawaiian or Other Pacific Islander*, *White*, *Two or more race*s, *Race/ethnicity unknown*, and *Non-resident alien*.

Proportion of Ingroup Students at the University. The Proportion of Ingroup Students at the University was calculated by taking the number of ingroup students at the university (e.g., for Black participants I took the total number of Black or African American degree-seeking, full-time undergraduate students) and dividing that by the total number of degree-seeking, full-time undergraduate students.

Proportion of Minorities at the University. The Proportion of Minorities at the University was calculated by summing the number of Black or African American, Asian, Hispanic, Native American or Alaska Native, and Native Hawaiian or Pacific Islander degree-seeking, full-time undergraduates and dividing that by number by the total number of degree-seeking, full-time undergraduates.

[20] While there may be some participants whose GPA is lower than the assigned value, re-coding their responses with the highest possible value within this category provides a conservative estimate of GPA and allows me to preserve some statistical power by including more participants' scores. Moreover, less than 1% of the eligible sample (N=99) selected this response.

Covariates.[21] As with the previous studies, I controlled for students' international status. For the 2017-2018 and 2016-2017 collection cycles, participants were asked "Are you an international student?" and responded with either a *yes* or *no*. For the 2015-2016 collection cycle, participants were asked, "Are you a United States citizen (or permanent resident)?" and answered with either *yes* or *no*. In addition to students' international status, I controlled for several university characteristics that indicated the quality of each institution and the resources each institution may have had. It is possible that schools with greater numbers of minority students enrolled are less prestigious and have fewer resources. Thus the proportion of ingroup or minority students at the university may be capturing something about the university rather than racial representation for an individual student. Previous work on ethnic density has found that the relationship between mental health benefits and greater neighborhood ethnic density becomes stronger (Bécares et al., 2014, 2018) and the relationship between adverse mental health outcomes and greater neighborhood ethnic density reverses direction (Bécares et al., 2018) after controlling for area level deprivation. Therefore, I obtained the admission rate, average SAT of admitted students, average cost of attendance, 6 year graduation rate, endowment, and number of full-time degree-seeking undergraduates enrolled for the corresponding school year for each university in this data set from the Integrated PostSecondary Education Data System (IPEDS) collected by the U.S. Department of Education.

Results

Means, standard deviations, and correlations between the predictor and outcome variables for minorities and Whites are presented in Tables 18 and 19, respectively. For all analyses, multi-level modeling was used to control for the fact that some participants in the sample attended the

[21] The inclusion of these covariates was not in the pre-registered analyses.

same university and completed the study in different years. The university students' attended and the data collection cycle in which they participated were included as random factors. First, the results for the proportion of ingroup students at the university will be presented followed by the results for the proportion of minority students.

Proportion of Ingroup Students at University

For minority participants, the proportion of ingroup students at the university ranged from 0 to .37 (M = .11, SD = .07).[22] For White participants, the proportion of ingroup students at the university ranged from .2 to .88 (M = .65, SD = .13). For all analyses within this section, participant race (dichotomized as White or minority), proportion of ingroup students at the university, and the interaction between race and proportion ingroup were included as predictors and students' international status and the 6 university variables were included as covariates. Separate models were run for each outcome variable.[23] See Table 20 for estimates, standard errors, and p values.

Mental Health

Flourishing

There was no significant main effect of race (b = .01, p = .850) for flourishing. While there was a significant main effect of proportion of ingroup students for flourishing (b = .23, p = .036), this was qualified by a significant interaction effect between race and the proportion of ingroup students (b = -1.42, p = .000). See Figure 6. For minority students, a greater proportion of ingroup students at the university was associated with significantly lower levels of flourishing

[22] These values are almost exactly the same when comparing Black and Latinx students vs. Asian students. For Black and Latinx participants, the proportion of ingroup students at the university ranged from .01 to .36 (M = .11, SD = .08). For Asian participants, the proportion of ingroup students at the university ranged from 0 to .37 (M = .11, SD = .06).

[23] Confirmatory factor analyses were conducted to see whether the outcome variables under each heading could be combined into a single measure to reduce the number of analyses. However, these analyses suggested that these outcome measures should be kept separate.

(b = .86, p = .007). In contrast, a greater proportion of ingroup students at the university was associated with significantly higher levels of flourishing for White students (b = -.56, p = .000).

Depression

There was a significant main effect of the proportion of ingroup students for depression (b = -.21, p = .004), such that students attending universities with a greater proportion of ingroup students reported lower levels of depressive symptoms. The main effect of race (b = -.807, p = .065) and the interaction between race and the proportion of ingroup students (b = .57, p = .054) were only marginal for depression.

Anxiety

There were significant main effects of race (b = -.14, p = .003) and proportion of ingroup students (b = -.24, p = .007) for anxiety. White students had significantly higher levels of anxiety symptoms (M =1.89, SD = .77) than minority students (M = 1.86, SD = .74). But, for both minority and White students, a greater proportion of ingroup students at the university was associated with lower levels of anxiety symptoms. There was no significant interaction effect between race and the proportion of ingroup students for anxiety (b = .57, p = .102).

Physical Health

Sleep on Weekdays

There were significant main effects of race (b = -.28, p = .001) and proportion ingroup (b = .50, p = .000) for students' average sleep per night on weekdays. White students slept more per night on weekdays (M = 7.86, SD = 1.39) than minority students (M = 7.28, SD = 1.55). For all students, regardless of race, greater proportions of ingroup students at the university was significantly associated with greater sleep per night on weekdays. The interaction effect between

race and the proportion of ingroup students was only marginal for average sleep per night on weekdays (b = -.83, p = .092).

Sleep on Weekends

However, there was no significant main effect of race (b = .03, p = .743), main effect of proportion of ingroup students (b = .06, p = .719), or interaction effect between race and the proportion of ingroup students (b = -.06, p = .926) for average amount of sleep per night on weekends.

Academic Outcomes

There was a significant main effect of race for GPA (b = -.18, p = .000), such that White students reported higher GPA's (M =3.50 , SD = .55) than minority students (M = 3.40, SD = .61). There was no significant main effect of proportion of ingroup students (b = -.01, p = .834) or interaction effect between race and the proportion of ingroup students (b = .29, p = .201) for self-reported GPA.

Summary of Proportion Ingroup Findings

The results regarding the proportion of ingroup students suggest that the number of ingroup members at a university is related to students' mental health and physical health outcomes. However, for the most part these associations don't differ for students of different racial/ethnic groups. For all students, a greater proportion of ingroup students at the university was associated with lower levels of depression and anxiety symptoms as well as more average sleep per night on weekdays. There do seem to be differences with regards to a measure of general well-being. While greater proportions of ingroup students at the university was related to greater levels of flourishing for White students, it was associated with lower levels of flourishing

for minority students. In addition, the proportion of ingroup students was not associated with either students' average sleep per night on weekends or their self-reported GPA.

Exploratory analyses were also conducted such that the same models were run with race separated into 3 categories: Black and Latinx students, Asian students, and White students. See Table A17 in the Appendix for estimates and p values. These analyses revealed several significant interactions between race and the proportion of ingroup students at the university. For flourishing, depression, anxiety, and average sleep per night on weekdays, the effect of the proportion of ingroup students at the university was significantly different for Asian students compared to Black and Latinx students and Asian students compared to White students. For Asian students a greater proportion of ingroup students at the university was significantly associated with greater depressive symptoms, greater anxiety symptoms, lower levels of flourishing, and less sleep per night on weekdays. Alternatively, White students who attended universities with a greater proportion of ingroup students had lower levels of depression and anxiety symptoms, greater levels of flourishing, and reported more sleep per night on weekdays. The results for Black and Latinx students were more mixed. For these students, greater proportions of ingroup students at the university was significantly associated with lower levels of flourishing, but more sleep per night on weekdays. The proportion of ingroup students at the university was not related to Black and Latinx students' depressive and anxiety symptoms, although both of these estimates were negative. Therefore, it seems that the relationship between the proportion of ingroup students at the university and students' mental and physical health outcomes does differ for members of different minority groups for some health outcomes.

Proportion of Minority Students at University

For minority participants, the proportion of minority students at the university ranged from .07 to .47 (M = .27, SD = .09).[24] For White participants, the proportion of minority students at the university ranged from .07 to .71 (M = .21, SD = .09). For all analyses within this section, participant race (dichotomized as White or minority), proportion of minority students at the university, and the interaction between race and proportion minority were included as predictors and students' international status and the 6 university variables were included as covariates. Separate models were run for each outcome variable. See Table 21 for estimates, standard errors, and p values.

Mental Health

Flourishing

There were significant main effects of race (b = -.09, p = .000) and proportion of minority students (b = -.72, p = .002) for flourishing. Whites had greater levels of flourishing (M = 2.44 , SD = 1.05) than minorities (M = 2.60, SD = 1.12), but greater proportions of minority students at the university were associated with lower levels of flourishing for all students. There was no significant interaction effect between race and the proportion of minority students (b = .13, p = .583) for flourishing.

Depression

There was also a significant main effect of proportion of minority students for depression (b = .38, p = .038), such that greater proportions of minority students at the university were associated with greater depressive symptoms for all students. The main effect of race was only

[24] These values are almost exactly the same when comparing Black and Latinx students vs. Asian students. For Black and Latinx participants, the proportion of minority students at the university ranged from .08 to .47 (M = .27, SD = .10). For Asian participants, the proportion of ingroup students at the university ranged from .07 to .47 (M = .26, SD = .09).

marginally significant (b = .03, p = .059) and the interaction effect between race and the proportion of minority students was not significant (b = -.13, p = .393) for depression.

Anxiety

Again, there was a significant main effect of proportion of minority students for anxiety (b = .50, p = .019), such that greater proportions of minority students at the university were associated with greater anxiety symptoms for all students. There was no significant main effect of race (b = -.02, p = .184) or interaction between race and the proportion of minority students (b = -.24, p = .210) for anxiety.

Physical Health

Sleep on Weekdays

There was a significant main effect of race for average amount of sleep per night on weekdays (b = -.52, p = .000). White students slept more per night on weekdays (M = 7.86, SD = 1.39) than minority students (M = 7.28, SD = 1.55). The main effect of proportion of minority students was only marginally significant (b = -.30, p = .089) and the interaction between race and the proportion of minority students was not significant (b = .02, p = .967) for average amount of sleep per night on weekdays.

Sleep on Weekends

There was no significant main effect of race (b = .01, p = .888), main effect of proportion of minority students (b = -.21, p = .414), or interaction between race and the proportion of minority students (b = -.65, p = .127) for average amount of sleep per night on weekends.

Academic Outcomes

There was a significant main effect of race for GPA (b = -.17, p = .000), such that White students reported higher GPA's (M =3.50 , SD = .55) than minority students (M = 3.40, SD =

.61). There was no main effect of proportion of minority students (b = .09, p = .541) or interaction between race and the proportion of minority students (b = .03, p = .837) for GPA.

Summary of Proportion Minority Findings

The proportion of minority students at the university only seemed to be related to students' mental health outcomes and these relationships do not seem to differ by race. Both minority and White students with a greater proportion of minority students at the university had lower levels of flourishing and higher levels of depression and anxiety symptoms. However, the proportion of minority students at the university was unrelated to students' average amount of sleep per night on weekdays or weekends and their self-reported GPA.

Exploratory analyses were conducted in which the same models were run with race being separated in 3 categories: Black and Latinx students, Asian students, and White students. See Table A18 in the Appendix for estimates and p values. There were several significant interactions between race and the proportion of minority students at the university. The relationship between the proportion of minority students at the university and students' depression and anxiety was significantly different for Black and Latinx versus Asian students and Black and Latinx students versus White students. For Black and Latinx students, the relationship between the proportion of minority students at the university was unrelated to their depressive and anxiety symptoms, although both coefficients were negative. However, greater proportions of minority students at the university was associated with greater depressive and anxiety symptoms for both Asian and White students. These analyses also confirmed the main effect of proportion of minority students for flourishing for all students found in the main analyses. Together, these results suggest that the relationship between the proportion of minority

students at the university and students' mental health may differ for members of different minority groups.

Study 3 Discussion

Study 3's first objective was to test whether minority students fared better (mentally, physically, academically) at universities with a greater proportion of ingroup students and a greater proportion of minority students. The results from this study provided mixed support for my hypotheses. Neither measure of racial composition was associated with the average amount of sleep minority students reported having on weekends or their GPA. Additionally, the proportion of minority students at a university was unrelated to the average amount of sleep minority students reported having on weekdays. Greater proportions of ingroup students at a university were associated with fewer depressive symptoms, fewer anxiety symptoms, and more sleep on weekdays for minorities, which aligned with my hypotheses. However, contrary to my hypotheses, greater proportions of both ingroup and minority students at a university were associated with lower levels of flourishing and a greater proportion of minority students was also associated with more depressive and anxiety symptoms for minorities.

Study 3 provides mixed evidence as to whether greater racial diversity is positive for minorities' health, particularly their mental health. As such, the results from this study both coincide and conflict with previous research demonstrating the benefits of racial diversity for minorities. Minorities who reside in neighborhoods with more ingroup members have lower levels of depression and anxiety (Bécares et al., 2018) and report lower levels of negative health behaviors (e.g., smoking, drinking) (Bécares et al., 2012). It is thought these environments are less identity threatening (Purdie-Vaughns et al., 2008) and thus less stressful (Major & O'Brien, 2005), which is protective for minorities' mental and physical health. Study 3 suggests that

attending colleges with more ingroup members is also less threatening for minorities and is consequently associated with better health outcomes. However, Study 3 also found that greater proportions of ingroup students at a university was related to lower levels of flourishing among minorities. Perhaps having more ingroup members on campus protects minorities from some stressors that may lead to symptoms of negative mental health, but also brings new challenges that may wear on their positive psychological functioning. For example, greater proportions of ingroup members on campus may increase minorities' chances of interacting with ingroup members who behave in stereotypical ways, which is linked to lower self-esteem (Cohen & Garcia, 2005). Additionally, greater proportions of minority students was related to negative mental health outcomes for minorities, which also contradicts previous literature. Most of the previous literature demonstrates a protective effect of greater minority representation for minorities' mental health (Rucinski et al., 2019). However, minorities living in neighborhoods with more ingroup residents report lower levels of discrimination (Bécares et al., 2018), which is negatively associated with minorities' mental health (English et al., 2014; Walsemann, Bell, & Maitra, 2011). While universities with more minority students may have fewer White students, minorities may still face discrimination from members of other racial outgroups. The mixed evidence regarding the nature of the relationship between university racial composition and minorities' mental health indicate that there may be important moderators of this relationship.

Study 3 did not find a significant relationship between either measure of racial composition and minority students' GPA, which also diverges from previous findings. Greater ingroup (Benner & Crosnoe, 2011) and minority representation (Chang, 1999) are associated with higher academic achievement for minorities. However, a college/university's actual commitment to diversity may explain why actual levels of racial diversity were unrelated to

students' academic performance. Minority students' beliefs about how socially accepting their university is of minority students predicts how diverse they perceive their campus to be, above and beyond actual levels of minority student representation (Chen & Hamilton, 2015). Therefore, greater racial diversity at the university level may not confer benefits to minorities if they feel that the university does not truly accept them. In fact, Black students who were told that a future college course would include elements of Black culture in the curriculum performed better on subsequent mathematical and verbal tasks (Brannon et al., 2015). Therefore, future studies should investigate how minority students' perceptions of their college/university's commitment to diversity may shape whether university racial composition is related to their academic performance.

The second goal of this study was to test whether White students fared better (mentally, physically, academically) at universities with a greater proportion of ingroup students and a greater proportion of minority students, although I had no specific hypotheses. Neither measure of racial composition was associated with White students' academic performance or average amount of sleep on weekends. However, White students who attended universities with more ingroup students and fewer minority students reported better mental health outcomes: higher levels of flourishing and fewer depressive and anxious symptoms. A greater proportion of ingroup students at a university was also associated with more sleep on weekdays for Whites.

The results from Study 3 suggest that racial diversity may be harmful for Whites' mental and physical health, but unrelated to their academic performance. There is much less research investigating how racial diversity is associated with Whites' health outcomes, particularly physical health. Moreover, there is evidence that racial diversity is beneficial (Rucinski et al., 2019) and detrimental (Fisher et al., 2014) to White students' mental health. Thus, the findings

from Study 3 coincide with the latter findings. Research on interracial interactions has demonstrated that Whites often anticipate negative experiences during interracial interactions and thus report high anxiety (Plant et al., 2008). However, these negative feelings not only predict less interest in interracial contact in the future, but they also predict poorer interaction quality (Mallett & Wilson, 2010), confirming Whites unease about interracial interactions. White students who attend more racially diverse schools may be experiencing these negative emotions more often as well as more poor quality social interactions, which could have negative consequences to their mental and physical health in the long-term. On the other hand, the racial diversity of White students' schools was unrelated to their academic performance. This finding aligns with the rationale that the performance of members of high status groups is not as negatively impacted because they are not subject to the same pressures as members of low status groups (Sekaquaptewa & Thompson, 2002). Thus, greater racial diversity may be costly for some aspects of Whites' well-being and more research is needed to understand why this may be.

Study 3 demonstrated that the racial composition of the student body at colleges/universities is related to students' mental health and physical health, but unrelated to their academic performance. However, the results suggest that any benefits for students' health associated with racial diversity largely depend on the way racial diversity is operationalized. For both minority and White students, more ingroup students at the university was associated with better mental and physical health outcomes, while more minority students at the university was associated with poorer mental health outcomes. While some of these results align with those from Studies 1, 2a, and 2b, there are also numerous differences I will discuss below.

General Discussion

The goal of Chapter 1 was to examine whether the racial composition of college students' micro-climates was associated with both minority and White students' mental health, physical health, belonging, and academic outcomes. I also sought to test how different conceptualizations of racial diversity, greater proportions of ingroup members and greater proportions of minorities generally, were related to students' well-being across different micro-climates. See Tables 22 and 23 for a summary of the results for proportion ingroup and proportion minority across all 4 studies. The results demonstrate that not only is the racial composition of different collegiate micro-climates associated with minority and White students' health, belonging, and academic outcomes, but the way racial composition is operationalized matters. While greater ingroup representation in a micro-climate was largely associated with positive health, belonging, and academic outcomes for minorities, greater minority representation in a micro-climate was unassociated or sometimes negatively associated with minority students' outcomes, particularly mental health. For White students, greater numbers of Whites/fewer minorities within a micro-climate was mostly associated with better mental and physical health outcomes and a greater sense of belonging, but was unrelated to their academic outcomes. However, the findings above were not completely consistent across all 4 studies and much of this discussion will focus on factors that I believe help to explain these discrepancies.

The relationship between the racial composition of micro-climates and minorities' mental health varied somewhat across studies. While Studies 1 and 2a found no association between ingroup representation and minorities' mental health, there was a main effect of the proportion of ingroup students in Study 3, albeit the evidence for the direction of this relationship was mixed. However, results from Study 1 and some from Study 2a suggested that there was no relationship

between minority representation and minorities' mental health, but other results from Study 2a and results from Study 3 suggested that greater minority representation was detrimental for minorities' mental health. One important factor to consider is that the micro-climates across these 3 studies are different. Moreover, all of the null findings were found in the studies examining smaller micro-climates. Thus, it is possible that the racial composition of smaller micro-climates is not a strong contributor to minority college students' mental health. A more likely possibility is that because individuals within smaller micro-climates are more likely to encounter one another, the frequency and nature of these encounters likely play an important role in how the racial composition of these groups impact minorities' experiences and indicators of their mental health. On the other hand, the racial composition of a university may be more indicative of the overall campus climate or other features of the university that may contribute to minority students' well-being, like the student body's racial attitudes towards minorities or the number of race-based affinity groups. Therefore, it is important to explore how the racial composition of different micro-climates may be related to minorities' mental health as well as the different factors that may moderate this relationship across different micro-climates.

