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To cite this article: Joshua Brown, Fred Volk & Elisabeth M. Spratto (2019) The Hidden Structure: The Influence of Residence Hall Design on Academic Outcomes, Journal of Student Affairs Research and Practice, 56:3, 267-283

To link to this article: <https://doi.org/10.1080/19496591.2019.1611590>



Published online: 17 Jun 2019.



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# The Hidden Structure: The Influence of Residence Hall Design on Academic Outcomes

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*This study investigates the impact of residence hall architecture on students' academic achievement, also considering the influence of race and homophily opportunity—a tendency to create social bonds with like others. We found that socializing architecture was positively associated with a higher first-semester grade point average, and that homophily opportunity had a significant effect for Black students, but only when those students live in residence halls designed with socializing architecture.*

In the past two decades, residence halls have become one of the prominent features in the college recruitment “arms race.” Recent apartment style residence halls represent a distinct shift in philosophy from the communally focused corridor style. The structure of the apartment style residence halls focus on individualism and isolation, offering private rooms, individual bathrooms, and personal laundry facilities; while their amenities focus on luxury, providing students with swimming pools, specialty cuisine, and myriad electronic entertainment options (Eligon, 2013). Built by public and private universities alike, these buildings are constructed with high financial costs, often more than \$100 million per complex (McClure, DeVita, & Ryder, 2017). Some argued that the construction of such lavish facilities is one of the primary contributors to the dramatic increase in the price of higher education in recent decades (Kirshstein & Kadamus, 2012; Woodhouse, 2015). While the financial costs of these structures are known, at present their social and academic costs are more elusive. In an attempt to accommodate preferences of newly recruited students, have university administrators pursued a residence hall design that shapes new student outcomes in particular ways or for particular student groups?

Prior research that examined differences in student housing predominantly focused on differences between on-campus and off-campus student populations (Blimling, 1993). Research indicated that students who choose to live on campus often experience higher levels of engagement, retention, and degree attainment (Oseguera & Rhee, 2009; Pascarella & Terenzini, 1991; Titus, 2006). Yet, given that many colleges and universities have strategically expanded on-campus student housing facilities that employ more isolating forms of architecture than socializing forms of architecture, it may be

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possible that the on-campus living experience has become more varied than previously understood (Bronkema & Bowman, 2017; Graham, Hurtado, & Gonyea, 2018; Schudde, 2011). This study seeks to address the question, “In what ways does the design of residence hall architecture differentially shape student academic outcomes across student groups?” It examines 4 years of student housing records for first-year students attending a medium-sized, private liberal-arts university in the South.

This research makes important contributions to both the student development literature and student development practice. First, this study extends a long tradition of scholarship that examined how student choices in housing relate to student development and academic outcomes (Astin, 1977; Pascarella, 1985; Zhao & Kuh, 2004). It highlights that groups of students are differentially influenced by residence hall environments that embody tensions between community and individualism. This research contributes to the discourse that shifts the focus of the conversation from on/off campus to how university residence hall environments shape student outcomes. More specifically, this study highlights how a focus on homophily rather than race further illuminates the complex social processes that exist within the university residence hall setting. Second, it informs student development practice that addresses the placement of students during their first year of college. Whether administrators employ residence hall selection practices that emphasize selections made by the student or those assigned by the university, this study suggests that administrators should be mindful of the ways in which local policy and practice may differentially shape the academic outcomes of individual students, particularly students of Color.

## Literature Review

### Student Housing in Context

Research that examined the influence of student housing on outcomes such as development and engagement is well established. Early works examined student housing as a demographic in a categorical manner to determine differences between on-campus and off-campus student populations (Blimling, 1993). These studies highlighted that on-campus populations reported higher levels of degree attainment (Pascarella & Terenzini, 1991; Tinto, 1975), participation in college activities (Astin, 1973, 1977; Chickering, 1974), and positive perception of the college experience (Pascarella, 1985). Later works focused on the importance of living on campus within various residence types by examining the relationship between student outcomes and the programmatic aspects of college student housing such as athletic residence halls, themed housing, Greek life, and living–learning environments (Flowers, 2004; Pike, 2009; Zhao & Kuh, 2004). This development in the literature provided further understanding of the strategic role universities could take in shaping student outcomes via housing programs, but it did not examine the role universities also took when selecting a specific style of residence architectural hall design.