In contrast, the relationship between the racial composition of minority students' micro-climates and their physical health outcomes was more consistent across studies. Studies 1 and 3 found that greater ingroup representation was associated with better physical health outcomes for minorities. While Study 1 also found that greater minority representation was beneficial for minorities' physical health, Study 3 found that minority representation was unrelated to minorities' physical health. One interpretation of these results is that different conceptualizations of diversity are beneficial across different sized micro-climates. Within smaller groups minorities may not have very many options for contact with individuals who have similar experiences, so

both ingroup and minority representation are protective for their physical health. Alternatively, differences across different minority groups may be more important in larger groups and thus only ingroup representation is beneficial. Nevertheless, both greater ingroup and minority representation seem to be related to positive physical health outcomes for minority students. It is worth mentioning that the findings regarding the relationship between racial composition and minorities' mental health and their physical health do not follow the same pattern, which is unexpected. Yet, as I mentioned in the discussion for Study 1, it is possible different factors moderate the relationship between racial composition and minorities' mental health and physical health, respectively. Moreover, the physical health measures used assessed relatively minor symptoms (e.g., experiencing a cold, amount of sleep), while many of the mental health measures assessed more serious symptoms (e.g., depression, life satisfaction). This may also explain why the findings for these 2 constructs did not align with one another. Additional research should investigate how the racial diversity of different micro-climates may be differentially related to different facets of minority students' health.

The relationship between the racial composition of collegiate micro-climates and minorities' belonging and academic outcomes was somewhat consistent across studies. Minority group representation was unrelated to minority students' sense of belonging, academic performance, and feelings of stereotype threat across all studies. In contrast, there was evidence that ingroup representation was related to minorities' belonging and academic outcomes, although the nature of these relationships was inconsistent across studies. This pattern of results lends additional support to previous work that finds that ingroup representation may influence minority students' sense of belonging (Madsen et al., 2016) and academic performance (Brodbeck et al., 2011) over and above greater minority representation. However, while Study 1

found that greater ingroup representation can be beneficial for minorities' academic outcomes and belonging to their hall, Studies 2b and 3 found that ingroup representation was unrelated to minorities' academic outcomes and detrimental for their belonging to their university. There are several factors that may explain these inconsistent results.

While the varying results regarding ingroup representation and belonging can be explained by differences in the salience of group identity, the results for academic outcomes may be caused by competing effects of racial composition at the dorm room and university level. The dormitory halls in Study 1 represent meaningful groups for those students, so it follows that their representation within that group was related to their sense of belonging to that group. Students likely do not have a salient roommate identity, so their roommates may impact their introduction to other groups of students and sense of belonging more generally. As for academic outcomes, ingroup representation is thought to improve minorities' performance by reducing performance pressure (Kanter, 2008), but there is evidence that having a White roommate is related to better performance (Shook & Clay, 2012; Shook & Fazio, 2008). This suggests that within larger roommate groups, having more ingroup members may both reduce performance pressure and access to the academic resources Whites may provide. Previous research also demonstrates that greater racial heterogeneity is related to more racially segregated friendship (Moody, 2001). Thus, minorities at universities with more ingroup students are likely interacting with White students less, which may negate the positive impact of greater ingroup representation. However, greater ingroup representation on dormitory halls provides both benefits to minorities. These potential explanations stress the need to investigate the relationship between racial diversity and minority students' outcomes across different micro-climates.

This chapter also explored how the racial diversity of micro-climates was associated with White students' health, belonging, and academic outcomes. Consistently across studies, the racial composition of White students' micro-climates was unrelated to their academic outcomes, providing additional evidence that racial composition does not impact Whites' academic performance because of their status within the academic domain (Sekaquaptewa & Thompson, 2002). There was also evidence that the racial composition of collegiate micro-climates was associated with Whites' mental health, physical health, and belonging, although the direction of these associations varied somewhat across studies. Studies 1, 2a, and 3 found that greater racial diversity was negatively associated with Whites' mental health, sleep, and sense of belonging to their hall. However, Studies 1 and 2b found that greater ingroup representation (i.e. Whites) was associated with more stress, more physical health symptoms, and a lower sense of belonging to the university. As mentioned earlier in this chapter, there is much less research on the relationship between racial diversity and Whites' health and sense of belonging, and the existing findings are quite mixed, with some studies finding positive outcomes for Whites' sense of belonging (Juvonen et al., 2018) and mental health (Rucinski et al., 2019) and other studies finding the opposite (Fisher et al., 2014; Murphy & Zirkel, 2015; Trail et al., 2009). Thus, more research is needed to understand when and how the racial composition of various micro-climates are related to White students' health and belonging.

One major strength of the current studies is that they operationalize racial diversity in two different ways. Previous research often conflates different definitions of racial diversity so it is unclear how different conceptualizations of diversity may contribute to students' outcomes. The current study provides some evidence that different kinds of diversity may be more strongly associated with students' well-being, particularly for minorities. Another strength of these

studies is that they examine how racial diversity is associated with students' health, belonging, and academic outcomes across different micro-climates. Examining the racial composition of several different micro-climates allows for better understanding of when the relationship between racial diversity and students' outcomes may or may not differ. The studies also include micro-climates, like dormitory halls and dorm rooms, in which there is a limited amount of research concerning how the racial diversity of these contexts is associated with minority and White students' mental health, physical health, belonging, and academic outcomes. Moreover, Studies 2a and 2b extend previous research on roommate pairs by focusing exclusively on participants with more than 1 roommate in order to disentangle the effects of ingroup and minority representation among roommates. The studies in this chapter also include students from a variety of minority groups as well as White students. By including students from different racial/ethnic backgrounds, I was able to test whether the racial composition of micro-climates differed for members of different racial/ethnic groups. Another strength of these studies is that they incorporate data collected by different research teams from a number of universities. Utilizing data from a variety of sources aids in the external validity of these findings.

In addition to the aforementioned strengths, there are also several limitations of the current studies. First, the studies are all correlational, so I am unable to claim that the racial composition of micro-climates is causing differences in students' health, belonging, and academic outcomes. Future longitudinal research could help disentangle whether racial diversity is actually resulting in the beneficial and detrimental health, belonging, and academic outcomes demonstrated in the current studies. Studies 2a and 2b only examined the racial composition of triad roommate groups, which makes it difficult to determine if the racial diversity of roommate groups is related to student outcomes differently across roommate groups of different sizes.

However, the supplementary analyses using the full range of roommate group sizes of eligible participants in Study 2b largely mirror the results described above. Lastly, including data from studies conducted by other research teams presents additional limitations. Almost no outcomes were measured using the same questionnaires or the same time scale and some measures only consisted of 1 item. These studies also recruited participants that did not meet my inclusion criteria, which meant excluding large numbers of participants. The data was also collected using different methods across a large span of time. It is possible that some of the different findings across studies are not due to the different types of micro-climates but are a result of other differences across studies. Thus, future research should include the same measures in studies across different micro-climates at similar time points to ensure that any differences found are a result of the type of micro-climate.

Despite these limitations, I believe the results make a compelling case that the racial composition of collegiate micro-climates play some role in minority and White students' well-being and that future research is needed to better understand these relationships. One line of future research concerns determining whether or not the relationship between racial diversity and students' health, belonging, and academic outcomes differs across different types of micro-climates. Replicating the results here as well as examining the racial composition of other collegiate climates would help determine whether the micro-climate matters in determining the relationship between racial diversity and students' well-being. Future research should also measure diversity using racial heterogeneity (i.e., all groups have equal representation), which would further clarify what an optimally diverse micro-climate should look like. It would also be interesting to assess how minorities and Whites perceive different conceptualizations of diversity and whether these perceptions influence their outcomes. Supplementary analyses provided mixed

evidence as to whether the association between racial diversity and students' outcomes differed for members of different minority groups. Therefore, future studies should examine whether racial diversity impacts members of different minority groups in similar ways. Future research concerning potential moderators (e.g., frequency of contact, salience of group identity) of the relationship between racial diversity and students' health, belonging, and academic outcomes would be helpful in understanding the null effects found in the current studies. Exploring a university's commitment to diversity may aid in interpreting the mixed findings regarding racial diversity and Whites' health and belonging. Whites often report feeling excluded by multicultural diversity philosophies (Plaut et al., 2011), suggesting that greater racial diversity at schools that endorse this ideology should be related to detrimental outcomes for Whites. Experimental studies that manipulate the racial composition of fictional micro-climates and longitudinal studies examining the racial composition of existing micro-climates would provide causal evidence for the link between racial diversity and students' health, belonging, and academic outcomes.

The studies from Chapter 1 demonstrate that the racial composition of the micro-climates minority and White college students find themselves in is related to their mental health, physical health, belonging, and academic outcomes. Moreover, the nature of the relationship between racial composition and students' outcomes varies depending on the way racial composition is defined, particularly for minorities. With a better understanding of how the racial diversity of students' micro-climates may impact their health, belonging, and academic outcomes, universities may be better equipped to ensure that all students, regardless of race, are receiving the benefits purportedly provided by greater racial diversity.

Chapter 2: Racially Biased Micro-Climates:

Health, Belonging, and Academic Implications for Minorities

While an increasing number of Whites from 2009 to 2017 have acknowledged that racism is a big problem in society today (Neal, 2017), only a ⅓ of White Americans report that racism is a big problem when compared to other issues, such as affordability of healthcare and the federal budget deficit (Pew Research Center, 2019). In contrast, over 70% of Blacks and 60% of Hispanics endorse that racism is a big problem when considering other national issues (Pew Research Center, 2019). This large divide between Whites' and minorities' beliefs about the presence of racism suggests that not only do Whites and minorities perceive racism differently, but Whites and minorities have vastly divergent experiences with racism. A variety of research using different methodology demonstrates that racial bias not only continues to exist, but it can have detrimental effects on minorities' mental health, physical health, belonging, and academic outcomes.

Perceived Discrimination and Minorities' Health, Belonging, and Academic Outcomes

There is a relatively robust line of literature linking perceptions of discrimination to a variety of negative mental health and physical health outcomes (Pascoe & Smart Richman, 2009; Schmitt et al., 2014). While these associations hold across different kinds of discrimination, including gender (e.g., McDonald et al., 2014; Pavalko et al., 2003) and sexual orientation (e.g., (Bogart et al., 2013; Mays & Cochran, 2001), a majority of the studies on perceived discrimination and health outcomes examine racial discrimination (Pascoe & Smart Richman, 2009). Perceived racial discrimination has been linked to higher levels of psychological distress (Broman et al., 2000), perceived stress (Anderson, 2013; Todorova et al., 2010) and depressive symptoms (Karlson & Nazroo, 2002; Todorova et al., 2010) as well as actual diagnoses of major

depression (Kessler et al., 1999; McLaughlin et al., 2010), Post Traumatic Stress Disorder (PTSD), and anxiety disorders (McLaughlin et al., 2010). Perceived racial discrimination has even been associated with increases in psychosis (Karlson & Nazroo, 2002), including auditory and visual hallucinations (Oh et al., 2014), and greater likelihood of suicidal ideation (Tobler et al., 2013). In addition to poorer mental health, perceived racial discrimination is also linked to a host of negative physical health outcomes for minorities. Not only is perceived racial discrimination predictive of a number of medical conditions, like hypertension (Dolezsar et al., 2014), respiratory disease (Karlson & Nazroo, 2002; Todorova et al., 2010), arthritis, being overweight, and gastrointestinal disease (Todorova et al., 2010), but it is also associated with symptoms that are known as precursors to more serious medical diagnoses. For example, reports of chronic racial discrimination are associated with coronary artery calcification (Lewis et al., 2006) and heightened cortisol responses during sleep (Zeiders et al., 2014). Taken together, this research demonstrates that for minorities, believing they and/or their group has been discriminated against has consequences for their mental and physical health.

One alternative explanation for the association between perceived discrimination and health is that people who have poorer health are more likely to claim they have experienced discrimination. Several longitudinal studies partly address this alternative interpretation and suggest this is not the case. Perceived discrimination predicts higher levels of psychological distress up to five years later, even after controlling for baseline mental health (Pavalko et al., 2003; Schulz et al., 2006). However, psychological distress at baseline does not predict subsequent levels of perceived discrimination a year later (Brown et al., 2000). Moreover, most of the findings concerning perceived discrimination and physical health hold when controlling for various risk factors, like Body Mass Index (BMI; Lewis et al., 2006), chronic health

conditions (Lewis et al., 2010), and family poverty (Brody et al., 2014). Lastly experimental studies that expose minorities to discriminatory stimuli or actual mistreatment, have illustrated that minorities who experience discrimination show elevated cardiovascular reactivity immediately after exposure and during the recovery period after exposure (Fang & Myers, 2001; Guyll et al., 2001; McNeilly et al., 1995). These studies suggest that experiencing racial discrimination results in negative mental and physical health outcomes.

Although a bulk of the perceived discrimination research has focused on its impact on health, there has been research investigating how perceived discrimination is related to academic outcomes. A study on graduate students, postdoctoral researchers and faculty members found a positive association between interpersonal discrimination and stress, with stress predicting lower academic performance (O'Brien et al., 2016). Additionally, Black adolescents who reported more experiences of racial discrimination, generally or from teachers specifically, had lower self-reported grades (Neblett et al., 2006; Thomas et al., 2009). One reason perceived discrimination may be negatively related to academic performance is its negative association with academic orientation. For adolescent minority students, perceived racial discrimination is associated with lower behavioral engagement, less persistence in school (Dotterer & Lowe, 2015; Neblett et al., 2006), lower academic self-esteem (Dotterer & Lowe, 2015), and higher likelihood of skipping school (Tobler et al., 2013). Moreover, the negative changes in academic orientation associated with perceived discrimination in 5th grade mediated the negative relationship between perceived discrimination and college enrollment 8 years later (O'Hara et al., 2012). In another study, Black college students who perceived their group as a target of discrimination were more likely to devalue the importance of academic success (Schmader et al., 2001), which is associated with lower grades (Loose et al., 2012). Minority students might distance themselves from academics

because of the negative experiences they face within collegiate micro-climates, ultimately leading to poorer performance.

Minority students' academic performance may also suffer due to perceived discrimination's effect on their social integration within the academic context. Students of color who report experiencing racial discrimination perceive college campuses as more hostile than their White counterparts (Rankin & Reason, 2005) and feel a lesser sense of belonging (Levin et al., 2006). These perceptions are important because students who feel like they don't belong in college report poorer academic performance (Walton & Cohen, 2007). Moreover, social integration on college campuses, like attending events on campus, is associated with higher GPA (Saenz et al., 1999). However, perceived discrimination does not allow for minorities to feel included on campus and minority students often do not achieve the same level of social integration, which would predict poorer academic performance. This is supported by findings that feelings of belonging predict second semester grades for minority students, but not for White students (Murphy & Zirkel, 2015). This research demonstrates that feeling like one is targeted because of one's racial/ethnic identity in a collegiate micro-climate can be harmful to not only minorities' social experience but their academic experience as well.

Overall this literature paints a disturbing picture about how perceived racial discrimination can impact minorities' health, belonging, and academic outcomes. While this literature aids in our understanding of how experiencing discrimination is associated with minorities' well-being, there are some limitations. Perceived discrimination studies typically rely on asking participants about whether they have experienced discrimination and thus only capture minorities' perceptions of the world around them. By asking participants about their perceptions of their environment rather than measuring the actual environment, it is possible that minorities

are over-reporting or under-reporting the actual amount of discrimination they experience. Given the wide range of negative effects associated with mere perceived discrimination and the possibility that the current levels of discrimination reported could be an underestimation or an overestimation, it is important to capture racial bias in a micro-climate using alternative methods in order to better understand what minorities may encounter on a daily basis.

Aggregate Levels of Racial Bias

Researchers within the last decade have focused their attention on trying to authentically capture how racial bias is related to minorities' well-being by measuring the attitudes of the individuals in the communities where minorities reside. Researchers using direct measures of bias within a community have found that greater levels of both implicit and explicit bias are linked to a variety of negative outcomes. Living in areas with greater levels of aggregate explicit racial bias at both the county and metropolitan level is related to reduced efficacy of an intervention to improve condom use (Reid et al., 2014), greater risk of death from circulatory disease (Leitner et al., 2016), and greater risk of all-cause mortality (Lee et al., 2015) amongst Blacks. Living in areas with greater levels of both aggregate implicit and explicit racial bias is also associated with larger disparities in Black-White infant mortality (Orchard & Price, 2017). Aggregate bias has also been linked to negative outcomes other than physical health. Counties, metropolitan areas, and states with greater levels of both implicit (Hehman et al., 2018; Leitner et al., 2018; Riddle & Sinclair, 2019) and explicit bias (Leitner et al., 2018; Riddle & Sinclair, 2019) have greater Black-White disciplinary gaps (Riddle & Sinclair, 2019), greater Black-White disparities in fatal police shootings (Hehman et al., 2018), and lower levels of spending on state-level Medicaid (Leitner et al., 2018). All of this research provides evidence that residing in

an area with greater racial bias, measured both implicitly and explicitly, is correlated with a variety of negative health outcomes and some educational outcomes.

While implicit racial bias is associated with more negative affect (Vorauer & Kumhyr, 2001) and greater impaired performance (Murphy et al., 2013) than explicit bias in dyadic interracial interactions, studies using aggregate levels of racial bias find that implicit and explicit bias generally predict the same outcomes. Hehman et al. (2019) note that implicit and explicit bias are highly correlated at the regional level and suggest that regional levels of implicit and explicit bias could be tapping into the same phenomenon. Other researchers have argued that implicit bias is actually measuring the level of systemic bias within a particular context and the influence of certain contexts on the accessibility of particular attitudes and associations may explain why individual implicit bias scores can vary at different time points (Payne et al., 2017). However, by averaging the implicit bias scores across a number of individuals, one is able to discard the individual differences that each individual may bring and tap into the stable associations that are shared across all of the individuals (Payne et al., 2017). If the aggregate level of implicit bias is tapping into the general level of bias that exists within a particular context, then it seems reasonable that aggregate implicit and explicit bias predict the same outcomes as they are both measuring aspects of the general bias within a community.

However, there is evidence that aggregated implicit and explicit bias may differ in how strongly they are related to certain outcomes. In some instances explicit bias is a better predictor than implicit bias (Leitner et al., 2016; Orchard & Price, 2017; Riddle & Sinclair, 2019), while in other instances implicit bias is the better predictor (Hehman et al., 2018). Thus, implicit and explicit bias may predict the same outcomes, albeit through different mechanisms. One study concerning individual level racial bias supports the idea that implicit and explicit bias may work

through different mechanisms: even though both teachers' implicit and explicit racial bias predicted poorer test performance, only anxiety mediated the relationship between teacher's implicit bias and student's test performance (Jacoby-Senghor et al., 2016). It is possible that unknown mechanisms may provide insight into why aggregated implicit and explicit bias are stronger predictors for certain outcomes and not others. However, all of the studies concerning aggregate racial bias have measured bias at a macro-level (e.g., county, metropolitan area, state). It is not clear if aggregated levels of implicit and explicit bias work similarly when one considers the racial bias of smaller micro-climates, like dormitory halls. Given that individual level implicit bias and explicit bias predict different behaviors (Dovidio et al., 1997) and the correlation between aggregated levels of implicit and explicit bias become larger as the unit of aggregation increases (Hehman et al., 2019), aggregated implicit bias and explicit bias at a more micro-level may not predict the same outcomes. Thus, it is important to test whether the racial attitudes, measured both implicitly and explicitly, of the individuals within a micro-climate are associated with minorities' health, belonging, and academic outcomes.

Current Study

Studies regarding perceived discrimination and aggregated measures of racial bias demonstrate that minorities' health, belonging, and academic outcomes are influenced by the attitudes of other individuals they may encounter. While the studies looking at aggregate levels of bias move beyond minorities' perceptions and measure the level of bias surrounding minorities, there is no evidence that aggregated bias in smaller micro-climates is similarly associated with minorities' well-being. Moreover, it is important to explore how the attitudes of the other individuals in smaller micro-climates may impact minorities as these individuals may be more salient on a day-to-day basis. In this chapter I examined how the attitudes of the

individuals within a micro-climate were associated with students' outcomes. Specifically, I was interested in the influence of both implicit and explicit racial bias in order to see whether aggregate levels of implicit and explicit bias function similarly on a more micro-level as they do on the macro-level. Additionally, I tested whether the impact of racial bias on students' outcomes was distinguishable from that of perceived discrimination. Thus, my main research question was whether being in a micro-climate with racially biased Whites, above and beyond perceptions of racial bias, was associated with minority students' mental health, physical health, belonging, and academic outcomes.

Using the data from Study 1, I focused on Black, Latinx, and Asian first year undergraduate students living on campus at a private, medium sized, suburban university located in the northeastern United States and the average amount of racial bias endorsed by the White undergraduate students that lived on their dormitory hall. I pre-registered that hall bias would be calculated using the mean because previous research on aggregated bias has used mean levels of bias and the mean would provide a broader overview of the bias on students' halls. Given the wealth of evidence on the negative effects of perceived discrimination (Levin et al., 2006; Pascoe & Smart Richman, 2009) and residing in a geographic region with biased individuals (Leitner et al., 2016; Riddle & Sinclair, 2019), I predicted that Black, Latinx, and Asian students with a greater level of racial bias among Whites in their micro-climate would experience poorer mental health, physical health, belonging, and academic outcomes.

Study 4

Method

Participants. Six hundred and ninety-eight undergraduates participated in the study. All participants who self-identified as multi-racial (N = 43) or who did not self-identify as Black,

Latinx, Asian, or White (N = 64) were excluded from the sample. This resulted in an initial sample of 292 minority participants and 299 White participants. For this study, I am considering minority participants as respondents, although each minority group will be examined separately, and White participants as hallmates. As such, I am only interested in minorities' responses to the perceived discrimination and dependent (mental health, physical health, belonging, and academic outcomes) measures and Whites' responses to measures of racial bias. Thus, I will first discuss the minority sample and then the White sample. All minority participants who did not self-identify as first-year students (N = 35) and who did not have any White hallmates complete the survey or the racial bias measures (N = 11) were excluded from the sample. Minority participants who did not complete any of the dependent measures were not included in the analyses (N = 6). This resulted in a final sample of 257 minority undergraduates: 58 participants were Black, 38 participants were Latinx, and 161 participants were Asian. Among Black participants, 36 participants were female (62%). Among Latinx participants, 22 participants were female (58%). Among Asian participants, 97 participants were female (60%).

All White participants who belonged to a hall in which no Black, Latinx, or Asian participants completed the survey were not included in the analyses (N = 6). All White participants who did not complete either of the racial bias measures (N = 13) were not included in the analyses. This resulted in a final sample of 280 White participants, with 140 participants being female (50%). However, 33 White participants did not complete the IAT. While these participants' implicit bias scores were not included in the mean implicit bias score calculated for their hall, their explicit bias scores were included in the mean explicit bias score calculated for their hall. One participant did not complete the feeling thermometer regarding Whites and 1 other participant did not complete the feeling thermometer regarding Asians. While these

participants' explicit bias scores were not included in either any mean explicit bias scores calculated for their hall or in the mean pro-White/anti-Asian explicit bias score calculated for their hall, respectively, their implicit bias scores were included in the mean implicit bias score calculated for their hall.

As mentioned above, the analyses were conducted for each minority group separately, as was pre-registered.[25] For the Black participant sample, the participants were distributed across 44 of the 82 halls, and 150 White participants completed either the implicit or explicit racial bias measures (20 participants only completed the explicit racial bias measures). For the Latinx participant sample, the participants were distributed across 35 of the 82 halls, and 132 White participants completed either the implicit or explicit racial bias measures (19 participants only completed the explicit racial bias measures and 1 participant only completed the implicit bias measure). For the Asian participant sample, the participants were distributed across 72 of the 82 halls, and 280 White participants completed either the implicit or explicit racial bias measures (33 participants only completed the explicit racial bias measures and 2 participants only completed the implicit racial bias measure).

Procedure. The procedures for this study are identical to those of Study 1, with one exception. As mentioned earlier, the survey was sent to the upperclassmen students who head the first-year students' residential advising groups. While these students' survey responses were not included in Study 1, the White advising group leaders' racial bias scores were included in this study. Not only do these students live on the same hall as their advisees, but they also spend a lot

[25] I pre-registered that I would conduct models for each racial group separately and then conduct models which collapsed across race with race and the interaction between race and hall implicit and explicit biases as additional predictors. However, the null results from these initial analyses suggested that the more complex model would not be informative.

of time with their advisees. As such, it is important to capture whether their racial bias might also be contributing to minority students' outcomes.

Measures. After answering demographic questions, all participants then completed measures presented together under the subsequent headings in the following order: Belonging, Academic, Mental and Physical Health, and Racial Bias and Discrimination. Within each category, questionnaires were randomized with the exception of the Racial Bias and Discrimination measures. The implicit bias measure was always presented last among the Racial Bias and Discrimination measures. While stereotype threat is an academic outcome, it was presented with the bias and discrimination measures in order to prevent students from knowing the true objective of the study. All of the belonging, academic, and mental and physical health measures were described in Study 1. Therefore, I will only describe the measures that are new to this study.[26]

Racial Bias and Discrimination

Perceived Discrimination. One item measured participants' perceptions of personal racial discrimination within their residential advising group. The item was adapted from the personal perceived racial discrimination item used by Sidanius et al. (2008). The item read, "I have experienced discrimination in my zee group because of my ethnicity." Participants indicated the degree to which they agreed with the statement on a 7-point scale, ranging from *strongly disagree* (1) to *strongly agree* (7).

Explicit racial bias. Participants completed feeling thermometers to measure explicit racial bias. Participants indicated their general feeling of warmth or coolness towards the following racial groups: Blacks, Whites, Latinos, and Asians. In order to conceal my interest in

[26] See the Appendix for all measures included in this study.

racial bias specifically, I also included feeling thermometers for males, females, and various socioeconomic classes. For all groups, the thermometers ranged from 0 to 100, with 0 representing coolness and 100 representing warmth. I subtracted participants' Black, Latinx, and Asian explicit bias scores from their White explicit bias scores in order to create an explicit bias variable that mirrors the comparison between different racial groups as used by the IAT. More positive scores indicated more favorable explicit attitudes towards Whites.

Implicit bias. Participants completed a version of the brief multi-factor IAT (Sriram & Greenwald, 2009). Participants saw White, Black, Asian, and Latinx faces taken from Axt et al. (2014). A first initial and a stereotypical last name were included under each face to aid in categorization. Both male and female faces were used. Examples are provided in the Appendix. Faces from a particular racial category were paired with faces from every other racial category in a random order. The IAT measures the strength of an association between positive/negative attributes and racial groups by taking the standardized mean difference score of the 'hypothesis-inconsistent' pairings and 'hypothesis-consistent' pairings (d-score) (Greenwald et al., 2003). The software Inquisit, the program that runs the IAT, calculated the d-scores using the improved scoring algorithm as described in Greenwald et al. (2003). Positive scores indicated a pro-White, anti-Black/Latinx/Asian bias and negative scores indicated a pro-Black/Latinx/Asian, anti-White bias.

Explicit Bias on the Hall. To measure the amount of explicit bias on participants' dormitory halls, I calculated the mean level of explicit bias among their hallmates by averaging White hallmates' appropriate explicit bias difference scores. For Black participants, I calculated the mean pro-White/anti-Black explicit bias among their White hallmates. For Latinx participants, I calculated the mean pro-White/anti-Latinx explicit bias among their White

hallmates. For Asian participants, I calculated the mean pro-White/anti-Asian explicit bias among their White hallmates.

Implicit Bias on the Hall. To measure the amount of implicit bias on participants' dormitory halls, I calculated the mean level of implicit bias among their hallmates by averaging White hallmates' appropriate d scores. For Black participants, I calculated the mean pro-White/anti-Black implicit bias among their White hallmates. For Latinx participants, I calculated the mean pro-White/anti-Latinx implicit bias among their White hallmates. For Asian participants, I calculated the mean pro-White/anti-Asian implicit bias among their White hallmates.

Results

Means, standard deviations, and correlations between the predictor and outcome variables are presented in Tables 24, 25, and 26. These tables contain the descriptive statistics for Black, Latinx, and Asian participants, respectively. For all analyses, multi-level modeling was used to control for the fact that some participants in the sample belonged on the same dormitory hall. Participants' hall ID was included as a random factor. Additionally, the average amount of implicit bias on the hall, the average amount of explicit bias on the hall, and participants' perception of personally experienced racial discrimination on the hall were included as predictors in all analyses. Separate models were run for each outcome variable.

Black Participants

For Black participants, the average amount of implicit bias among their hallmates ranged from -.70 to .68 (M = -.03, SD = .33). The average amount of explicit bias among their hallmates ranged from -31 to 35 (M = 1.18, SD = 15.02). The average level of personal racial discrimination experienced on the hall ranged from 1 to 7 (M = 1.98, SD = 1.50).

Average Implicit and Explicit Bias Among Hallmates

There were no significant relationships between the average implicit bias among White hallmates or the average explicit bias among White hallmates and Black students' mental health, physical health, belonging, and academic outcomes. See Table 27 for estimates, standard errors, and p values.

Perceived Discrimination

The level of personal perceived discrimination on the hall was also unrelated to almost all of Black students' outcomes. However, personal perceived racial discrimination on the hall was significantly associated with Black students' sense of belonging to their hall (b = -.37, p = .015), such that Black participants who reported personally experiencing racial discrimination on their hall had a lower sense of belonging to their hall.

Latinx Participants

For Latinx participants, the average amount of implicit bias among their hallmates ranged from -.84 to .63 (M = -.05, SD = .33). The average amount of explicit bias among their hallmates ranged from -33 to 47 (M = -.40, SD = 14.14). The average level of personal discrimination experienced on the hall ranged from 1 to 5 (M = 1.50, SD = 1.01).

Average Implicit and Explicit Bias Among Hallmates

As with Black participants, the average amount of implicit bias and explicit bias among White hallmates was unrelated to Latinx students' mental health, physical health, belonging, and academic outcomes. See Table 28 for estimates, standard errors, and p values.

Perceived Discrimination

While Latinx students' perceptions of personal racial discrimination on the hall was unrelated to most of their outcomes, the perceived racial discrimination experienced personally

on the hall was significantly associated with Latinx students' sense of belonging to their hall (b = -.62, p = .017), such that Latin participants who reported personally experiencing racial discrimination on their hall had a lower sense of belonging to their hall.

Asian Participants

For Asian participants, the average amount of implicit bias among their hallmates ranged from -.63 to .88 (M = .03, SD = .31). The average amount of explicit bias among their hallmates ranged from -29 to 39 (M = .99, SD = 12.09). The average level of personal discrimination experienced on the hall ranged from 1 to 5 (M = 1.34, SD = .82).

Average Implicit Bias Among Hallmates

Again, the average amount of implicit bias among White hallmates was unrelated to Asian students' mental health, physical health, belonging, and academic outcomes. See Table 29 for estimates, standard errors, and p values.

Average Explicit Bias Among Hallmates

Greater amounts of average explicit pro-White/anti-Asian bias among White hallmates was significantly associated with a greater feelings of stereotype threat (b = .02, p = .033) for Asian students. However, the average amount of explicit bias among White hallmates was only marginally related to Asian students' physical health symptoms (b = -.01, p = .064) and was unrelated to all other measures of Asian students' mental health, belonging, and academic outcomes.

Perceived Discrimination

The level of perceived racial discrimination experienced personally on the hall was significantly related to Asian students' sense of belonging to the hall (b = -.45, p = .004) and their sense of stereotype threat (b = .56, p = .000). Asian students who reported personally

experiencing racial discrimination on their hall had a lower sense of belonging to their hall and experienced more stereotype threat. Perceived racial discrimination on the hall was only marginally significant for Asian students' physical health symptoms (b = .11, p = .092) and was unrelated to the other measures of Asian students' mental health, belonging, and academic outcomes.

Discussion

The primary aim of this study was to examine whether being in a micro-climate with racially biased Whites was related to Black, Latinx, and Asian students' mental health, physical health, belonging and academic outcomes respectively. The results predominantly did not support my hypothesis. After controlling for perceived personal racial discrimination on the hall, the average level of implicit and explicit bias among White hallmates was not significantly related to minorities' perceived stress, depressive symptoms, physical health symptoms, sense of belonging to the hall and to the university, and self-reported GPA. While neither average White hallmates' implicit or explicit bias was associated with any outcomes for Black and Latinx students, only White hallmates' explicit bias was associated with Asian students' feelings of stereotype threat. This relationship was in the predicted direction. Greater explicit bias among White hallmates was associated with greater stereotype threat among Asian students. Contrary to expectations, perceived discrimination was not consistently related to most measures of minorities' mental health, physical health, belonging, and academic outcomes. Perceived discrimination on the hall was associated with lower belonging on the hall for Black, Latinx, and Asian students and greater stereotype threat for Asian students.

These results do not reflect the findings from the literature concerning aggregate levels of racial bias. Minorities who live in regions with Whites who have greater implicit and explicit

racial bias have poorer physical health (Lee et al., 2015; Leitner et al., 2016; Orchard & Price, 2017) and academic outcomes (Riddle & Sinclair, 2019). Moreover, Whites who interact with a single individual who has implicit racial bias report more negative affect after the interaction (Vorauer & Kumhyr, 2001) and demonstrate impaired cognitive performance (Murphy et al., 2013). Based on these findings, one would expect that greater levels of implicit and explicit racial bias in a micro-climate would be associated with more negative mental health, physical health and academic outcomes for minorities, which was not the case for almost all outcomes in this study. The one exception was that greater levels of explicit bias on the hall was related to more stereotype threat for Asian students, which aligns with previous findings.

I also did not find a link between perceptions of discrimination and minorities' mental health, physical health, and academic outcomes, which is particularly surprising. Perceptions of racial discrimination are associated with a greater prevalence of mental health issues, including perceived stress (Anderson, 2013) and depressive symptoms (Todorova et al., 2010), as well as physical health symptoms that are believed to be indicators of future medical diagnoses (Lewis et al., 2006; Zeiders et al., 2014). Previous research has also demonstrated that minority students who say they experience more racial discrimination have lower self-reported grades (Neblett et al., 2006). Thus, the consistent null relationship between perceived discrimination and all measures of mental and physical health and academic outcomes in the current study is quite unexpected. However, minority students in this study who perceived experiencing racial discrimination on their hall reported lower levels of belonging to their hall, which is aligned with previous research on perceived discrimination (Levin et al., 2006). One interpretation of these findings and the results regarding racial bias is that the racial attitudes of other individuals within a micro-climate are irrelevant to minority students' health and academic outcomes. However, I

believe there are several important moderators that may explain why implicit and explicit racial bias and perceived discrimination were unrelated to minority students' outcomes in this study.

One factor that may have influenced whether bias or discrimination were related to students' outcomes is how minorities interpreted the negative behavior they may have encountered. Whites' implicit bias is associated with negative nonverbal behaviors during interracial interactions (e.g., Dovidio et al., 1997). However, many of these negative nonverbal behaviors are quite ambiguous and thus must be interpreted by the minority individuals who experience them (Dovidio, Hebl, Richeson, & Shelton, 2006, as cited by West et al., 2014). While these behaviors are often interpreted as signs of dislike (Dovidio, West, Pearson, Gaertner, & Kawakami, 2007, as cited by West et al., 2014), they could also be attributed to nervousness or stress caused by some outside event. If these negative experiences are not registered as incidents of racial prejudice, then they should be unrelated to minorities' outcomes. Although this seems unlikely, as there is evidence that individuals are more likely to make negative assumptions about behaviors from members of racial outgroups than they would for ingroup members (e.g., Pearson et al., 2008; Shelton & Richeson, 2005), research on perceived discrimination suggests there are additional factors that determine whether perceptions of prejudice are harmful to minorities' well-being.

Despite the abundance of evidence that perceived discrimination is associated with a host of negative outcomes, there is some evidence that perceptions of discrimination can be protective. For example, women who attributed the cause of negative feedback to discrimination had higher self-esteem than women who attributed the cause of negative feedback to their own ability (Major et al., 2003). Crocker and Major (1989) argue that attributing negative experiences to prejudice towards one's group allows members of stigmatized groups to externalize rather

than internalize the cause of negative experiences. If minorities can blame negative behavior they experience on prejudice, then they cannot blame some aspect of themselves for warranting this negative behavior. What determines whether negative behavior can be attributed to racial bias? A review by Barreto and Ellemers (2005) discusses that in situations where discriminatory behavior is obvious, attributing the negative outcomes to prejudice is reasonable and therefore likely to protect well-being. This may explain why more overt signs of prejudice, like explicit bias and discrimination, were unrelated to minority students' health and academic outcomes in this study. When an individual expresses explicit bias or is deliberately discriminative, then it should be easier for minorities to blame this negative behavior on the other person, preserving minorities' health and academic well-being. This is supported by findings that minorities who are confronted with blatant racial bias and those who are confronted with no racial bias have similar levels of performance on a cognitive task (Murphy et al., 2013; Salvatore & Shelton, 2007). Nevertheless, there are other factors that determine whether minorities will attribute a negative outcome to racial bias.

An individuals' belief about how pervasive prejudice is has been demonstrated to moderate the relationship between perceived discrimination and well-being (Barreto & Ellemers, 2005). Women who believed prejudice was pervasive experienced more depressive affect and lower self-esteem after experiencing subtle discrimination than women who believed prejudice was rare (Stroebe et al., 2011). The authors argue that the belief that prejudice is pervasive is harmful not only because it means that one is likely to experience prejudice in the future, but it also threatens beliefs that the world is a just place (Barreto & Ellemers, 2005; Stroebe et al., 2011). Perhaps participants do not see racial prejudice as pervasive at their university, thus the negative interactions they experience on their hall are less threatening and they do not experience

any deleterious effects on their mental health, physical health, belonging, or academic outcomes. This also helps explain why perceived discrimination was not associated with a majority of minorities' health, belonging, and academic outcomes in this study. Participants might have interpreted their hallmates' behavior as racial discrimination, but if they saw those occurrences as rare, then those experiences would not be associated with their well-being in the same way as someone who believed that prejudice was a problem they would encounter frequently. While this is only speculation, understanding how minorities interpret the negative racial experiences they may have might help elucidate how the level of racial bias within a micro-climate is related to minority students' health, belonging, and academic outcomes.