In the past decade, many colleges and universities underwent two transformations in their strategic approach to student housing—expansion and design. First, many universities sought to expand their undergraduate student populations as a form of creating additional revenue. Practices in enrollment management enabled colleges to improve efficiencies in recruiting new students (Kraatz, Ventresca, & Deng, 2010). Enrollment management practices emphasizing student demographics also enabled colleges to strategically recruit new groups or types of students, such as first generation, students of Color, and working adults (DesJardins & Bell, 2006). Many residential colleges and universities require newly admitted students to live on campus for at least the first academic year of attendance. Thus, increases in enrollment necessitated the expansion of student housing on many growing campuses. A second strategic transformation in college student housing pertained to the

architectural design of the residence halls. Student housing became an important part of the campus admissions tour as enrollment managers sought to further “sell” the campus to prospective students (Posecznick, 2017; Stevens, 2007). As new residence halls were constructed, their architectural design was given strategic attention to address the new student preferences of privacy, technology, and amenities (McClure et al., 2017). While these aspects of residence hall design were given strategic attention for purposes of student preference and demand, it is less clear whether administrators considered how residence hall design might also influence student social, cultural, or academic outcomes.

### The Influence of Architectural Design

Architectural design impacts the lives of people in a functional manner, but it also bears significant influence on human sociocultural phenomena by providing a *nomos*, a social ordering of space (Smith & Bugni, 2006). The built environment influences social interaction in three respects: it communicates cultural or symbolic meanings, preserves the values and paradigms of a group, and shapes the interactions of people (Shah & Kesan, 2007; Smith & Bugni, 2006). The design of architecture does not guarantee that interaction will occur; instead it allows the physical barriers to regulate or control opportunities for interaction (Altman & Chemers, 1980). Enclosures are designed to strengthen in-group formation, whereas open spaces are designed to encourage association and socializing (Al-Homoud & Abu-Obeid, 2003). Architecture is more than just background in a college or university setting; rather, it influences social life as its design encourages isolation/socialization and engagement/estrangement among persons (Gieryn, 2000, 2002). Design influences the opportunities of interacting with persons similar to oneself.

The influence of design on interaction has also been documented by researchers studying homophily. Lazarfield and Merton (1954) coined the term *homophily* to describe this phenomenon whereby individuals tend to form friendships with persons like themselves. They summarized their empirical pattern via the traditional maxim, “Birds of a feather flock together.” Homophily occurs across relationship types that vary in interpersonal strength such as marriage, friendship, association, and mere contact. Two homophily categories predominantly apply to this study, namely space and race. First, space characteristics—including architecture, proximity, and geography—affect levels of group interaction (Allport, Clark, & Pettigrew, 1954). A concerning trend is that in spaces designed with closed structures, individuals only “reach out” to those perceived as “like me” (Nahemow & Lawton, 1975). Space characteristics are more important in determining the “thickness” of relationships than the existence of mere connections (McPherson, Smith-Lovin, & Cook, 2001).

Second, race is a significant factor in friendship selection for most age groups, and for college students it is the most salient characteristic of friendship formation (Massey, Camille, Lundy, & Fischer, 2003; Smith & Moore, 2000). Throughout society, people often reside in homogenous neighborhoods with individuals of similar racial, ethnic, and cultural backgrounds (Caplow & Forman, 1950; Owens, 2010). The similarities of these ethnic and cultural groupings are often disrupted upon entering college, especially for students of Color who choose to attend a Predominantly White Institution (Guiffida, 2003, 2004; Tierney, 1999). Whether or not they are given attention, the spatial features of the college environment significantly influence interracial group formation (Stearns, Buchmann, & Bonneau, 2009). Prior to college, many students of Color lived in a home or neighborhood with high homophily, whereas the transition to college—especially a Predominantly White Institution—typically upends the homophily composition in their new lived environment: the residence halls (Park, Denson, & Bowman, 2013; Sidanius et al., 2008).

## The Paradox in Residence Hall Design

The increased use of the apartment-style residence hall design in the past two decades has resulted in a “residential paradox” on many college campuses (Bronkema & Bowman, 2017). On the one hand, new students and their parents prefer living options that provide increased amenities, technology, and privacy (Chambliss & Takacs, 2014; Cross, Zimmerman, & O’Grady, 2009). On the other hand, the apartment-style residence hall design leaves students more isolated than their peers living in the more socializing corridor-style residence halls, meaning those with individual rooms opening off a single indoor hallway (Devlin, Donovan, Nicolov, Nold, & Zandan, 2008). A socializing residence hall design is characterized by both common spaces for interaction and limited barriers to privacy (e.g., doors that lock). The isolating nature of the apartment style of residence hall design, with its successive locking doors and minimal communal space, has been shown to negatively influence feelings of community (Devlin et al., 2008), whereas the communal nature of the corridor style encourages student socialization patterns (Chambliss & Takacs, 2014).