The existence of a social support system outside of minorities' halls may also explain why there was no association between the level of bias on minorities' halls and their health, belonging, and academic outcomes. Friendships are known to buffer individuals from a variety of adverse events, including the negative effects of peer victimization (Hodges et al., 1999) and stress related to negative daily experiences (Adams et al., 2011). Friendships are also associated with greater involvement (Berndt & Keefe, 1995) and belonging (Hamm & Faircloth, 2005) in school. Social support, while related to but distinct from friendship, is a moderator between perceived racial discrimination and negative health outcomes, like depression (Marshall-Fabien & Miller, 2016) and blood pressure (Krieger et al., 1990). Findings from both literatures suggest that friendship could be a buffer against biased hallmates on minorities' health, belonging, and academic outcomes. If participants in this study had a supportive social network outside of their hall, particularly those with more racially biased hallmates, then it would follow that the level of bias on their hall would be unrelated to their health, belonging, and academic outcomes.

The diversity of minorities' friendship networks may also moderate the relationship between the level of racial bias on minorities' halls and their outcomes. While there is some evidence that ingroup friendships are more stable (Rude & Herda, 2010) and more intimate (Aboud et al., 2003; Kao & Joyner, 2004) than outgroup friendships, having ingroup (Grier-Reed & Wilson, 2015; McGill et al., 2012) and outgroups friendships (Page-Gould et al., 2014; Shook & Clay, 2012) predicts fewer depressive symptoms and greater belonging for minorities. Thus, minorities with more diverse social networks might have a more diverse set of support providers which could shield their health, belonging, and academic well-being from the effects of racial bias. Participants were asked to list up to 5 of their closest friends outside of their hall and indicate the race of those friends. Therefore, in future analyses I can gauge whether the size and diversity of minority students' friendship networks moderate the relationship between the level of racial bias in a micro-climate and minorities' health, belonging, and academic outcomes.

Lastly, the nature of minority students' relationship with their hallmates is another factor that may help elucidate why hallmates' racial bias was unrelated to minority students' outcomes in this study. Perhaps, minorities avoided interacting with their hallmates who had negative attitudes towards their group. Previous research has shown that members of stigmatized groups who have negative expectations about interacting with an outgroup member (Plant et al., 2008) or believe they are likely to be stereotyped by an outgroup member (Pinel, 1999) have a strong desire to avoid the interaction (Plant et al., 2008) or avoid topics that could arouse stereotyping (Pinel, 1999). Thus, avoidance is a reasonable strategy for minority students who expect to encounter bias on their hall. If minorities can avoid racially biased hallmates, then the level of bias on their hall is likely to be unassociated with their health, belonging, and academic outcomes.

However, minority students may not always be able to avoid biased hallmates. In these situations, minority students may also develop feelings of closeness to these hallmates. Qualitative responses from Black college students demonstrate that making external attributions for prejudiced behavior is more difficult when those demonstrating the prejudiced behavior are friends as opposed to strangers (Wilkins, 2012). Thus, minorities who feel close to biased hallmates are not only more likely to experience bias because they are potentially spending more time with biased Whites, but they are also less capable of coping with their biased behavior. Alternatively, minority students who may interact with biased hallmates frequently, but are psychologically distant, have an easier time attributing their hallmates prejudiced behavior to bias and can maintain their well-being. Therefore, how often minority students interact and how close they feel to biased hallmates may moderate whether the level of bias within a micro-climate is associated with minority students' health, belonging, and academic outcomes. Participants indicated how frequently they interacted with and how close they felt to each hallmate, so future analyses can test if participants' relationships to the individuals within a micro-climate moderate the relationship between those individuals' racial bias and minority students' outcomes.

One major strength of this study is that it captures how racially biased a micro-climate is by measuring the implicit and explicit racial bias of the individuals within a micro-climate. Research regarding the negative effects associated with perceived discrimination mostly rely on self-report. While these self-reports of perceived discrimination are associated with a variety of outcomes, it is possible that racial minorities are under-estimating or over-estimating the amount of racial prejudice they face. By measuring the levels of implicit and explicit bias among minority students' hallmates, I am able to address the critique that perceived discrimination, and

the negative outcomes associated with it, are all in minorities' heads. While more recent research measuring implicit and explicit bias at the county or metropolitan level has conferred a better understanding of the impact of more structural levels of bias, these studies do not capture how the bias in smaller micro-climates that are much more pertinent to minorities' everyday lives is related to their mental health, physical health, belonging and academic outcomes. Lastly, this study asked participants about the nature of their relationships with their hallmates as well as their social network outside of this micro-climate. Minority college students are embedded within a complex array of micro-climates and measuring various aspects of these different micro-climates aids in our ability to interpret how minorities' experiences within micro-climates are associated with their health, belonging, and academic outcomes.

Despite the strengths of this study, it also has a number of limitations. One limitation is the participation rate. While approximately half of the first-year class completed the study, there are much fewer minority students to begin with, particularly Black and Latinx students. Only recruiting half of the first-year class lowers the power of the analyses and the likelihood of detecting significant effects. Additionally, about 80% of the participants only had 4 White hallmates or less complete the study. By only measuring the racial bias of a few hallmates, I was only able to measure a small portion of the level of racial bias on minority students' hall. It is also possible that White students who were racially biased heard about the racial bias measures and chose not to complete the study. However, students were asked not to discuss the nature of the questions and the study was not advertised to be about racial bias, so this is unlikely. Future studies should collect data from a larger number of individuals within a micro-climate to ensure that the level of racial bias is an accurate representation of the bias within that micro-climate. The online survey platform used to administer the IAT was another limitation of the study.

Students could not be forced to click the link that took them to the online IAT, which allowed some students to complete the study without completing the IAT. However, a majority of participants did complete the IAT and recruiting students to come into the lab to take the online survey would have likely resulted in lower levels of participation.

Despite these limitations, this study provides some evidence and a theoretical basis for further exploration into the relationship between the amount of racial bias in collegiate micro-climates and minority students' mental health, physical health, belonging, and academic outcomes. Other analyses using different models could be used in the current or future studies to examine whether there is a threshold at which bias becomes harmful or whether Whites with pro-Black attitudes neutralize the effects of those with pro-White attitudes. Another line of future research concerns the potential moderators of the relationship between racial bias in micro-climates and various health, belonging, and performance outcomes. Some of these moderators, including frequency of interaction with hallmates, perceived closeness to hallmates, and the size and diversity of external friendship networks, will be explored with additional analyses with this data set. There are other factors known to be moderators between perceived discrimination and well-being that could also be explored. For example, individuals with low self-esteem experience more negative self-directed affect after experiencing subtle discrimination (Cihangir et al., 2010) and minorities who more highly identify with their ethnic group demonstrate greater suspicion regarding subtle bias than those who are lowly identified (Operario & Fiske, 2001). Future research could also look at the role of minorities' beliefs about the pervasiveness of prejudice. Longitudinal research demonstrating the association between aggregated racial bias and minorities' health, belonging and academic outcomes over time could be very useful in determining whether racial bias within micro-climates is causally related to minorities' well-

being. Longitudinal research could also pinpoint a crucial time of intervention that might shield minorities from potential negative long-term consequences. One last line of research involves applying these research questions to other collegiate micro-climates. The results from Chapter 1 suggested that racial diversity may be differentially associated with minority students' health, belonging, and academic outcomes across different micro-climates. Therefore, one crucial extension of this study is to explore whether the relationship between racial bias and minority students' outcomes is the same across different collegiate micro-climates, particularly those in which minority students spend a large amount of time like their dormitory halls.

While this study provided limited evidence for a link between the racial bias in minority college students' micro-climates and their mental health, physical health, belonging, and academic outcomes, a large array of literature demonstrates that racial bias is negatively related to minority students' well-being. However, previous research has only investigated this link by examining minorities' perceptions of the world around them or by measuring the racial bias of the individuals within large, macro-sized, micro-climates, like counties and metropolitan regions. By understanding how racial bias operates within micro-climates that likely constitute a large portion of college students' daily lives, colleges and universities will be more capable of combating the negative effects of bias and facilitating minority students' academic and personal success in college.

Conclusion

One argument I made at the beginning of this dissertation was that examining the distinct social environments that minority students find themselves in, i.e., micro-climates, at colleges and universities may be a fruitful line of inquiry for understanding why health, belonging, and academic disparities continue to persist among minority and White college students. Across both chapters of this dissertation I investigated whether 2 characteristics of collegiate micro-climates, their racial composition and the racial attitudes of the White students within them, were associated with minority students' health, belonging, and academic outcomes. In the first chapter I found that the racial composition of minority students' dormitory halls, dorm rooms, and the university student body was associated with minority students' mental health, physical health, belonging, and academic outcomes. The results suggested that the nature and direction of this relationship differed depending on whether racial diversity was captured using ingroup vs. minority representation, with greater ingroup representation often associated with beneficial outcomes and minority representation being unrelated or negatively related to minority students' well-being. Chapter 1 also compared the relationship between racial diversity and minority students' outcomes to the relationship for White students. The mixed results suggest that more research is needed to understand when racial diversity is beneficial and for whom.

In the second chapter, I focused exclusively on minority students and tested how the racial attitudes of their White hallmates were associated with their health, belonging, and academic outcomes. While the results were largely not significant, there are a number of moderators that may impact whether racial bias is associated with minority students' outcomes. While the results across both chapters were not always consistent and did not always support my hypotheses regarding the direction of effects, I believe they do provide evidence that the various

collegiate micro-climates that minority students belong to and the other individuals with whom they share a micro-climate with are important for discerning what about their college experience may lead to disparate health, belonging, and academic outcomes. Additionally, the significant findings as well as the null findings suggest that there is much more to learn about how these 2 aspects of micro-climates are associated with minority students' outcomes. There are a multitude of avenues for future research that would aid in understanding how minorities' micro-climates are related to their well-being.

There are also several important implications of this research. While this dissertation examined collegiate micro-climates, there are many other important micro-climates that may be strongly related to minorities' well-being outside of the collegiate domain. For example, minorities may choose to work at a particular company, but they likely do not get to choose what particular work group they are assigned to or who they must work with. However, the other individuals within this micro-climate likely play a large role in minorities' performance and sense of belonging to their workplace. Moreover, their performance and belonging probably impact their levels of stress, which can impact their mental and physical health. Hence, it is important to know how the racial composition and the racial bias of micro-climates across a variety of contexts, like workplaces or neighborhoods, are associated with minorities' well-being. Moreover, ingroup and minority representation and the attitudes of individuals within a micro-climate are likely associated with health and performance outcomes for members of other stigmatized groups, e.g., women, LGBTQ individuals, and individuals with physical disabilities. Not only would research examining additional stigmatized groups benefit the well-being of members of these groups, but it would illuminate how broadly the theorized connection between

the diversity of and exposure to bias in micro-climates and stigmatized group members' mental and physical health, belonging, and performance can be applied.

Overall, the results from this dissertation suggest that both researchers and institutions of higher learning need to pay greater attention to minority students' experiences within various micro-climates on college campuses. While this research may help explain why racial disparities continue to exist between minority and White college students, it may also provide important information regarding how colleges and universities may be able to intervene and buffer minority students from the negative impact of low levels of racial diversity and racial bias. With more research regarding how various aspects of minorities' micro-climates may relate to their mental health, physical health, belonging, and academic outcomes, institutions of higher learning might be better able to facilitate minorities' inclusion on college campuses and ensure that minorities are reaping the same rewards of a college education as their White counterparts.

Table 1

Dependent Measures Across Studies 1, 2a, 2b, and 3

Measures/Constructs	Study 1	Study 2a	Study 2b	Study 3
		Mental Health		
Stress	X	X	-	-
Anxiety	-	-	-	X
Depression	X	-	-	X
Positive Mental Health	-	X	-	X
		Physical Health		
Physical Health Symptoms	X	-	-	-
Sleep	-	-	-	X
		Belonging		
Belonging- Dorm/Hall	X	-	X	-
Belonging- University	X	-	X	-
		Academic		
GPA	X	-	X	X
Stereotype Threat	X	-	X	-

Note: This table displays what dependent measures (organized by type) appear in each study. An "X" denotes that a measure for that construct appears in that study. However, this does not mean that the same measure was used. The only constructs that were measured using the same measures are Stress (Study 2a uses a subset of the same scale in Study 1) and GPA.

Table 2

Overview of Samples Used Across Studies 1, 2a, 2b, and 3

	Study 1	Study 2a	Study 2b	Study 3
Level of Micro-climate	Dormitory Hall	Dorm Rooms	Dorm Rooms	Student Body
Number of Schools	1	6	1	109
School Year(s) Data Collected	2017-2018	2004-2005	1996-1997	2015-2016, 2016-2017, & 2017-2018
Student Race	Black, Latinx, Asian, & White	Black, Latinx, Asian/Pacific Islander, & White	Black, Latinx, Asian, & White	Black, Latinx, Asian/Pacific Islander, & White
Grade Level of Students	1st year	1st year	1st year	1st year
Residence	Residence Hall on Campus	Residence Hall/Dorm on Campus	Residence Hall on Campus	On Campus
Enrollment Status	Full-time (no part-time enrollment at school)	Full-time (provided by students)	Full-time (no part-time enrollment at school)	Full-time (provided by students)
International Status Included	Yes (Asked if international student)	Yes (Citizenship)	Unclear (Asked if born in US; If no then how many years live in US)	Yes (Asked if international student [2016-2018] & citizenship [2015-2016])
Assignment of Roommate Included	-	No	Yes	-

Table 3

Study 1 Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Minorities

Variables			1	2	3	4	5	6	7	8	9	10
	M (SD)	N										
1) Stress	2.87 (.60)	268	-	0.78**	0.43**	-0.17**	-0.47**	-0.24**	0.29**	-0.08	0.05	0.04
2) Depression	2.14 (.53)	268	-	-	0.53**	-0.19**	-0.58**	-0.16**	0.27**	-0.07	-0.03	0.03
3) Physical Health Symptoms	2.19 (.78)	268	-	-	-	-0.07	-0.24**	-0.10	0.26**	-0.14*	-0.07	0.01
4) Belonging on Hall	4.34 (1.72)	268	-	-	-	-	0.32**	-0.05	-0.23**	0.09	0.07	0.01
5) Belonging at University	5.02 (1.14)	268	-	-	-	-	-	0.02	-0.15*	0.01	-0.01	-0.03
6) GPA	3.52 (.38)	257	-	-	-	-	-	-	-0.19**	0.19**	-0.04	-0.07
7) Stereotype Threat	2.51 (1.39)	268	-	-	-	-	-	-	-	0.23**	-0.02	0.10
8) Proportion Ingroup	.16 (.11)	268	-	-	-	-	-	-	-	-	0.43**	0.02
9) Proportion Minority	.43 (.13)	268	-	-	-	-	-	-	-	-	-	-0.01
10) International	.12 (.32)	267	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 4

Study 1 Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Whites

Variables	*M (SD)*	N	1	2	3	4	5	6	7	8	9	10
1) Stress	2.83 (.65)	271	-	0.82**	0.50**	-0.14*	-0.46**	-0.14*	0.18**	0.12	-0.11	0.00
2) Depression	2.08 (.54)	271	-	-	0.51**	-0.18**	-0.56**	-0.10	0.13*	0.03	-0.07	0.00
3) Physical Health Symptoms	2.21 (.73)	272	-	-	-	-0.08	-0.13*	-0.12*	0.12*	0.20**	-0.20**	0.02
4) Belonging on Hall	4.69 (1.69)	272	-	-	-	-	0.31**	-0.06	-0.11	0.04	-0.01	-0.04
5) Belonging at University	5.33 (1.13)	272	-	-	-	-	-	-0.07	-0.15*	-0.02	0.08	0.09
6) GPA	3.44 (.39)	270	-	-	-	-	-	-	-0.05	-0.06	0.04	-0.05
7) Stereotype Threat	1.26 (.55)	272	-	-	-	-	-	-	-	-0.01	0.02	-0.01
8) Proportion Ingroup	.43 (.12)	272	-	-	-	-	-	-	-	-	-0.75**	0.13*
9) Proportion Minority	.44 (.11)	272	-	-	-	-	-	-	-	-	-	-0.16**
10) International	.15 (.36)	271	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 5

Study 1 Estimates, Standard Errors, and p Values for Models Using Proportion Ingroup

	Race			Proportion Ingroup			Race X Proportion Ingroup			International		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress^	0.08	0.08	0.343	0.13	0.24	0.583	-1.11	0.48	0.021*	-0.03	0.08	0.706
Depression^	0.04	0.07	0.558	-0.07	0.21	0.722	-0.51	0.41	0.218	-0.02	0.07	0.806
Physical Health Symptoms	0.04	0.10	0.700	0.15	0.29	0.613	-2.23	0.61	0.000**	-0.01	0.09	0.892
Belonging on Hall	-0.01	0.22	0.979	1.27	0.64	0.047*	0.24	1.48	0.869	-0.06	0.20	0.752
Belonging at University	-0.34	0.15	0.026*	-0.11	0.44	0.804	0.32	0.91	0.729	0.23	0.14	0.117
GPA^	0.13	0.05	0.017*	0.20	0.15	0.184	0.87	0.30	0.004**	-0.01	0.05	0.923
Stereotype Threat	0.86	0.14	0.000**	-1.46	0.40	0.000**	-3.40	0.84	0.000**	-0.19	0.13	0.143

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across halls is too small. For these outcome variables, multiple regression was used instead.

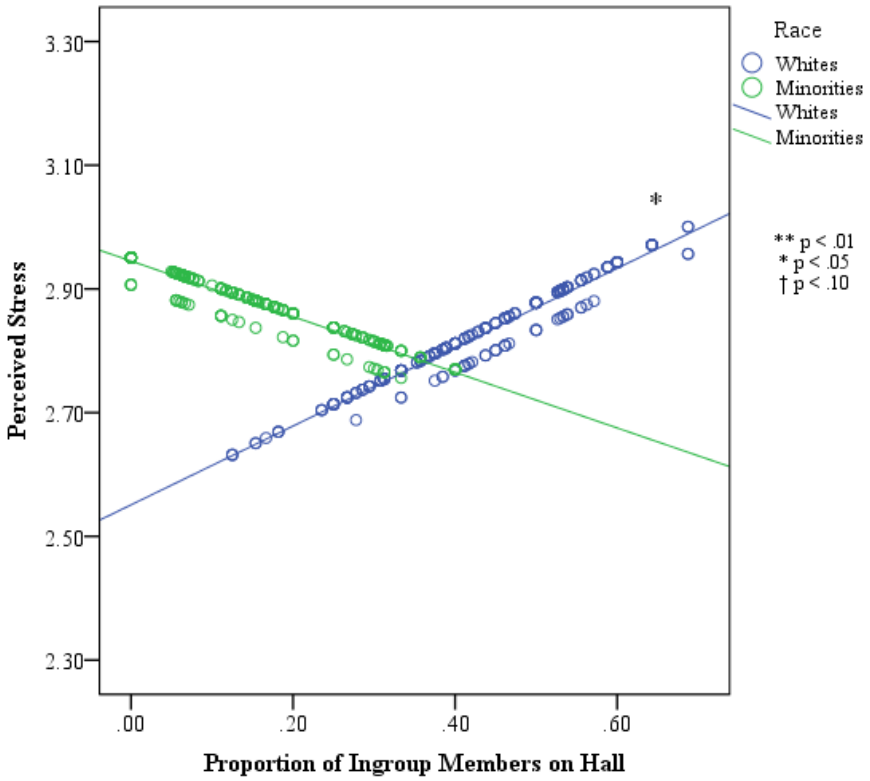


Figure 1. Students' perceived stress over the past semester predicted by participant race and the proportion of ingroup members on the hall (Study 1).

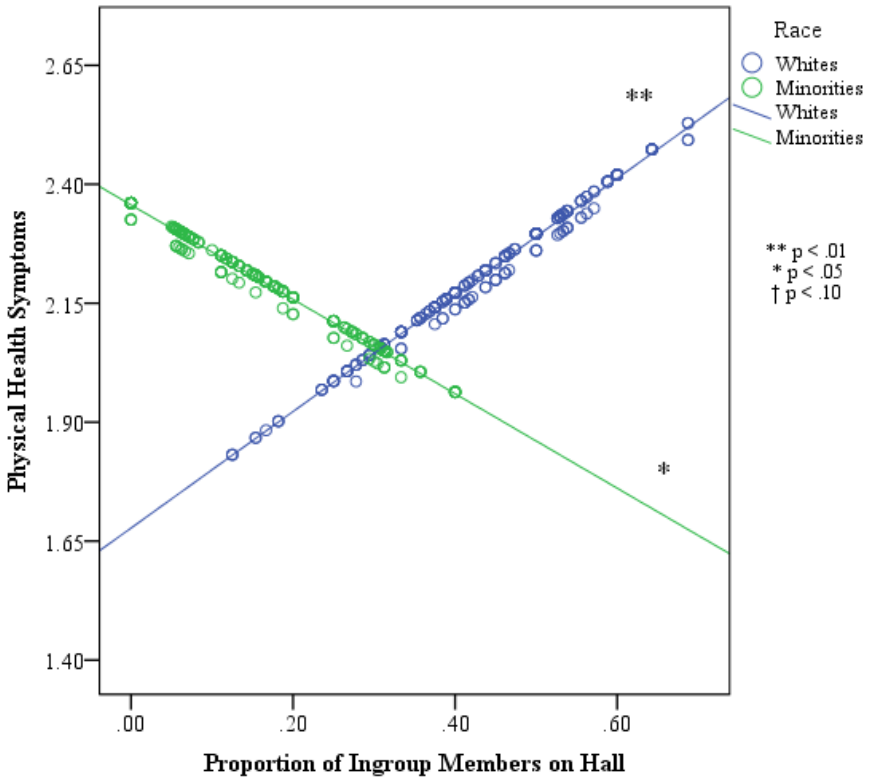


Figure 2. How often students experienced physical health symptoms over the past semester predicted by participant race and the proportion of ingroup members on the hall (Study 1).

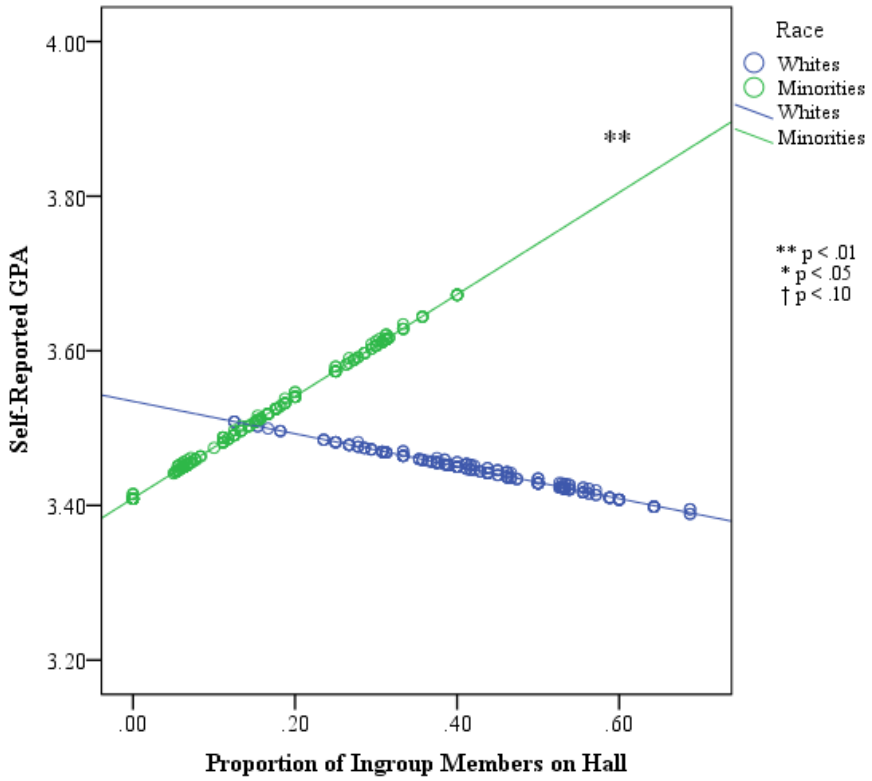


Figure 3. Students' self-reported GPA for the past semester predicted by participant race and the proportion of ingroup members on the hall (Study 1).

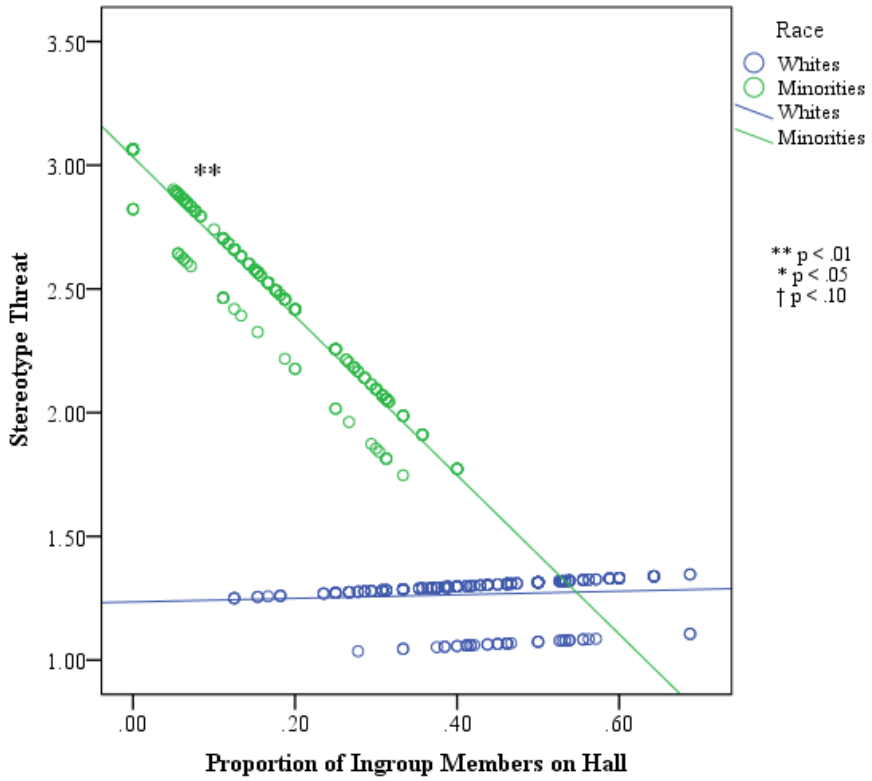


Figure 4. Students' perceived stereotype threat experienced over the past semester predicted by participant race and the proportion of ingroup members on the hall (Study 1).

Table 6

Study 1 Estimates, Standard Errors, and p Values for Models Using Proportion Minority

	Race			Proportion Minority			Race X Proportion Minority			International		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress^	0.04	0.05	0.433	-0.13	0.22	0.556	0.85	0.45	0.062†	-0.03	0.08	0.700
Depression^	0.06	0.05	0.205	-0.21	0.19	0.276	0.26	0.39	0.505	-0.02	0.07	0.727
Physical Health Symptoms	-0.02	0.06	0.710	-0.77	0.30	0.013*	0.84	0.54	0.122	-0.02	0.09	0.816
Belonging on Hall	-0.33	0.14	0.022*	0.40	0.88	0.649	1.98	1.18	0.093†	-0.03	0.20	0.882
Belonging at University	-0.30	0.10	0.002**	0.31	0.43	0.473	-1.08	0.82	0.189	0.23	0.14	0.110
GPA	0.07	0.03	0.034*	-0.02	0.14	0.906	-0.27	0.28	0.347	0.00	0.05	0.997
Stereotype Threat	1.25	0.09	0.000**	-0.11	0.40	0.783	-0.28	0.76	0.712	-0.22	0.13	0.092†

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across halls is too small. For these outcome variables, multiple regression was used instead.

Table 7

Study 2a Distribution of Students by Race Across Universities

Race	Schools						
	University 1	University 2	University 3	University 4	University 5	University 6	Total by Race
Black	1	5	2		2	2	12
Latinx		2				14	16
Asian/Hawaiian	1	1	1		1	103	107
White	7	18	68	2	16	47	158
Total by School	9	26	71	2	19	166	

Table 8

Study 2a Descriptive Statistics of Universities in Sample

	M	*SD*	Minimum	Maximum
Admission Rate	0.47	0.29	0.13	0.85
Avg. SAT of Admitted Students	1255.33	163.12	1030	1480
In-State Tuition	17506.00	12517.71	4761	29910
Out-of-State Tuition	24157.00	5708.41	16866.00	29910.00
6 Year Graduation Rate	0.74	0.22	0.34	0.97
Number of Enrolled Undergraduate Students	2,696,535,990	3,982,156,189	41,443,001	10,251,952,000
Number of Enrolled Undergraduate Students	14,370.00	10,860.02	4678	31,552

Table 9

Study 2a Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Minorities

Variables	*M (SD)*	N	1	2	3	4	5	6	7	8	9	10	11	12
1) Stress	2.77 (.74)	135	-	-0.66**	0.00	0.02	-0.09	0.22*	0.15	0.19*	0.07	0.19*	-0.18*	0.21*
2) Life Satisfaction (reverse)	3.88 (1.15)	135	-	-	-0.06	-0.11	0.04	-0.12	-0.08	-0.10	-0.04	-0.10	0.10	-0.14
3) Proportion Ingroup	.42 (.39)	135	-	-	-	0.66**	-0.13	-0.02	-0.16	-0.09	0.14	-0.09	0.13	0.02
4) Proportion Minority	.61 (.36)	135	-	-	-	-	-0.16	-0.01	-0.20*	-0.11	0.19*	-0.10	0.16	0.01
5) Admission Rate	.26 (.10)	135	-	-	-	-	-	-0.52**	0.31**	-0.20*	-0.86**	-0.14	-0.08	-0.11
6) Average SAT of Admitted Students	1,264.20 (40.92)	135	-	-	-	-	-	-	0.51**	0.76**	0.50**	0.86**	-0.67**	0.30**
7) In-State Tuition	8,704.16 (6,487.71)	135	-	-	-	-	-	-	-	0.86**	-0.48**	0.57**	-0.97**	0.13
8) Out-of-State Tuition	23,891.56 (1746.25)	135	-	-	-	-	-	-	-	-	-0.09	-.59**	-0.96**	-0.17*
9) Graduation Rate	.86 (.05)	135	-	-	-	-	-	-	-	-	-	0.31**	0.30**	0.18*
10) Endowment	843,868,695 (1,486,239,30	135	-	-	-	-	-	-	-	-	-	-	-0.62**	0.30**
11) Number of Full-Time Undergraduates Enrolled	22,602.38 (5,046.23)	135	-	-	-	-	-	-	-	-	-	-	-	-0.16
12) International	.25 (.61)	135	-	-	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 10

Study 2a Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Whites

Variables	*M (SD)*	N	1	2	3	4	5	6	7	8	9	10	11	12
1) Stress	2.55 (.74)	158	-	-0.50**	0.02	-0.01	0.20*	-0.21**	-0.25**	-0.27**	-0.08	-0.14	0.29**	0.01
2) Life Satisfaction (reverse)	4.13 (.96)	158	-	-	0.15	-0.13	-0.09	0.11	0.16*	0.15	0.02	0.07	-0.17*	0.03
3) Proportion Ingroup	.63 (.39)	158	-	-	-	-0.89**	0.38**	-0.16*	0.08	-0.20*	-0.22**	0.11	0.11	-0.17*
4) Proportion Minority	.31 (.38)	158	-	-	-	-	-0.36**	0.14	-0.09	0.18*	0.19*	-0.11	-0.10	0.20*
5) Admission Rate	.26 (.08)	158	-	-	-	-	-	-0.86**	-0.42**	-0.84**	-0.85**	-0.45**	0.66**	-0.14
6) Average SAT of Admitted Students	1,303.12 (72.26)	158	-	-	-	-	-	-	0.73**	0.92**	0.83**	0.80**	-0.84**	0.04
7) In-State Tuition	13,031.59 (9,427.24)	158	-	-	-	-	-	-	-	0.84**	0.28**	0.67**	-0.92**	-0.09
8) Out-of-State Tuition	25900.65 (2278.91)	158	-	-	-	-	-	-	-	-	0.64**	0.60**	-0.94**	0.04
9) Graduation Rate	.8 (.08)	158	-	-	-	-	-	-	-	-	-	0.59**	-0.40**	0.12
10) Endowment	3,209,749,514 (2,913,146,21	158	-	-	-	-	-	-	-	-	-	-	-0.65**	-0.06
11) Number of Full-Time Undergraduates Enrolled	19276.04 (7559.06)	158	-	-	-	-	-	-	-	-	-	-	-	0.02
12) International	.19 (.14)	158	-	-	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 11

Study 2a Estimates, Standard Errors, and p Values for Models Using Proportion Ingroup

	Race			Proportion Ingroup			Race X Proportion Ingroup			Admission Rate			Avg. SAT of Admitted Students[a]			In-State Tuition			Out-of-State Tuition[a]			Graduation Rate			Endowment			Number of Full-Time Students Enrolled			International		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress^	0.25	0.11	0.024*	-0.07	0.12	0.564	0.10	0.24	0.697	1.32	1.52	0.386				0.00	0.00	0.896				2.58	3.10	0.407	0.00	0.00	0.725	0.00	0.00	0.917	0.25	0.10	0.016*
Life Satisfaction^	-0.22	0.16	0.159	0.18	0.17	0.285	-0.76	0.35	0.029*	-1.59	2.19	0.468				0.00	0.00	0.718				-3.16	4.47	0.480	0.00	0.00	0.759	0.00	0.00	0.753	-0.23	0.15	0.114

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools is too small. For these outcome variables, multiple regression was used instead.

[a] For these covariates, the statistical software excluded them from the analysis because these variables were perfectly predicted from one or more of the other predictors.

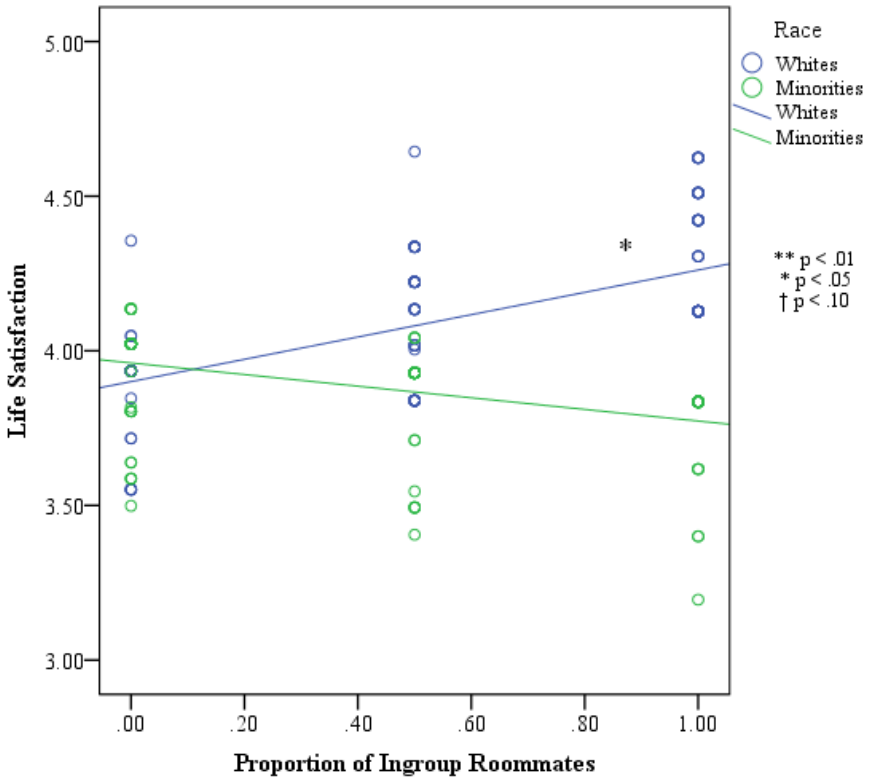


Figure 5. Students' life satisfaction over the past month predicted by participant race and the proportion of ingroup roommates (Study 2a).

Table 12

Study 2a Estimates, Standard Errors, and p Values for Models Using Proportion Minority

	Race			Proportion Minority			Race X Proportion Minority			Admission Rate			Avg. SAT of Admitted Students[a]			In-State Tuition			Out-of-State Tuition[a]			Graduation Rate			Endowment			Number of Full-Time Students Enrolled			International		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress^	0.24	0.11	0.027*	0.09	0.13	0.488	-0.12	0.25	0.634	1.26	1.52	0.407				0.00	0.00	0.963				2.43	3.10	0.434	0.00	0.00	0.762	0.00	0.00	0.967	0.24	0.10	0.017*
Life Satisfaction^	-0.20	0.16	0.211	-0.45	0.18	0.014*	0.20	0.35	0.561	-1.45	2.17	0.505				0.00	0.00	0.964				-2.64	4.42	0.552	0.00	0.00	0.901	0.00	0.00	0.926	-0.22	0.15	0.130

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools is too small. For these outcome variables, multiple regression was used instead.

[a] For these covariates, the statistical software excluded them from the analysis because these variables were perfectly predicted from one or more of the other predictors.