The socialization and engagement of first-year college students is particularly important given the major transition from home to college. First-year students who develop a greater sense of belonging yield higher levels of grade point average (GPA), persistence, and degree attainment (Hausmann, Ye, Schofield, & Woods, 2009; Johnson et al., 2007). An important component of college socialization processes are the myriad learning outcomes that occur as a result of cross-race interactions (Bowman & Park, 2014; Jones, Liu, & Bell, 2017). Such interactions have been shown to yield short-term benefits such as persistence and satisfaction (Chang, 1999; Chang, Denson, Saenz, & Misa, 2006), as well as long-term benefits such as labor market outcomes and workforce competencies (Comeaux, 2013; Engberg, 2007; Jayakumar, 2008), for students of all races, not just students of Color. For the first-year student, matters of socialization and belonging often occur within the university residence hall setting, as many are required to live on campus. Prior survey research highlighted that the density of the residence halls can influence social outcomes for first-year students, such as engagement and sense of self (Clemons, McKelfresh, & Banning, 2005; Kaya, 2004). Yet, the limited research on the residential paradox examining multiple architectural designs has yielded inconclusive findings, which has led scholars to call for additional research to further understand the complexity of the matter (Bronkema & Bowman, 2017).

Looking beyond the influence of architectural design on the average student, architectural choices may differentially impact subgroups within the larger student body. Prior research sought to further understand the residential paradox by focusing on race (Bronkema & Bowman, 2017). However, the properties of architecture do not influence race—a static category—as much as they influence homophily, which is a dynamic category. In the university environment, homophily is a social phenomenon that varies from hall to hall and from year to year, depending on how students may choose or be assigned to a specific residence hall type. What is important is not just the known race of a given student, but also the opportunity presented to them to find others “like me”—in other words, their homophily opportunity. A student’s experience of diversity is related not only to the campus-wide demographics, but also to the architectural design of their living space that shapes their opportunities for friendship formation.

## Hypotheses

Given that earlier residence hall research has not examined the distinction between race and homophily, we explore the following research question with a multi-year sample: “In what ways does the design of residence hall architecture differentially shape student academic outcomes

across student groups?” Three hypotheses were developed to assess the influence of social and environmental factors on student academic outcomes.

Engagement and a sense of belonging within the first semester in which a student arrives on campus is critical to their subsequent academic and social success (Hausmann, Schofield, & Woods, 2007; Zea, Reisen, Beil, & Caplan, 1997). The residence hall setting is an important environment in which first-year students establish friendships and develop their sense of belonging. However, the design of a given residence hall (apartment vs. corridor) shapes the opportunity for students to establish relationships with persons “like me.” As first-year students have greater opportunities to form friendships with others of similar backgrounds, they will experience a greater sense of belonging and, as a result, perform better academically. Students residing in corridor-style residence halls have greater accessibility to one another and therefore may yield better academic outcomes. Considering this, two hypotheses were developed related to a student’s first-semester GPA; these include:

*H1:* Students who live in student housing that fosters socialization (corridor style) are more likely to have higher first-semester GPAs than students who live in student housing that fosters isolation (apartment style).

*H2a:* Homophily opportunity is positively related to students’ first-semester GPA.

While integration into the college environment is important for all first-year students, it is particularly vital for first-year Black students attending Predominantly White Institutions (Davis, 1994; Harper, 2009; Wood & Palmer, 2014). A significant amount of research highlighted that various organizational factors can influence the social and academic success of Black college students—including the role of professors (Howard, 2003; Milner, 2006), Black student organizations (Guiffrida, 2003), leadership (Harper, 2006), and university programming that is culturally relevant (Fries-Britt & Turner, 2002), to name just a few. In addition to organizational factors, scholars showed that relational factors influence the social and academic success of Black students, such as social capital (Palmer & Gasman, 2008), peer networks (Datnow & Cooper, 1997), and supportive relationships (Strayhorn, 2008b). The relational factors help facilitate their adjustment within environments where it may particularly difficult to integrate or establish a fit.

These two types of factors—organizational and personal—converge in the residence hall setting, where the isolating or socializing architectural design chosen by the university influences the opportunities for students to establish relationships with persons “like me.” The opportunity to form meaningful relationships during the college experience is important for the academic achievement of Black students (Guiffrida, 2004). Conversely, when Black students perceive the campus as unwelcoming, they are less involved and withdrawn (Museus, 2008). Research highlighted that Black students must often overcome non-academic challenges in the university environment before they can focus on academic achievement (Mallinckrodt & Sedlacek, 2009). Strayhorn (2008a) purported that the academic achievement of Black males on some campuses is negatively impacted because they are “socially isolated” (p. 502). However, thoughtfully designed environments on university campuses encourage—rather than prohibit—the opportunity for Black students to form relationships and find peer models that improve their academic achievement (Hensley, Shaulskiy, Zircher, & Sanders, 2015). A third hypothesis was developed to specifically examine the academic achievement (i.e., GPA) for first-year Black students:

*H2b:* Homophily opportunity has an effect on first-semester GPA for Black students, but only when those students live in residence halls designed with socializing rather than isolating architecture.