Table 13

Study 2b Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Minorities

Variables	*M (SD)*	N	1	2	3	4	5	6	7
1) Belonging in Dorm	5.16 (1.44)	253	-	-.49**	0.06	-0.11	-0.05	0.00	-0.03
2) Belonging at University	5.13 (1.24)	252	-	-	0.05	0.02	-0.15*	-0.07	0.02
3) GPA	3.09 (.46)	227	-	-	-	.151*	0.08	0.02	-0.09
4) Stereotype Threat	3.94 (1.86)	253	-	-	-	-	-0.09	0.02	0.01
5) Proportion Ingroup	.28 (.36)	253	-	-	-	-	-	0.55**	-0.22**
6) Proportion Minority	.58 (.37)	253	-	-	-	-	-	-	-0.04
7) Semester Enrolled	1.79 (1.25)	253	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 14

Study 2b Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Whites

Variables	*M (SD)*	N	1	2	3	4	5	6	7
1) Belonging in Dorm	5.17 (1.42)	127	-	0.54**	0.03	-0.03	0.04	-0.15	0.04
2) Belonging at University	4.93 (1.42)	127	-	-	0.05	0.04	-0.05	-0.15	0.03
3) GPA	3.24 (.42)	120	-	-	-	-0.20*	-0.10	0.07	0.11
4) Stereotype Threat	2.31 (1.52)	127	-	-	-	-	-0.12	0.05	-0.05
5) Proportion Ingroup	.34 (.37)	127	-	-	-	-	-	-0.81**	0.07
6) Proportion Minority	.55 (.37)	127	-	-	-	-	-	-	-0.06
7) Semester Enrolled	1.31 (.66)	127	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 15

Study 2b Estimates, Standard Errors, and p Values for Models Using Proportion Ingroup

	Race			Proportion Ingroup			Race X Proportion Ingroup			Semester Enrolled		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Belonging in Dorm	-0.01	0.16	0.968	-0.08	0.21	0.686	-0.36	0.43	0.413	-0.02	0.07	0.771
Belonging at University	0.18	0.14	0.216	-0.41	0.19	0.028*	-0.31	0.39	0.426	0.01	0.06	0.901
GPA	-0.14	0.05	0.006**	0.02	0.07	0.781	0.21	0.14	0.141	-0.02	0.02	0.379
Stereotype Threat	1.62	0.20	0.000**	-0.49	0.25	0.053†	0.01	0.53	0.986	-0.03	0.08	0.732

** p < .01

* p < .05

† p < .10

Table 16

Study 2b Estimates, Standard Errors, and p Values for Models Using Proportion Minority

	Race			Proportion Minority			Race X Proportion Minority			Semester Enrolled		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Belonging in Dorm	0.00	0.16	0.980	-0.20	0.20	0.315	0.58	0.42	0.175	-0.02	0.07	0.786
Belonging at University	0.21	0.14	0.156	-0.34	0.18	0.059†	0.32	0.38	0.402	0.02	0.06	0.691
GPA	-0.15	0.05	0.005**	0.04	0.07	0.536	-0.06	0.14	0.651	-0.02	0.02	0.363
Stereotype Threat	1.63	0.20	0.000**	0.13	0.25	0.585	-0.07	0.52	0.887	0.00	0.08	0.988

** p < .01

* p < .05

† p < .10

Table 17
Study 3 Descriptive Statistics for Colleges/Universities in Sample

	M	*SD*	Minimum	Maximum
Admission Rate	0.60	0.22	0.05	0.99
Avg. SAT of Admitted Students	1185.71	127.06	849	1524
Average Cost	38722.55	17644.03	12243	72717
6 Year Graduation Rate	0.67	0.17	0.23	0.97
Endowment	964,417,766	2,531,804,207	65,226	22,398,130,000
Number of Enrolled Undergraduate Students	9,637.45	9,394.19	167	39,883

Table 18

Study 3 Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Minorities

Variables	*M (SD)*	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1) Flourishing	5.40 (1.12)	3254	-	-0.45**	-0.33**	0.10**	-0.04	0.10**	-0.06**	-0.04*	-0.03	0.03	-0.02	0.04*	0.02	0.04*	-0.03
2) Depression	1.87 (.64)	2717	-	-	0.74**	-0.19**	0.00	-0.14**	0.04*	0.06**	0.06**	-0.06**	0.01	-0.07**	-0.03	-0.04*	-0.08**
3) Anxiety	1.86 (.74)	2672	-	-	-	-0.14**	-0.03	-0.11**	0.03	0.05*	0.04*	-0.06**	0.02	-0.05**	-0.05*	-0.07**	-0.13**
4) Average Sleep per Night on Weekdays	7.28 (1.55)	1916	-	-	-	-	0.19**	0.04	-0.01	-0.02	0.01	-0.02	-0.08**	0.01	0.02	0.06**	-0.03
5) Average Sleep per Night on Weekends	8.69 (1.66)	1868	-	-	-	-	-	0.01	-0.01	-0.05*	0.00	0.00	-0.02	0.01	-0.03	0.03	0.06**
6) Self-Reported GPA	3.40 (.61)	2732	-	-	-	-	-	-	-0.03	-0.01	-0.09**	0.12**	0.12**	0.12**	0.07**	0.00	0.19**
7) Proportion Ingroup	.11 (.07)	3316	-	-	-	-	-	-	-	0.72**	-0.11**	0.02	-0.01	-0.05**	0.12**	0.07**	-0.08**
8) Proportion Minority		3316	-	-	-	-	-	-	-	-	-0.23**	0.18**	0.08**	0.05**	0.25**	0.08**	-0.13**
9) Admission Rate	.48 (.25)	3316	-	-	-	-	-	-	-	-	-	-0.80**	-0.52**	-0.78**	-0.46**	0.03	-0.05**
10) Average SAT of Admitted Students	1,270.26 (131.57)	3316	-	-	-	-	-	-	-	-	-	-	0.40**	0.84**	0.50**	-.15**	0.05**
11) Average Cost of Attendance	44,991.34 (19,390.96)	3316	-	-	-	-	-	-	-	-	-	-	-	0.40**	0.18**	-0.56**	0.15**
12) Graduation Rate	.77 (.14)	3316	-	-	-	-	-	-	-	-	-	-	-	-	0.42**	0.18**	0.08**
13) Endowment	1,606,691,469 (2,954,603,018)	3316	-	-	-	-	-	-	-	-	-	-	-	-	-	0.18**	0.02
14) Number of Full Time Undergraduates Enrolled	11,676.19 (9,560.13)	3316	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.04*
15) International	.22 (.41)	3312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 19

Study 3 Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Whites

Variables	*M (SD)*	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1) Flourishing (reverse)	5.56 (1.05)	10,694	-	-0.57**	-0.44**	0.10**	-0.03*	0.15**	0.06**	-0.05**	-0.05**	0.04**	0.00	0.07**	0.04**	0.05**	-0.01
2) Depression	1.82 (.65)	8,723	-	-	0.75**	-0.19**	-0.02	-0.14**	-0.09**	0.08**	0.08**	-0.07**	0.01	-0.11**	-0.09**	-0.08**	0.01
3) Anxiety	1.89 (.77)	8,597	-	-	-	-0.16**	-0.04**	-0.06**	-0.07**	0.06**	0.08**	-0.07**	0.01	-0.10**	-0.09**	-0.09**	-0.02
4) Average Sleep per Night on Weekdays	7.86 (1.39)	6,929	-	-	-	-	0.25**	0.03**	0.07**	-0.03*	0.02	0.01	-0.03**	0.03**	0.02	0.03**	-0.01
5) Average Sleep per Night on Weekends	8.70 (1.44)	6,753	-	-	-	-	-	-0.01	0.02	-0.01	0.04**	-0.06**	-0.04**	-0.06**	-0.03*	0.00	-0.03**
6) Self-Reported GPA	3.50 (.55)	9,702	-	-	-	-	-	-	-0.08**	0.05**	-0.08**	0.08**	0.08**	0.06**	0.04**	-0.03**	0.02
7) Proportion Ingroup	.65 (.13)	10,843	-	-	-	-	-	-	-	-0.85**	0.45**	-0.34**	-0.37**	-0.20**	-0.20**	0.01	-0.10**
8) Proportion Minority	.21 (.09)	10,843	-	-	-	-	-	-	-	-	-0.34**	0.32**	0.18**	0.19**	0.19**	0.05**	0.06**
9) Admission Rate	.57 (.23)	10,843	-	-	-	-	-	-	-	-	-	-0.64**	-0.41**	-0.59**	-0.41**	-0.03**	-0.05**
10) Average SAT of Admitted Students	1,230.72 (117.43)	10,843	-	-	-	-	-	-	-	-	-	-	0.28**	0.81**	0.52**	0.20**	0.03**
11) Average Cost of Attendance	38,602.06 (17,904.64)	10,843	-	-	-	-	-	-	-	-	-	-	-	0.37**	0.10**	-0.57**	0.09**
12) Graduation Rate	.73 (.14)	10,843	-	-	-	-	-	-	-	-	-	-	-	-	0.45**	0.19**	0.02*
13) Endowment	1,051,457,183 (1,718,066,032)	10,843	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35**	0.06**
14) Number of Full Time Undergraduates Enrolled	12,052.90 (9,996.98)	10,843	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.05**
15) International	.01 (.12)	10,835	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 20

Study 3 Estimates, Standard Errors, and p Values for Models Using Proportion Ingroup

	Race			Proportion Ingroup			Race X Proportion Ingroup			Admission Rate			Avg. SAT of Admitted Students			Average Cost			Graduation Rate			Endowment			Number of Full-Time Students Enrolled			International		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Flourishing	0.01	0.06	0.850	0.23	0.11	0.036*	-1.42	0.38	0.000**	-0.23	0.14	0.121	0.00	0.00	0.483	0.00	0.00	0.386	0.44	0.27	0.113	0.00	0.00	0.784	0.00	0.00	0.489	-0.05	0.04	0.206
Depression	-0.07	0.04	0.065†	-0.21	0.07	0.004**	0.57	0.30	0.054†	0.14	0.11	0.196	0.00	0.00	0.351	0.00	0.00	0.845	-0.37	0.20	0.068†	0.00	0.00	0.904	0.00	0.00	0.248	-0.11	0.03	0.000**
Anxiety	-0.14	0.05	0.003**	-0.24	0.09	0.007**	0.57	0.35	0.102	0.12	0.13	0.354	0.00	0.00	0.915	0.00	0.00	0.973	-0.22	0.23	0.354	0.00	0.00	0.707	0.00	0.00	0.122	-0.23	0.03	0.000**
Avg. Sleep per Night on Weekdays^	-0.28	0.08	0.001**	0.50	0.14	0.000**	-0.83	0.49	0.092†	0.11	0.10	0.249	0.00	0.00	0.024*	0.00	0.00	0.005**	0.94	0.20	0.000**	0.00	0.00	0.073	0.00	0.00	0.660	-0.02	0.07	0.766
Avg. Sleep per Night on Weekends	0.03	0.10	0.743	0.06	0.17	0.719	-0.06	0.60	0.926	-0.11	0.14	0.435	0.00	0.00	0.204	0.00	0.00	0.373	-0.26	0.29	0.363	0.00	0.00	0.792	0.00	0.00	0.723	0.14	0.08	0.080†
Self-Reported GPA	-0.18	0.03	0.000**	-0.01	0.06	0.834	0.29	0.23	0.201	-0.06	0.09	0.527	0.00	0.00	0.083†	0.00	0.00	0.137	-0.10	0.17	0.529	0.00	0.00	0.936	0.00	0.00	0.892	0.19	0.02	0.000**

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools or years is too small. For these outcome variables, multiple regression was used instead.

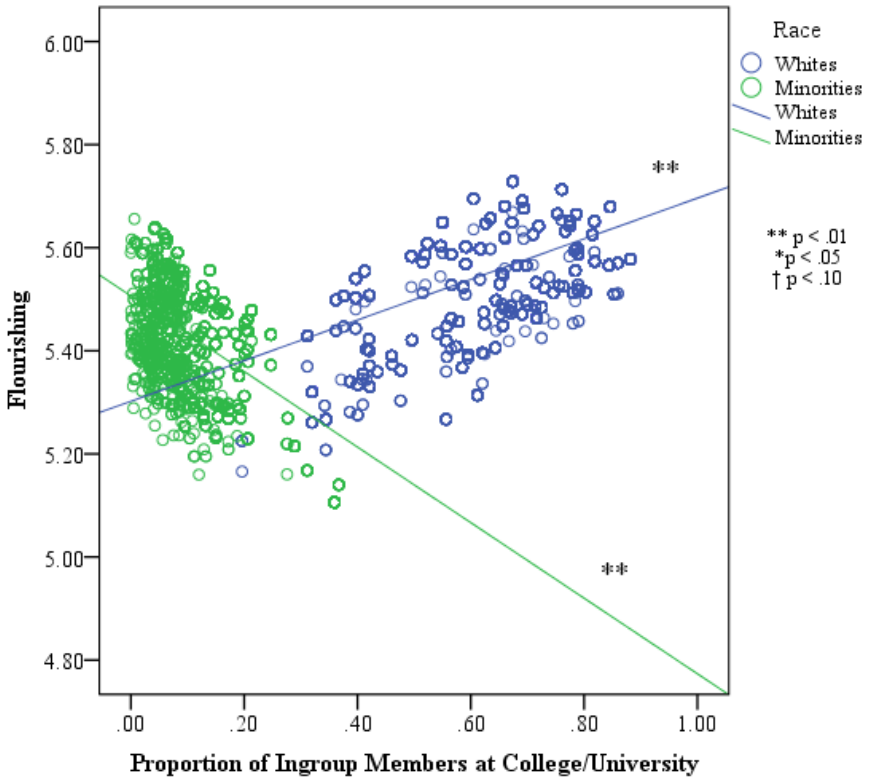


Figure 6. Students' level of flourishing predicted by participant race and the proportion of ingroup students at the university (Study 3).

Table 21

Study 3 Estimates, Standard Errors, and p Values for Models Using Proportion Minority

	Race			Proportion Minority			Race X Proportion Minority			Admission Rate			Avg. SAT of Admitted Students			Average Cost			Graduation Rate			Endowment			Number of Full-Time Students Enrolled			Intemational		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Flourishing	-0.09	0.02	0.000**	-0.72	0.23	0.002**	0.13	0.23	0.583	-0.25	0.14	0.077†	0.00	0.00	0.470	0.00	0.00	0.359	0.42	0.27	0.120	0.00	0.00	0.865	0.00	0.00	0.423	-0.06	0.04	0.162
Depression	0.03	0.02	0.059†	0.38	0.18	0.038*	-0.13	0.16	0.393	0.14	0.11	0.195	0.00	0.00	0.327	0.00	0.00	0.748	-0.39	0.20	0.055†	0.00	0.00	0.681	0.00	0.00	0.231	-0.11	0.03	0.000**
Anxiety	-0.02	0.02	0.184	0.50	0.21	0.019*	-0.24	0.19	0.210	0.12	0.13	0.332	0.00	0.00	0.873	0.00	0.00	0.966	-0.23	0.23	0.316	0.00	0.00	0.479	0.00	0.00	0.100	-0.23	0.03	0.000**
Avg. Sleep per Night on Weekdays^	-0.52	0.04	0.000**	-0.30	0.18	0.089†	0.02	0.39	0.967	0.16	0.10	0.110	0.00	0.00	0.011*	0.00	0.00	0.000**	1.03	0.20	0.000**	0.00	0.00	0.030*	0.00	0.00	0.365	-0.04	0.07	0.606
Avg. Sleep per Night on Weekends	0.01	0.04	0.888	-0.21	0.25	0.414	-0.65	0.42	0.127	-0.12	0.14	0.408	0.00	0.00	0.227	0.00	0.00	0.361	-0.27	0.29	0.341	0.00	0.00	0.869	0.00	0.00	0.692	0.14	0.08	0.086†
Self-Reported GPA	-0.17	0.01	0.000**	0.09	0.14	0.541	0.03	0.13	0.837	-0.05	0.09	0.575	0.00	0.00	0.083†	0.00	0.00	0.144	-0.10	0.17	0.543	0.00	0.00	0.872	0.00	0.00	0.860	0.19	0.02	0.000**

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools or years is too small. For these outcome variables, multiple regression was used instead.

Table 22

Summary of Chapter 1 Proportion Ingroup Results

	Proportion Ingroup			
Outcomes	Study 1 Hall N = 540	Study 2a Dorm Room N = 293	Study 2b Dorm Room N = 380	Study 3 University N = 14,159
Mental Health				
Stress	**Significant** **Race X PropIng** **White: + stress** Min: not sig	No Significance	-	-
Depression	No Significance	-	-	**Significant** **PropIng** **More ingroup ~ lower depression**
Anxiety	-	-	-	**Significant** **Prop Ing** **More ingroup ~ lower anxiety**
Positive Mental Health	-	**Significant** **Race X PropIng** **White: + satisfaction** Min: not sig	-	**Significant** **Race X PropIng** **White: + flourishing** **Min: - flourishing**
Physical Health				
Physical Health Symptoms	**Significant** **Race X PropIng** **White: + symptoms** **Min: - symptoms**	-	-	-
Avg Sleep on Weekdays	-	-	-	**Significant** **PropIng** **More ingroup ~ more sleep**
Avg Sleep on Weekends	-	-	-	No Significance
Belonging				
Belonging- Dorm/Hall	**Significant** **PropIng** **More ingroup ~ more belonging**	-	No Significance	-
Belonging- University	No Significance	-	**Significant** **PropIng** **More ingroup ~ lower belonging**	-
Academic				
GPA	**Significant** **Race X PropIng** White: not sig **Min: + GPA**	-	No Significance	No Significance
Stereotype Threat	**Significant** **Race X PropIng** White: not sig **Min: - threat**	-	No Significance	-

Table 23

Summary of Chapter 1 Proportion Minority Results

	Proportion Minority			
Outcomes	Study 1 Hall N = 540	Study 2a Dorm Room N = 293	Study 2b Dorm Room N = 380	Study 3 University N = 14,159
Mental Health				
Stress	No Significance	No Significance	-	-
Depression	No Significance	-	-	**Significant PropMin More minorities ~ greater depression**
Anxiety	-	-	-	**Significant PropMin More minorities ~ greater anxiety**
Positive Mental Health	-	**Significant PropMin More minorities ~ lower satisfaction**	-	**Significant PropMin More minorities ~ lower flourshing**
Physical Health				
Physical Health Symptoms	**Significant PropMin More minorities ~ fewer symptoms**	-	-	-
Avg Sleep on Weekdays	-	-	-	No Significance
Avg Sleep on Weekends	-	-	-	No Significance
Belonging				
Belonging- Dorm/Hall	No Significance	-	No Significance	-
Belonging- University	No Significance	-	No Significance	-
Academic				
GPA	No Significance	-	No Significance	No Significance
Stereotype Threat	No Significance	-	No Significance	-

Table 24

Study 4 Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Blacks

Variables			1	2	3	4	5	6	7	8	9	10
	M (SD)	N										
1) Perceived Stress	3.02 (.60)	58		0.67**	0.31*	-0.05	-0.36**	-0.24	0.21	0.20	0.11	-0.05
2) Depression	2.25 (.54)	58			0.47**	-0.28*	-0.53**	-0.22	0.28*	0.19	0.04	0.00
3) Physical Health Symptoms	2.36 (.88)	58				-0.13	-0.23	-0.04	0.44**	0.03	0.19	-0.03
4) Belonging on Hall	4.15 (1.73)	58					0.24	0.14	-0.31*	0.00	-0.11	-0.28*
5) Belonging at University	4.93 (1.13)	58						0.11	-0.09	0.11	0.00	0.07
6) Self-Reported GPA	3.33 (.37)	58							-0.06	-0.08	0.17	0.02
7) Stereotype Threat	3.58 (1.47)	58								0.23	0.16	0.21
8) Mean Implicit Bias on Hall	-.03 (.33)	58									0.35**	0.09
9) Mean Explicit Bias on Hall	1.18 (15.02)	58										0.08
10) Perceived Discrimination on Hall	1.98 (1.50)	58										

** p < .01

* p < .05

Table 25

Study 4 Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Latinxs

Variables			1	2	3	4	5	6	7	8	9	10
	M (SD)	N										
1) Perceived Stress	2.86 (.66)	38	-	0.75**	0.44**	-0.18	-0.55**	-0.25	0.54**	-0.17	-0.05	0.13
2) Depression	2.18 (.51)	38	-	-	0.51**	-0.11	-0.54**	-0.24	0.52**	-0.01	-0.11	-0.04
3) Physical Health Symptoms	2.35 (.83)	38	-	-	-	-0.19	-0.24	0.15	0.04	-0.01	-0.20	-0.10
4) Belonging on Hall	4.45 (1.57)	38	-	-	-	-	0.46**	-0.19	-0.16	-0.04	-0.13	-0.38*
5) Belonging at University	5.05 (1.06)	38	-	-	-	-	-	0.33	-0.25	-0.07	-0.12	-0.16
6) Self-Reported GPA	3.40 (.48)	35	-	-	-	-	-	-	-0.30	0.11	-0.05	0.14
7) Stereotype Threat	2.18 (1.37)	38	-	-	-	-	-	-	-	-0.26	-0.10	0.17
8) Mean Implicit Bias on Hall	-.05 (33)	38	-	-	-	-	-	-	-	-	0.02	-0.20
9) Mean Explicit Bias on Hall	-.40 (14.14)	38	-	-	-	-	-	-	-	-	-	0.03
10) Perceived Discrimination on Hall	1.50 (1.01)	38	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 26

Study 4 Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Asians

Variables	*M (SD)*	N	1	2	3	4	5	6	7	8	9	10
1) Perceived Stress	2.81 (.59)	161	-	0.82**	0.49**	-0.21**	-0.50**	-0.16*	0.21**	-0.01	-0.06	0.11
2) Depression	2.09 (.54)	161	-	-	0.58**	-0.18*	-0.61**	-0.05	0.20*	0.00	-0.05	0.07
3) Physical Health Symptoms	2.10 (.71)	161	-	-	-	-0.04	-0.28**	-0.11	0.19*	-0.02	-.163*	0.13
4) Belonging on Hall	4.41 (1.74)	161	-	-	-	-	0.32**	-0.16*	-0.17*	0.07	0.05	-0.25**
5) Belonging at University	5.07 (1.16)	161	-	-	-	-	-	-0.08	-0.14	0.04	-0.04	-0.03
6) Self-Reported GPA	3.63 (.29)	155	-	-	-	-	-	-	0.02	-0.10	0.08	0.06
7) Stereotype Threat	2.22 (1.15)	161	-	-	-	-	-	-	-	0.06	.186*	0.40**
8) Mean Implicit Bias on Hall	.03 (.31)	161	-	-	-	-	-	-	-	-	0.21**	-0.09
9) Mean Explicit Bias on Hall	.99 (12.09)	161	-	-	-	-	-	-	-	-	-	0.04
10) Perceived Discrimination on Hall	1.34 (.82)	160	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table 27

Study 4 Estimates, Standard Errors, and P Values for White Hallmates' Bias Predicting Black Students' Outcomes

	Mean Implicit Bias on Hall			Mean Explicit Bias on Hall			Perceived Discrimination on Hall		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress^	0.36	0.26	0.176	0.00	0.01	0.761	-0.03	0.05	0.576
Depression^	0.33	0.23	0.167	0.00	0.01	0.855	-0.01	0.05	0.925
Physical Health Symptoms	-0.16	0.43	0.707	-0.01	0.01	0.137	0.01	0.07	0.880
Belonging on Hall	0.28	0.79	0.723	-0.01	0.02	0.552	-0.37	0.15	0.015*
Belonging at University	0.41	0.52	0.430	0.00	0.01	0.844	0.04	0.10	0.717
GPA^	-0.17	0.16	0.282	0.01	0.00	0.130	0.00	0.03	0.936
Stereotype Threat	0.79	0.64	0.226	0.01	0.01	0.559	0.21	0.13	0.108

** $p < .01$

* $p < .05$

† $p < .10$

^ The statistical software produced a warning that the variances across halls is too small. For these outcome variables, multiple regression was used instead.

Table 28

Study 4 Estimates, Standard Errors, and P Values for White Hallmates' Bias Predicting Latinx Students' Outcomes

	Mean Implicit Bias on Hall			Mean Explicit Bias on Hall			Perceived Discrimination on Hall		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress	-0.20	0.38	0.607	0.00	0.01	0.773	0.06	0.12	0.598
Depression	0.02	0.30	0.958	0.00	0.01	0.584	-0.02	0.09	0.846
Physical Health Symptoms	-0.19	0.47	0.684	-0.01	0.01	0.277	-0.07	0.14	0.631
Belonging on Hall^	-0.52	0.75	0.492	-0.01	0.02	0.474	-0.62	0.25	0.017*
Belonging at University^	-0.31	0.54	0.573	-0.01	0.01	0.519	-0.18	0.18	0.316
GPA	0.21	0.30	0.493	0.00	0.01	0.970	0.11	0.11	0.330
Stereotype Threat	-0.95	0.77	0.224	-0.01	0.02	0.545	0.16	0.24	0.510

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across halls is too small. For these outcome variables, multiple regression was used instead.

Table 29

Study 4 Estimates, Standard Errors, and P Values for White Hallmates' Bias Predicting Asian Students' Outcomes

	Mean Implicit Bias on Hall			Mean Explicit Bias on Hall			Perceived Discrimination on Hall		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress	0.02	0.17	0.889	0.00	0.00	0.365	0.08	0.06	0.145
Depression	0.01	0.15	0.923	0.00	0.00	0.472	0.04	0.05	0.400
Physical Health Symptoms	0.10	0.21	0.642	-0.01	0.01	0.064†	0.11	0.07	0.092†
Belonging on Hall	0.27	0.57	0.642	0.01	0.01	0.525	-0.45	0.15	0.004**
Belonging at University	0.20	0.32	0.540	0.00	0.01	0.610	-0.03	0.11	0.821
GPA^	-0.11	0.08	0.158	0.00	0.00	0.238	0.02	0.03	0.537
Stereotype Threat^	0.22	0.27	0.428	0.02	0.01	0.033*	0.56	0.10	0.000**

** $p < .01$

* $p < .05$

† $p < .10$

^ The statistical software produced a warning that the variances across halls is too small. For these outcome variables, multiple regression was used instead.

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APPENDICES

Appendix A: Study 1 & Study 4 Materials

Demographics

1. Race

Please indicate your race/ethnicity. Check all that apply.

a. African American or Black
b. Arab American or Arab
c. Asian American or Asian/Pacific Islander
d. Latinx or Hispanic American
e. Native American, American Indian or Alaskan Native
f. South Asian
g. White or European American
h. Not Listed above (please indicate)

Please indicate which race/ethnicity you most identify as. Choose one. (**used for eligibility**)

i. African American or Black
j. Arab American or Arab
k. Asian American or Asian/Pacific Islander
l. Latinx or Hispanic American
m. Native American, American Indian or Alaskan Native
n. South Asian
o. White or European American
p. Multi-Racial
q. Not Listed above (please indicate)

Please indicate how most other people identify your primary race/ethnicity. Choose one.

r. African American or Black
s. Arab American or Arab
t. Asian American or Asian/Pacific Islander
u. Latinx or Hispanic American
v. Native American, American Indian or Alaskan Native
w. South Asian
x. White or European American
y. Not Listed above (please indicate)

Note: Race was also obtained from the university official records. The administration team provided the federal race and the university's designated race for each member of the first year class, including those who did not complete our survey.

Federal Race

a. Alien Temporary/International
b. American Indian/Alaska Native
c. Asian
d. Black/African American
e. Hispanic/Latino
f. Multiracial
g. Native Hawaiian/Oth Pac Islander
h. Unknown
i. White

Primary Race (University designated)

a. American Indian/Alaska Native
b. Asian
c. Black/African American
d. Hispanic/Latino
e. Mexican-Amer, Mexican, Chicano
f. Two or More Races
g. Native Hawaiian/Oth Pac Islander
h. Puerto Rican
i. Unknown
j. White

Check all that apply:
International
Hispanic/Latino
Puerto Rican
Mexican American
White
Asian
Black
American Indian
Pacific Islander
Unknown

2. Gender

    Which of the following best represents you?
    a. Male
    b. Female
    c. Transgender
    d. Prefer not to answer

3. SES
    a. Imagine the ladder below shows how your society is set up. At the top of ladder are the people who are best off… At the bottom are people who are the worse off… Now think about your family. Please tell us where you think your family would be on this ladder. Select the number below that corresponds to the rung that best represents where your family would be on this ladder. (1- lowest rung, 10- highest rung)

4. Grade Level
    Please indicate your year in college.
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. Graduate Student

5. Athlete (yes or no)

6. Political Ideology
    What is your political ideology?
    Liberal ----------Conservative

7. SAT Scores
    1. Please type in your SAT Verbal score below.
    2. Please type in your SAT Math score below.

Friendship

I. Social Context

The names of all of the students in a participant's residential advising group as well as their upper-class student leader appeared separately on a different page. Participants were asked to answer all of the questions below for each person.

1. Where does this person live in relation to you?
    a. Roommate, suitemate, hallmate, entryway, different floor
2. To what extent do you consider this person a friend? (1=Acquaintance, 10=Close friend)
3. How close do you feel to this person? (1 not at all to 10 very)
4. How much do you like this person? (1 not at all to 7 very much)
5. How comfortable do you feel interacting with this person? (1 not at all to 10 very)
6. How authentic do you feel around this person? (1 not at all to 10 very)
7. How often do you interact with this person?
    a. Multiple times day
    b. Once a day
    c. A few times per week
    d. Once a week
    e. A few times per month
    f. Once a month
    g. A few times per semester

II. Outside Friendships

1. Please list up to 5 of your closest friends who DO NOT [belong in your residential advising group].
2. Please indicate each person's gender, race, and whether or not they are a student at the same university.

Belonging

III. Social Fit- University level, Dorm/Freshman Group Level (Walton & Cohen, 2007)

INSTRUCTIONS: On a scale from 1(*strongly disagree*) to 7 (*strong agree*), please rate your agreement with the following statements.

1. I feel like I belong as a student [at *school name inserted here*] [in my residential advising group].
2. I feel like I fit in with the academic community [at *school name inserted here*] [my residential advising group].
3. If my parents were to visit me or when they have visited me at [*school name inserted here*] I would feel or have felt comfortable introducing them to [my friends] [my residential advising group].
4. I feel a part of [the *school name inserted here* community] [my residential advising group].
5. I expect that the social experience [at *school name inserted here*] [within my residential advising group] will be difficult for me. (R)
6. In the future, I could see myself having a lot of friends [at *school name inserted here*] [within my residential advising group].

IV. Common Ingroup Identity (Sidanius, Levin, van Laar, & Sears, 2008)-
Strongly agree (1) to Strongly disagree (7)

1. Despite the different groups at [*school name inserted here*], there is frequently the sense that we are all just one group.
2. At [*school name inserted here]*, it feels as though we belong to different groups.

Academic

V. Perceived Academic performance (Sidanius, Levin, van Laar, & Sears, 2008)

1. How well are you doing in school compared to other students at (school name inserted here)? (1 not as well as most, 7 better than most)
2. Compared to other student at (school name inserted here), how smart are you? (1- not as smart as most to 7- smarter than most)

VI. Discounting scale (Sidanius, Levin, van Laar, & Sears, 2008)-
Strongly disagree(1) to Strongly agree (7)

1. My academic performance at (school name inserted here) accurately reflects how smart I am.
2. The grades I have received at (school name inserted here) are not a good measure of my intellectual ability.

VII. Dis-identification scale (Sidanius, Levin, van Laar, & Sears, 2008)
Strongly disagree (1)to Strongly agree (7)

1. My performance in school does not affect whether I feel good or bad about myself.
2. How I feel about myself depends a lot on how well I do in school.

VIII. Self Reported GPA

Please type in all of the classes you took last semester in the space below. To the right of each class, please select the grade you received for each class.

IX. Tendency to seek college resources
Never (1), One time (2), Occasionally (2-3 times) (3), Frequently (4 or more times) (4)

1. During the fall semester, how many times have you emailed a professor and/or an AI to ask a question?
2. During the fall semester, how many times have you met with a professor and/or AI outside of class?
3. During the fall semester, please estimate how many times have you sought educational resources for your classes (Writing Center, (teacher center name inserted here), peer tutoring).

Mental and Physical Health

X. Physical health symptoms- items from headache, gastrointestinal, cold/flu, metabolic, and muscular pain subscales of the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983)

Mark the number for each statement that best describes HOW MUCH THAT PROBLEM HAS BOTHERED OR DISTRESSED YOU DURING THE PAST SEMESTER. Mark only one number for each item. At one extreme, 0 means that you have not been bothered by the problem. At the other extreme, 4 means that the problem has been an extreme bother.

HOW MUCH WERE YOU BOTHERED BY:

1. Sleep problems (can't fall asleep, wake up in the middle of night or early in morning) (metabolic)
2. Weight gain or loss (metabolic)
3. Constipation (gastro)
4. Diarrhea (gastro)
5. Constant fatigue (metabolic)
6. Headache (headache)
7. Indigestion (gastro)
8. Upset stomach (gastro)
9. Appetite change (metabolic)
10. Feeling low in energy (metabolic)
11. Stuffy head or nose (cold/flu)
12. Muscle tension (muscular pain)
13. Cold or cough (cold/flu)

XI. Self-Reported Physical Health- Healthy Days Core Module (CDC)

Over the fall semester, would you say that in general your health was…
Poor (1), Fair(2), Good(3), Very Good(4), Excellent (5)

XII. Exercise

How often do you exercise?

a. Never
b. Rarely
c. A few times a month
d. A few times a week
e. Everyday

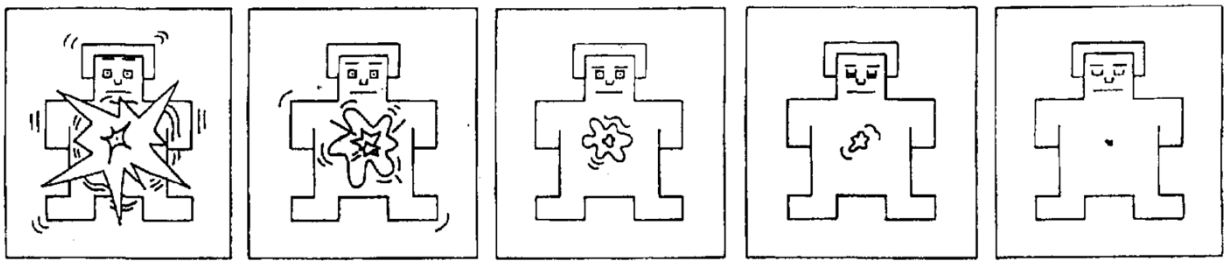
XIII. Stress- Perceived Stress Scale (Cohen & Williamson, 1988)

INSTRUCTIONS: The questions in this scale ask you about your feelings and thoughts during the past semester. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate questions. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate. Please select one of the options below.
Never (1), Almost Never (2), Sometimes(3), Fairly Often(4), Very Often(5)

1. Over the past semester, how often have you been upset because of something that happened unexpectedly?
2. Over the past semester, how often have you felt that you were unable to control the important things in your life?
3. Over the past semester, how often have you felt nervous and "stressed"?
4. Over the past semester, how often have you felt confident about your ability to handle your personal problems?
5. Over the past semester, how often have you felt that things were going your way?
6. Over the past semester, how often have you found that you could not cope with all the things that you had to do?
7. Over the past semester, how often have you been able to control irritations in your life?
8. Over the past semester, how often have you felt that you were on top of things?
9. Over the past semester, how often have you been angered because of things that happened that were outside of your control?
10. Over the past semester, how often have you felt difficulties were piling up so high that you could not overcome them?

XIV. Anxiety (Bradley & Lang, 1994)

1. Please select an image below that best describes how anxious you feel in general?
2. Please select an image below that best describe how anxious you feel when you are engaged in campus social interactions?



XV. Depressive symptoms- CES-D 10 (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993)

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the past semester by selecting the appropriate answer for each question.
Rarely or none of the time (1), Some or little of the time (2), Occasionally or a moderate amount of time (3), All of the time (4)

1. I was bothered by things that usually don't bother me.
2. I had trouble keeping my mind on what I was doing.
3. I felt depressed
4. I felt that everything I did as an effort.
5. I felt hopeful about the future.
6. I felt fearful.
7. My sleep was restless.
8. I was happy.
9. I felt lonely.
10. I could not "get going."

XVI. Happiness adapted from Abdel-Khalek, 2006

In general, I consider myself:
Not a very happy person (1) to Avery happy person (5)

Previous experiences with diversity

XVII. Zip Code

1. Please type in the zip code of the place where you grew up.
2. Thinking back to the last school you attended, roughly what percentage of the students were Black? Hispanic? Asian? White?
3. Thinking back to the last neighborhood you lived in, roughly what percentage of the residents were Black? Hispanic? Asian? White?

Racial Bias and Discrimination

XVIII. Implicit Bias (Racial)- Multi Category -IAT- code taken from brief multi-factor IAT (Sriram & Greenwald; http://www.millisecond.com/download/library/MultifactorIAT/), derivative of the commonly used 2 group IAT (Greenwald, McGhee, & Schwartz, 1998). Original task can be found at https://implicit.harvard.edu/implicit/takeatest.html
This task involves multiple racial categories. An example of the stimuli is shown below. Stimuli taken from MultiCategory IAT task from Axt, Ebersole, & Nosek, 2014; https://osf .io/zg2su/files/.



XIX. Explicit Bias- Feeling Thermometers
0 indication coolness to 100 indicating warmth

Please indicate the general level of warmth or coolness towards each of these groups. (Blacks? Whites? Latinos? Asians? Females? Males? Working class? Middle class? Upper class?)

XX. Stereotype threat (Marx & Goff, 2005)
Strongly disagree (1) to Strongly agree (7)

1. My professor's expectations for me are related to my race
2. I worry that my ability to perform well on tests is affected by my race
3. I worry that if I perform poorly on a test, my professors will think it is because of my race
4. I worry that my race will affect how smart people think I am

XXI. Experiences of discrimination (Sidanius, Levin, van Laar, & Sears, 2008)-
Strongly disagree(1) to Strongly agree(7)

1. I have experienced discrimination at [*school name inserted here*] because of my ethnicity.
2. Other members of my ethnic group have experienced discrimination on campus.
3. I have experienced discrimination at [*school name inserted here*] because of my gender.
4. Other members of my gender have experienced discrimination on campus.
5. I have experienced discrimination within my residential advising group because of my ethnicity.
6. Other members of my ethnic group have experienced discrimination within my residential advising group.

Appendix B: Tables for Supplementary Analyses

Table A1

Study 1 Estimates, Standard Errors, and p Values for Models Using Proportion Ingroup and 3 Category Race

	Race1 (B&L vs. As)		Race2 (Wh vs. B&L)		Race3 (Wh vs. As)		Proportion Ingroup		Race1 X Proportion Ingroup		Race2 X Proportion Ingroup		Race3 X Proportion Ingroup	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Perceived Stress^	-0.21	0.017*	0.28	0.019*	0.07	0.393	0.39	0.138	-0.34	0.738	-0.48	0.608	-0.81	0.174
Depression^	-0.14	0.063†	0.18	0.085†	0.04	0.611	0.10	0.658	-0.63	0.468	0.28	0.727	-0.35	0.502
Physical Health Symptoms	-0.31	0.003**	0.34	0.016*	0.03	0.757	0.558	0.082†	-0.55	0.655	-1.33	0.247	-1.88	0.015*
Belonging on Hall	-0.07	0.767	0.06	0.847	-0.01	0.978	1.36	0.055†	4.105	0.132	-2.352	0.365	1.75	0.346
Belonging at University	0.11	0.472	-0.45	0.037*	-0.34	0.027*	-0.26	0.597	3.44	0.064†	-2.57	0.137	0.87	0.448
GPA	0.32	0.000**	-0.19	0.01*	0.14	0.007**	-0.21	0.196	0.84	0.172	-0.61	0.283	0.23	0.536
Stereotype Threat	-0.84	0.000**	1.67	0.000**	0.83	0.000**	-0.39	0.369	-0.88	0.597	-0.70	0.651	-1.58	0.128

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across halls is too small. For these outcome variables, multiple regression was used instead.