A conceptual model of the three hypotheses is included in Figure 1. It depicts the relationship between the three independent variables used in the study and the outcome variable—first-semester GPA. High school GPA was treated as a covariate in the study.

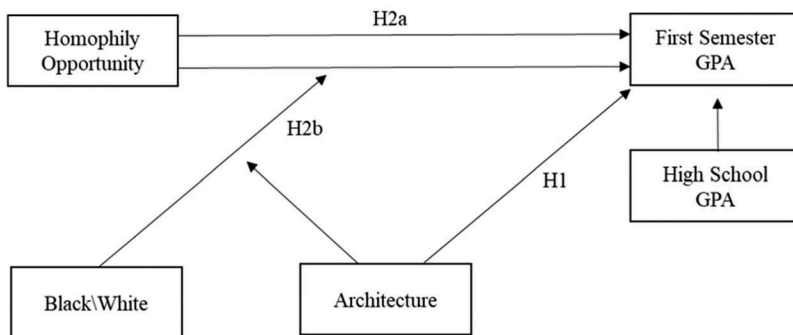
## Method

### Site Selection

This study employs a design that examines differences between the two types of residence hall structures—apartment and corridor—at a medium-sized, private liberal-arts university in the South. The site was selected based on two factors: the importance the organization places on new students living residentially, and the priority it afforded to the apartment-style residence halls design during a multimillion-dollar expansion of its student housing. First, university policies for the organization require students to reside in the residence halls during their first 2 years. Consequently, the system of student housing impacts the majority of students during their early undergraduate experience. Second, the university expanded its campus housing facilities in a large-scale construction project solely with the apartment style of architecture. Prior to the expansion, 29 of the 33 residence hall structures were built with the traditional corridor design (i.e., socializing). During the expansion, 30 additional luxury residence halls were constructed, giving students a more private experience—comprising an individual bathroom, washer and dryer, climate-controlled facilities, full kitchen, and a furnished living room (i.e., isolating).

Following the completion of the residence hall expansion, nearly all first-year students were required to choose between two dominant styles of residence halls that offered two very different living experiences on campus. The corridor-style residence halls have two rows of rooms separated by a single hallway down the middle of the building and house approximately 70 residents. The bedrooms each house three people, with two communal bathrooms per floor. Everyone must walk through the hallway to access their rooms. The corridor-style residence halls further heighten social access, since there is a single entrance and exit for the building. In contrast, the newly constructed apartment-style residence halls are composed of multiple suites. An individual suite contains three double-occupancy bedrooms, three bathrooms, a kitchen, laundry closet with washer/dryer, and a shared living room for the six students. The apartment-style residence halls do not have a common hallway and individual

Figure 1. Conceptual model of hypotheses.



suites contain multiple locked doors to maximize privacy. Direct interaction within the apartment-style residence halls is typically limited to the six individuals, given that each suite has its own exterior entry. The apartment-style architecture limits student access to one another and thus the opportunity to develop relationships with greater numbers of students beyond the six members of one's suite.

The building density for the socializing architecture was 120 students across two floors, whereas the building density for the isolating architecture was 84 students across three floors. Given the cost and scope of the residence hall expansion by the university, the site provided a unique opportunity to comparatively examine the possible impact of the two architectural design differences.

### Participants

Housing records for all incoming first-year students were obtained in collaboration with the Office of Residence Life. International students, students with incomplete admissions records, students who did not belong to the two most populous racial groups on campus, residence halls designated for specific student populations (e.g., athletics), and students who did not live in the two most common residence hall arrangements (corridor and apartment) were excluded from the analyses. There was no systematic assignment of students to specific residence hall structures other than self-selection; and those who were systematically assigned (e.g., student athletes) were removed from the analysis. This resulted in sample size over a 4-year period of 5,537 incoming first-year students, 803 of whom were Black (see Table 1).

### Analysis

We analyzed the data using ordinary least-squares regression. Independent variables include homophily opportunity, race, and architecture. *Homophily Opportunity* is defined as the percentage of other residents in a student's residence hall that were the same race as the student. The percentage of each racial group was computed for each residence hall and the corresponding percentage was attached to each student based on their race. For example, if 4% of students in a given residence hall were Black, then each Black student in that residence hall was assigned a value of 0.04, while White students were assigned a value of .96. *Race* is a self-reported characteristic collected by the university upon receiving a student's enrollment application. Students may choose from eight options: Black, American Indian or Alaska Native, Asian, Hispanic/Latino, Mexican American, Native Hawaiian/Pacific Islander, Puerto Rican, and White. The two race categories used for this study were the two highest among the student population—Black and White. All others were excluded due to insufficient statistical power for detecting small effects (Cohen, 1992). The *architecture* variable is dummy coded to represent the two dominant styles on the campus—corridor and apartment.