Table A2

Study 1 Estimates, Standard Errors, and p Values for Models Using Proportion Minority and 3 Category Race

	Race1 (B&L vs. As)		Race2 (Wh vs. B&L)		Race3 (Wh vs. As)		Proportion Minority		Race1 X Proportion Minority		Race2 X Proportion Minority		Race3 X Proportion Minority	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Perceived Stress^	-0.15	0.054†	0.14	0.060†	-0.02	0.811	-0.12	0.578	-1.52	0.009**	1.77	0.002**	0.25	0.617
Depression^	-0.12	0.068†	0.14	0.030*	0.01	0.813	-0.20	0.289	-1.08	0.031*	0.92	0.060†	-0.16	0.712
Physical Health Symptoms	-0.24	0.012*	0.12	0.157	-0.11	0.127	-0.757	0.014*	0.28	0.686	0.71	0.295	0.99	0.102
Belonging on Hall	0.12	0.560	-0.40	0.036*	-0.28	0.079†	0.40	0.653	2.89	0.049*	0.18	0.904	3.07	0.019*
Belonging at University	0.08	0.592	-0.35	0.008**	-0.27	0.014*	0.31	0.480	1.96	0.062†	-2.27	0.028*	-0.31	0.737
GPA	0.30	0.000**	-0.11	0.012*	0.18	0.000**	-0.04	0.791	0.14	0.707	-0.40	0.261	-0.26	0.407
Stereotype Threat	-0.89	0.000**	1.80	0.000**	0.93	0.000**	-0.06	0.875	-1.69	0.070†	0.85	0.358	-0.84	0.307

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across halls is too small. For these outcome variables, multiple regression was used instead.

Table A3

Study 2a Sample Characteristics for Presence of Ingroup/Minority Roommate Analysis

Race	N
Black	26
Latinx	24
Asian	162
White	432
Total	644

Number of Roommates	N
2 Roommates	293
3 Roommates	220
4 Roommates	49
5 Roommates	19
6 Roommates	10
7 Roommates	30
8 Roommates	22
10 Roommates	1

	N	
Presence of Ingroup Roommate	Minority	White
No	92	55
Yes	120	377

Presence of Minority Roommate	Minority	White
No	47	216
Yes	165	216

Table A4

Study 2a Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Minorities

Variables	*M (SD)*	N	1	2	3	4	5	6	7	8	9	10	11	12
1) Stress	2.69 (.71)	212	-	-0.59**	0.09	0.03	-0.11	-0.01	-0.05	0.03	0.03	-0.09	0.01	0.17*
2) Life Satisfaction (reverse)	3.99 (1.07)	212	-	-	-0.02	-0.05	0.00	0.06	0.05	0.02	0.05	0.10	-0.04	-0.11
3) Ingroup Roommate (Y or N)	.57 (.50)	212	-	-	-	0.61**	-0.14**	-0.03	-0.15*	-0.03	0.09	-0.11	0.09	0.01
4) Minority Roommate (Y or N)	.78 (.42)	212	-	-	-	-	-0.04	-0.11	-0.19**	-0.11	0.00	-0.16*	0.16*	0.06
5) Admission Rate	.28 (.19)	212	-	-	-	-	-	-0.73**	-0.33**	-0.75**	-0.91**	-0.43**	0.57**	0.09
6) Average SAT of Admitted Students	1,297.97 (108.76)	212	-	-	-	-	-	-	0.85**	0.95**	0.86**	0.92**	-0.94**	0.00
7) In-State Tuition	13,134.91 (10,356.91)	212	-	-	-	-	-	-	-	0.87**	0.46**	0.90**	-0.96**	0.02
8) Out-of-State Tuition	(3582.33)	212	-	-	-	-	-	-	-	-	0.76**	0.81**	-0.97**	-0.04
9) Graduation Rate	.87 (.08)	212	-	-	-	-	-	-	-	-	-	0.68**	-0.64**	-0.03
10) Endowment	2,861,791,777 (4,075,884,080)	212	-	-	-	-	-	-	-	-	-	-	-0.89**	0.05
11) Number of Full-Time Undergraduates Enrolled	19,560.38 (9,244.09)	212	-	-	-	-	-	-	-	-	-	-	-	0.01
12) International	.25 (.61)	212	-	-	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table A5

Study 2a Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Whites

Variables	*M (SD)*	N	1	2	3	4	5	6	7	8	9	10	11	12
1) Stress	2.45 (.73)	429	-	-0.53**	-0.08	-0.03	0.19**	-0.19**	-0.21**	-0.21**	-0.15**	-0.17**	0.22**	0.05
2) Life Satisfaction (reverse)	4.19 (.94)	432	-	-	0.11*	-0.03	-0.13**	0.14**	0.17**	0.16**	0.10*	0.13**	-0.17**	0.01
3) Ingroup Roommate (Y or N)	.87 (.33)	432	-	-	-	-0.33**	0.08	0.07	0.17**	0.04	-0.01	0.17**	-0.09	-0.07
4) Minority Roommate (Y or N)	.5 (.50)	432	-	-	-	-	-0.23**	0.15**	0.09	0.18**	0.16**	0.07	-0.16**	0.07
5) Admission Rate	.43 (.31)	432	-	-	-	-	-	-0.94**	-0.79**	-0.95**	-0.93**	-0.80**	0.88**	-0.17**
6) Average SAT of Admitted Students	1,296.60 (160.12)	432	-	-	-	-	-	-	0.92**	0.97**	0.94**	0.95**	-0.94**	0.18**
7) In-State Tuition	17,664.85 (11,395.71)	432	-	-	-	-	-	-	-	0.94**	0.75**	0.89**	-0.97**	0.15**
8) Out-of-State Tuition	(5526.41)	432	-	-	-	-	-	-	-	-	0.87**	0.86**	-0.97**	0.16**
9) Graduation Rate	.83 (.13)	432	-	-	-	-	-	-	-	-	-	0.87**	-0.78**	0.18**
10) Endowment	4,571,795,227 (4,671,152,561)	432	-	-	-	-	-	-	-	-	-	-	-0.88**	0.18**
11) Number of Full-Time Undergraduates Enrolled	17,923.90 (12,442.80)	432	-	-	-	-	-	-	-	-	-	-	-	-0.16**
12) International	.06 (.33)	432	-	-	-	-	-	-	-	-	-	-	-	-

** p < .01

* p < .05

Table A6

Study 2a Estimates, Standard Errors, and p Values for Models Using Presence Ingroup

	Race			Presence Ingroup			Race X Presence Ingroup			Admission Rate			Avg. SAT of Admitted Students[a]			In-State Tuition			Out-of-State Tuition[a]			Graduation Rate			Endowment			Number of Full-Time Students Enrolled			International		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress^	0.16	0.07	0.035*	0.00	0.07	0.987	0.23	0.15	0.133	0.90	1.37	0.512				0.00	0.00	0.593				2.22	2.77	0.423	0.00	0.00	0.376	0.00	0.00	0.703	0.18	0.06	0.003**
Life Satisfaction^	-0.10	0.10	0.349	0.12	0.10	0.238	-0.30	0.21	0.147	-1.01	1.88	0.592				0.00	0.00	0.731				-2.49	3.79	0.512	0.00	0.00	0.438	0.00	0.00	0.769	-0.13	0.09	0.126

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools is too small. For these outcome variables, multiple regression was used instead.

[a] For these covariates, the statistical software excluded them from the analysis because these variables were perfectly predicted from one or more of the other predictors.

Table A7

Study 2a Estimates, Standard Errors, and p Values for Models Using Presence Minority

	Race			Presence Minority			Race X Presence Minority			Admission Rate			Avg. SAT of Admitted Students[a]			In-State Tuition			Out-of-State Tuition[a]			Graduation Rate			Endowment			Number of Full-Time Students Enrolled			International		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Perceived Stress^	0.16	0.07	0.027*	-0.02	0.06	0.714	0.01	0.14	0.948	0.88	1.37	0.521				0.00	0.00	0.586				2.20	2.77	0.426	0.00	0.00	0.374	0.00	0.00	0.700	0.19	0.06	0.003**
Life Satisfaction^	-0.12	0.10	0.241	-0.08	0.09	0.325	0.03	0.19	0.881	-0.98	1.88	0.600				0.00	0.00	0.769				-2.39	3.79	0.529	0.00	0.53	0.456	0.00	0.00	0.799	-0.13	0.09	0.133

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools is too small. For these outcome variables, multiple regression was used instead.

[a] For these covariates, the statistical software excluded them from the analysis because these variables were perfectly predicted from one or more of the other predictors.

Table A8

Study 2a Estimates, Standard Errors, and p Values for Models Using Proportion Ingroup and 3 Category Race

	Race1 (B&L vs. As)		Race2 (Wh vs. B&L)		Race3 (Wh vs. As)		Proportion Ingroup		Race1 X Proportion Ingroup		Race2 X Proportion Ingroup		Race3 X Proportion Ingroup	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Perceived Stress^	-0.10	0.555	0.32	0.049*	0.22	0.071†	-0.05	0.680	-1.04	0.030*	1.01	0.036*	-0.03	0.898
Life Satisfaction^	0.16	0.517	-0.33	0.152	-0.18	0.311	0.15	0.382	0.98	0.154	-1.64	0.017*	-0.66	0.068†

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools is too small. For these outcome variables, multiple regression was used instead.

Table A9

Study 2a Estimates, Standard Errors, and p Values for Models Using Proportion Minority and 3 Category Race

	Race1 (B&L vs. As)		Race2 (Wh vs. B&L)		Race3 (Wh vs. As)		Proportion Minority		Race1 X Proportion Minority		Race2 X Proportion Minority		Race3 X Proportion Minority	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Perceived Stress^	-0.11	0.484	0.32	0.041*	0.21	0.083†	0.09	0.498	-0.06	0.896	-0.05	0.901	-0.11	0.674
Life Satisfaction^	0.20	0.396	-0.34	0.139	-0.14	0.427	-0.45	0.015*	0.21	0.737	0.01	0.994	0.22	0.565

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools is too small. For these outcome variables, multiple regression was used instead.

Table A10

Study 2b Sample Characteristics for All Roommate Group Sizes Analyses

Race	N
Black	40
Latinx	131
Asian	160
White	157
Total	488

Number of Roommates	N
2 Roomates	380
3 Roomates	45
4 Roomates	7
5 Roomates	55
6 Roomates	1

Table A11

Study 2b Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Minorities

Variables	*M (SD)*	N	1	2	3	4	5	6	7
1) Belonging in Dorm	4.99 (1.51)	330	-	0.49**	0.05	-0.14**	-0.06	-0.02	-0.02
2) Belonging at University	5.10 (1.30)	330	-	-	0.02	-0.08	-0.14*	-0.04	-0.01
3) GPA	3.08 (.47)	296	-	-	-	0.12*	0.07	0.05	-0.04
4) Stereotype Threat	3.92 (1.94)	331	-	-	-	-	-0.05	0.06	0.00
5) Proportion Ingroup	.28 (.34)	331	-	-	-	-	-	0.54**	-0.21**
6) Proportion Minority	.59 (.35)	331	-	-	-	-	-	-	-0.03
7) Semester Enrolled	1.81 (1.26)	331	-	-	-	-	-	-	-

** p < .01

* p < .05

Table A12

Study 2b Means, Standard Deviations, and Correlations for Predictors, Outcomes, and Covariates for Whites

Variables	*M (SD)*	N	1	2	3	4	5	6	7
1) Belonging in Dorm	5.05 (1.48)	157	-	0.46**	0.01	0.02	-0.02	-0.08	0.04
2) Belonging at University	4.99 (1.44)	157	-	-	0.07	0.01	-0.03	-0.13	0.04
3) GPA	3.25 (.41)	149	-	-	-	-0.15	-0.14	0.10	0.08
4) Stereotype Threat	2.32 (1.59)	157	-	-	-	-	-0.05	0.01	-0.02
5) Proportion Ingroup	.36 (.36)	157	-	-	-	-	-	-0.83**	0.04
6) Proportion Minority	.55 (.36)	157	-	-	-	-	-	-	-0.04
7) Semester Enrolled	1.31 (.67)	157	-	-	-	-	-	-	-

** p < .01

* p < .05

Table A13

Study 2b Estimates, Standard Errors, and P Values for Models Using Proportion Ingroup and All Roommate Groups

	Race			Proportion Ingroup			Race X Proportion Ingroup			Semester Enrolled		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Belonging in Dorm	-0.07	0.15	0.641	-0.20	0.20	0.312	-0.21	0.42	0.619	-0.02	0.06	0.770
Belonging at University	0.09	0.13	0.492	-0.38	0.18	0.031*	-0.44	0.37	0.236	-0.01	0.06	0.819
GPA	-0.16	0.05	0.001**	0.01	0.06	0.898	0.25	0.13	0.060†	-0.01	0.02	0.699
Stereotype Threat	1.59	0.18	0.000**	-0.27	0.24	0.269	-0.05	0.51	0.917	-0.02	0.08	0.791

** p < .01

* p < .05

† p < .10

Table A14

Study 2b Estimates, Standard Errors, and P Values for Models Using Proportion Minority and All Roommate Groups

	Race			Proportion Minority			Race X Proportion Minority			Semester Enrolled		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Belonging in Dorm	-0.05	0.15	0.728	-0.15	0.19	0.449	0.241	0.408	0.556	-0.01	0.06	0.869
Belonging at University	0.13	0.13	0.347	-0.28	0.17	0.102	0.36	0.37	0.329	0.00	0.06	0.964
GPA	-0.16	0.05	0.001**	0.08	0.06	0.201	-0.07	0.13	0.613	-0.01	0.02	0.710
Stereotype Threat	1.59	0.18	0.000**	0.25	0.23	0.297	0.30	0.50	0.547	-0.01	0.08	0.945

** p < .01

* p < .05

† p < .10

Table A15

Study 2b Estimates, Standard Errors, and p Values for Models Using Proportion Ingroup and 3 Category Race

	Race1 (B&L vs. As)		Race2 (Wh vs. B&L)		Race3 (Wh vs. As)		Proportion Ingroup		Race1 X Proportion Ingroup		Race2 X Proportion Ingroup		Race3 X Proportion Ingroup	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Belonging in Dorm	0.01	0.966	-0.01	0.954	0.00	0.987	-0.09	0.690	-0.211	0.727	-0.222	0.723	-0.43	0.363
Belonging at University	-0.13	0.501	0.26	0.167	0.13	0.424	-0.37	0.056†	-0.39	0.479	0.01	0.993	-0.38	0.375
GPA	0.25	0.000**	-0.30	0.000**	-0.05	0.374	-0.05	0.450	0.06	0.769	0.086	0.666	0.14	0.364
Stereotype Threat	-0.11	0.676	1.68	0.000**	1.57	0.000**	-0.46	0.082†	-0.05	0.943	0.09	0.901	0.04	0.943

** p < .01

* p < .05

† p < .10

Table A16

Study 2b Estimates, Standard Errors, and p Values for Models Using Proportion Minority and 3 Category Race

	Race1 (B&L vs. As)		Race2 (Wh vs. B&L)		Race3 (Wh vs. As)		Proportion Minority		Race1 X Proportion Minority		Race2 X Proportion Minority		Race3 X Proportion Minority	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Belonging in Dorm	0.00	0.995	0.01	0.981	0.00	0.984	-0.20	0.317	0.07	0.882	0.538	0.289	0.61	0.204
Belonging at University	-0.21	0.252	0.33	0.069†	0.12	0.451	-0.33	0.071†	-0.12	0.787	0.41	0.367	0.29	0.501
GPA	0.23	0.001**	-0.29	0.000**	-0.06	0.323	0.03	0.697	-0.04	0.788	-0.06	0.699	-0.10	0.511
Stereotype Threat	-0.25	0.323	1.78	0.000**	1.53	0.000**	0.15	0.541	-1.00	0.102	0.51	0.413	-0.49	0.406

** p < .01

* p < .05

† p < .10

Table A17

Study 3 Estimates, Standard Errors, and p Values for Models Using Proportion Ingroup and 3 Category Race

	Race1 (B&L vs. As)		Race2 (Wh vs. B&L)		Race3 (Wh vs. As)		Proportion Ingroup		Race1 X Proportion Ingroup		Race2 X Proportion Ingroup		Race3 X Proportion Ingroup	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Flourishing	-0.11	0.004**	0.08	0.220	-0.04	0.534	0.25	0.024*	-1.38	0.026*	-0.94	0.036*	-2.32	0.000**
Depression	-0.07	0.074†	-0.06	0.143	-0.08	0.052†	-0.21	0.005**	1.23	0.008**	-0.05	0.905	1.19	0.002**
Anxiety	-0.06	0.057†	-0.10	0.049*	-0.22	0.001**	-0.22	0.011*	1.47	0.008**	-0.15	0.733	1.32	0.003**
Avg. Sleep per Night on Weekdays^	-0.06	0.387	-0.26	0.004**	-0.33	0.000**	0.48	0.001**	-3.40	0.000**	0.47	0.458	-2.42	0.001**
Avg. Sleep per Night on Weekends	0.09	0.194	-0.02	0.825	0.07	0.476	0.05	0.779	-0.40	0.715	0.10	0.898	-0.30	0.730
Self-Reported GPA	0.28	0.000**	-0.34	0.000**	-0.06	0.076†	-0.05	0.386	-0.40	0.253	0.49	0.057†	0.10	0.750

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools or years is too small. For these outcome variables, multiple regression was used instead.

Table A18

Study 3 Estimates, Standard Errors, and p Values for Models Using Proportion Minority and 3 Category Race

	Race1 (B&L vs. As)		Race2 (Wh vs. B&L)		Race3 (Wh vs. As)		Proportion Minority		Race1 X Proportion Minority		Race2 X Proportion Minority		Race3 X Proportion Minority	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
Flourishing	-0.11	0.005**	-0.04	0.213	-0.15	0.000**	-0.73	0.002**	-0.71	0.077†	0.50	0.113	-0.21	0.482
Depression	-0.02	0.394	0.04	0.047*	0.02	0.355	0.38	0.038*	0.63	0.019*	-0.49	0.026*	0.15	0.461
Anxiety	-0.07	0.036*	0.01	0.705	-0.06	0.018*	0.50	0.019*	0.72	0.025*	-0.64	0.015*	0.08	0.717
Avg. Sleep per Night on Weekdays^	-0.05	0.436	-0.50	0.000**	-0.56	0.000**	-0.31	0.084†	-1.09	0.102	0.49	0.348	-0.38	0.451
Avg. Sleep per Night on Weekends	0.09	0.191	-0.04	0.457	0.05	0.343	-0.20	0.424	-0.68	0.357	-0.32	0.571	-1.00	0.075†
Self-Reported GPA	0.28	0.000**	-0.32	0.000**	-0.04	0.036*	0.09	0.504	-0.20	0.379	0.13	0.446	-0.06	0.706

** p < .01

* p < .05

† p < .10

^ The statistical software produced a warning that the variances across schools or years is too small. For these outcome variables, multiple regression was used instead.