The dependent variable is *First-Semester GPA*. This includes only first-time college students. An additional measure includes *High School GPA* (measured on a 4.0 scale). It is common for high schools to assign weighted points to students in honors or advanced placement courses, which results in students possessing a GPA above 4.0. As a result, GPA values greater than 4.0 were truncated to 4.0, as this approach was consistent with university policy.

### Results

A regression analysis was performed to assess whether architecture, homophily opportunity, and race combined to predict first-semester GPA of incoming first-time college students. Hayes' (2017)



Table 1

**Subgroup and Total Means, SD, and CIs**

<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>LLCI</b>	<b>ULCI</b>
<i>High School GPA</i>					
Socializing architecture	3,307	3.257	.537	3.238	3.278
Isolating architecture	2,230	3.127	.573	3.104	3.151
Black students	803	2.701	.490	2.667	2.738
White students	4,734	3.294	.519	3.278	3.310
Male	2,703	3.082	.569	3.061	3.103
Female	2,834	3.328	.514	3.308	3.347
<b>Total</b>	5,537	3.208	.556	3.194	3.222
<i>Homophily Opportunity</i>					
Socializing architecture	3,307	.669	.208	.662	.676
Isolating architecture	2,230	.600	.228	.221	.235
Black students	803	.136	.054	.132	.139
White students	4,734	.020	3.259	.025	.103
Male	2,703	.618	.221	.610	.626
Female	2,834	.664	.215	.656	.671
<b>Total</b>	5,537	.641	.219	.636	.647
<i>First-Semester GPA</i>					
Socializing architecture	3,307	2.848	.866	2.817	2.877
Isolating architecture	2,230	2.603	.981	2.564	2.642
Black students	803	2.038	.924	1.979	2.095
White students	4,734	2.870	.865	2.844	2.895
Male	2,703	2.587	.944	2.550	2.622
Female	2,834	2.905	.872	2.869	2.940
<b>Total</b>	5,537	2.750	.922	2.725	2.774

process macro was used (version 3) to address all of the hypotheses simultaneously. Hayes (2017) Model 3 was applied to generate regression coefficients and *p*-values. Confidence intervals for each predictor and interaction were generated through 10,000 bootstrap samples. Predictors were mean-centered to calculate all cross-products for the interactions to facilitate interpretability (Dawson, 2014; Echambadi & Hess, 2007). The overall regression, including three predictors (architecture, homophily opportunity, and race), four interactions, and the covariate (high school GPA), were statistically significant, accounting for nearly 39% of the variance associated with first-semester GPA. As expected, high school GPA was predictive of first-semester GPA (see Table 2).

We hypothesized that first-time college students who are able to connect with others of similar backgrounds will experience more connectedness and, as a result, perform better academically. We examined two factors relative to this rationale: homophily opportunity and architecture. We hypothesized that socializing architecture (H1) and homophily opportunity (H2a) would be related to higher GPAs. We found that corridor architecture was positively related to

Table 2

**Process Model for First-Semester GPA**

Source	b	se	t	p	LLCI	ULCI
Architecture	.3127	.1058	2.9555	.0031	.1053	.5201
Homophily	.4208	.1771	2.3755	.0176	.0735	.7680
Architecture × Homophily	.7242	.3311	2.1873	.0288	.0751	1.3732
Race	.3018	.3945	.7650	.4443	-.4715	1.0751
Race × Architecture	1.7976	.7011	2.5640	.0104	.4232	3.1721
Race × Homophily	.5824	.7585	.7678	.4426	-.9046	2.0693
Architecture × Race × Homophily	2.8780	1.3696	2.1014	.0357	.1931	5.5630
High School GPA	.9374	.0190	49.4007	<.0001	.9002	.9746

first-semester GPA, with  $b = .312$ ,  $t(5,528) = 2.955$ . Those students in socializing architecture ( $M = 2.848$ ) had higher first-semester GPAs than those students in isolating architecture ( $M = 2.603$ ). Hypothesis 1 was supported. We found that homophily opportunity was positively related to first-semester GPA, with  $b = .4208$ ,  $t(5,528) = 2.375$ . More specifically, for every 10% increase in homophily opportunity there was a 4.2% increase in first-semester GPA. Hypothesis 2a was supported.

Finally, we proposed that for Black students, homophily opportunity and architecture would interact. That is, race and homophily opportunity would moderate the relationship between architecture and first-semester GPA. The three-way interaction was statistically significant, with  $b = 2.878$ ,  $t(5,528) = 2.101$ . For Black students, living in socializing architecture with other students like themselves has a positive impact on first-semester GPA. However, homophily opportunity makes no difference for Black students in isolating architecture. This provides support for Hypothesis 2b.

Though the effect size is small for the three-way interaction (<1%), this is to be expected for two reasons. First, there is notable proportional disparity in the number of Black students relative to White students. Because the significant effect was found in only the smaller group, the effect size for the whole sample would naturally be smaller. To assess the magnitude of this effect, we conducted a second analysis to examine the homophily opportunity by architecture interaction only for Black students and found that the effect was nearly 10 times more powerful. Second, and most important, interactions in non-experimental studies are difficult to detect (McClelland & Judd, 1993). Given that there are a large number of variables that could potentially affect first-semester GPA, even a small effect consistent with the theoretical framework is an important finding.

We used the most common approach, one standard deviation above and below the mean, to further examine the interaction (Cohen, Cohen, West, & Aiken, 2003). Because this research was conducted at a Predominantly White Institution, choosing our points for homophily opportunity on the whole sample would be misleading and would fail to address concerns noted by others about handling non-normal distributions (Spiller, Fitzsimmons, Lynch, & McClelland, 2013). We chose our “points” for Figures 2 and 3 based exclusively on the distributions of homophily opportunity for each race. That is, the distribution of homophily opportunity for White students ( $M = 72.71\%$ ,  $+1SD = 79.67\%$ ,  $-1SD = 65.74\%$ ) was very

Figure 2. Homophily opportunity × architecture interaction for Black students.

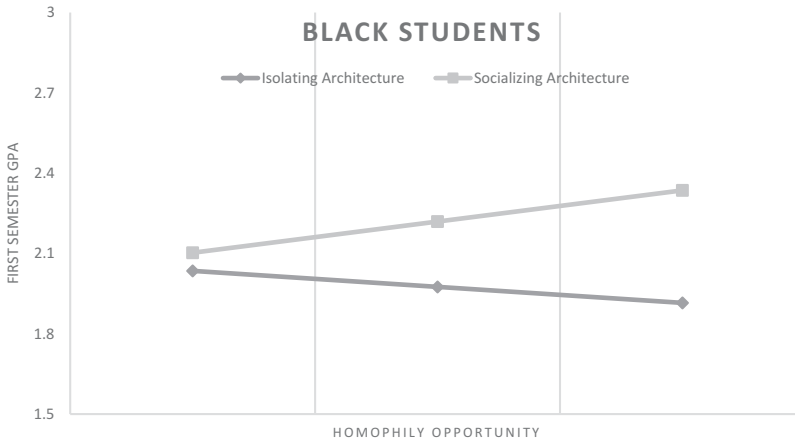
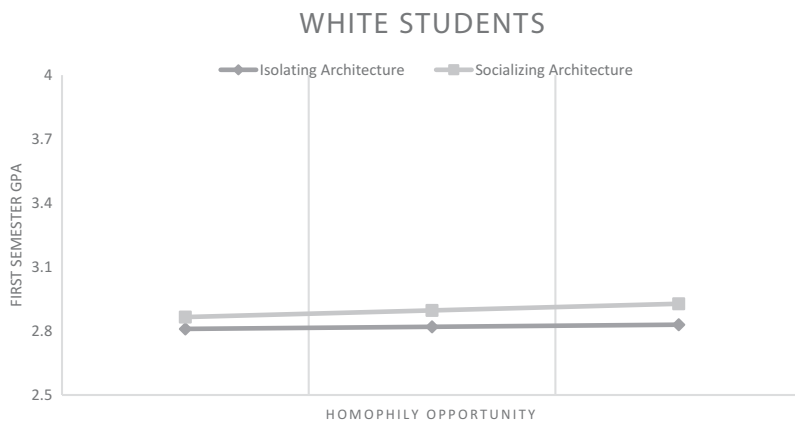


Figure 3. Homophily opportunity × architecture interaction for White students.



different than for Black students ( $M = 13.57\%$ ,  $+1SD = 18.93\%$ ,  $-1SD = 8.21\%$ ). We found that Black students benefited more from homophily opportunity in socializing architecture than White students at a Predominantly White Institution.

Even though all other non-Black student groups were excluded due to insufficient statistical power, we thought it was important to examine whether the effect sizes on first-semester GPA related to a race-homophily opportunity interaction for these groups were similar to the effect size found in Black students. We were able to generate those results for both self-identified Hispanic/Latino students ( $n = 204$ ) and Asian students ( $n = 106$ ). While there was no effect for Asian students, there was a similar effect size (not significant due to insufficient statistical power) for first-year Hispanic/Latino students relative to Black students. This suggests that the

predominant culture of the university may influence first-semester GPA for some students of Color more than others.

## Discussion and Implications

The study of how race and social processes impact the academic achievement of new students within a postsecondary context is a complex phenomenon comprising many facets. Scholars highlighted that factors such as engagement, culture, and programming, among many other variables, impact the academic success of new students (Bowman & Park, 2014; Chang, 1999; Museus, 2008; Strayhorn, 2008a). Research efforts continue to provide us with greater understanding of this phenomenon by accounting for additional variables of interest. The complete examination of this social phenomenon is beyond the capacity of any single study. However, the collective accumulation of this vein of research provides us with greater insights as to how a diverse array of new students might academically succeed in complex institutional environments. This study contributes to the ongoing discourse that examines race and social processes in a postsecondary context and contends that the physical structures designed by college and university leaders play a role in shaping the academic success of new students. These “hidden structures,” such as the architectural design of residence halls, have been relegated as background factors and have gone overlooked within the research.

This study offers two important ideas for postsecondary leaders—that architecture matters; and that contextual factors interact with race in meaningful ways. First, this research demonstrates that architecture matters, because it shapes first-year student engagement and experiences within the residence hall setting. Using data from across multiple years, it shows that students who live in the more socializing corridor residence halls have higher academic outcomes than those who live in the more isolating apartment residence halls. The findings further confirm the presence of extant tensions between student housing preferences and academic outcomes previously discussed by earlier scholars (Chambliss & Takacs, 2014; Devlin et al., 2008). This study extends prior knowledge by highlighting the role of race in shaping the extent to which one can find other persons with similar backgrounds. While considerable research has focused on the organizational and educational structures, little attention has focused on the facilitation of physical structures.

The second important idea this research offers for postsecondary leaders is that the contextual factors of an organization *interact* with race in meaningful ways. This study examined dynamic social processes that differ from one residence hall to another because there is variation in persons “like me.” Results showed that increases in homophily opportunity yield increases in academic outcomes. Moreover, Black students benefited more from homophily opportunity than White students within the socializing corridor residence halls. The implications of this research underscore a critical point: that planning interventions solely based on students’ race may not matter if the homophily opportunity is not supported by both the physical and organizational structures of the college or university.

The finding that race interacts with contextual factors highlights that there are implications for this phenomena that exist much further than simply the residence hall setting in a college or university. The results of this research indicate that a focus solely on race may not capture the complexity of the social phenomena at hand. Rather, practitioners should focus their attention on examining the outcomes determined by the combination of race and the specific contextual factors or social processes. For example, if a specific subpopulation of students yield lower levels of persistence with a specific process, program, or structure, university leaders ought to examine

the extent to which the phenomena exists because of the *interaction* between race and the unique social context. These results offer an example of how identifying and focusing on a single topic related to student success without an adequate consideration of the contextual factors will not yield the desired results for university administrators. More specifically, a focus on race bereft of an examination of the other dimensions that play a role in student success and satisfaction will not yield improved performance for students of Color. The lack of attention in the academic literature on residential housing design as it relates to student success is a demonstration of one area that has been historically under-considered. We are certain there are many more. Consequently, in other areas that are focused on racial disparities in outcomes, a much more nuanced and thorough examination of how a combination of factors may work together to facilitate or inhibit successful results may be more likely to result in effective “structural” changes.

### Implications for Practice

The findings from this research yield implications for postsecondary leaders and practitioners, specifically with regard to architectural design, placement processes, programming, and cross-race interactions. First, college and university leaders must give thoughtful consideration to how physical design influences social dynamics and ultimately the academic outcomes of students. The design and placement of future facilities, such as residence halls, student unions, and other collaborative spaces, should account for the social processes they will shape (Al-Homoud & Abu-Obeid, 2003; Gieryn, 2000, 2002; Shah & Kesan, 2007). For example, university leaders who are presently engaged in the architectural design process for new residence halls may wish to consider the possibility of developing a hybrid residence hall design that strategically couples the two types presented in this study—isolating and socializing. However, many facilities on university campuses have already been erected, and their design characteristics are firmly established. In these instances, university leaders might incorporate components into annual facilities assessments that require area administrators to evaluate facilities with regard to their impact on various types of social interaction (Amaratunga & Baldry, 2000; Nicolazzo, Marine, & Wagner, 2018; Vaccaro & Kimball, 2019). While most annual facilities assessments require managers to address matters of maintenance and efficiency, adding items pertaining to the social evaluation of the facilities provides a low-cost approach that explicitly encourages managers to consider the potential impact of the facility design in new ways. The evaluation brings to the fore what is relegated to the background or “hidden.”

Second, college and university leaders should consider how specific design structures may need to be strategically coupled with processes to encourage student persistence within student subpopulations. For example, while the option of self-selecting one’s residence hall location may emphasize greater levels of “customer service” by reinforcing the notion of choice, not all choices may be uniformly beneficial for students (Blimling, 2014; Li, Sheely, & Whalen, 2005). Residence hall assignment processes that maintain their self-selection emphasis could be infused with historical “rating” or “performance” information regarding a series of factors that include satisfaction, student demographics, and academic achievement, among other metrics, to help new students make more informed housing selections. Student affairs professionals should examine processes that require students to live on campus during their first year in attendance (López Turley & Wodtke, 2010), and consider whether these same students should reside in residence halls with more socializing design structures. Given that isolating and socializing design structures also exist in off-campus environments, student affairs professionals might also consider providing students with resources that direct them toward housing options shown to facilitate positive socialization and academic success.

Third, student affairs professionals should thoughtfully examine the role that strategic programming might play in addressing differential social and academic outcomes by residence hall design (Fink & Inkelas, 2015; Graham et al., 2018). Consideration should specifically focus on both new students and student leaders within the residence hall. Student affairs professionals must examine how core student development programming should vary by design type for new students (Erb, Renshaw, Short, & Pollard, 2014). For example, alcohol programming in the socializing residence halls may emphasize the elements and consequences of binge drinking, whereas alcohol programming in the isolating residence halls may emphasize the elements and consequences of drinking in solitude. The educational programming topic for students in both types of residence hall is foundational, but the emphasis differs slightly based on the unique context. Similarly, student affairs professionals should strategically design leadership training programs to address contextual needs unique to the specific residence hall design (Koch, 2016). For example, student leaders with high socialization skills could be strategically placed in isolating residence halls (Berg & Stoner, 2016). Moreover, these student leaders could receive tailored training on the developmental value of interaction, as well as applied training on how to encourage additional interaction among students in the unique isolating design style. The primary principle is that educational programming should strategically address variation in context.

Finally, college and university leaders should give consideration as to how these three items—design, processes, and programming—interact with race. The results of this study showed that race interacts with contextual factors and that the complexity of a social phenomenon may be more accurately captured by focusing on the interaction of multiple factors. The design features of specific residence halls not only influence the opportunity for engagement with peers “like me,” but also influence the opportunity for engagement with persons “different from me.” In other words, just as Black students face lesser opportunities to engage with other Black students, conversely the White students face lesser opportunities to engage with the same Black students. Consequently, it is likely that the isolating residence hall design influences the outcomes associated with cross-race interactions, given the limited opportunities for engagement (Bowman & Park, 2014; Jones et al., 2017; Strayhorn, 2008a). In evaluating the impact of residence hall design on social and academic outcomes, student affairs professionals should consider not only how to develop increased opportunities for Black students to engage with students “like me,” but also how to increase the opportunities for White students to engage with students “different from me” (Comeaux, 2013). This dual emphasis will maximize the social support and diverse learning opportunities that exist when members of both races have equal opportunities for engagement within and across races. This research highlights that the organizational decisions have differential implications on the academic outcomes of students and warrant careful consideration by university leaders.

## Limitations

Although thoughtful attention was given to site selection, data queries, modeling social processes, and data analysis, limitations to the study persist, five of which warrant discussion. First, the archival approach taken with this research limits the nature of the inquiry. There was no opportunity to engage the students in other potential methods that would aid in understanding how the design of student housing may have influenced their experiences. For example, students could have engaged others in either casual or organized activities that could have influenced their experiences more than architecture. This study does not measure the “social architecture” or actual social interactions, as other research has done (Harris, 2016; McClure & Ryder, 2017). More work is needed to bridge the archival approach this study adopts with the

survey approach others adopt when examining the impact of the college residential environment (Bronkema & Bowman, 2017; Harris, 2016; Pike, 2009).

Second, we did not have access to reliable records of institutional policies or procedural approaches related to student housing assignment that may have provided further understanding about the extent to which architecture, race, and homophily opportunity were related. We were unable to examine the extent to which the self-assignment housing processes might further influence homophily opportunity. Third, access to student financial aid data was not available to the researchers, which eliminated the possibility of incorporating socioeconomic status in the study. Fourth, academic factors beyond GPA were not included in this study. Future studies might incorporate specialized academic programs (e.g., honors college), specialized academic courses (e.g., first-year seminar), or academic major. Finally, though our rationale is conceptually sound relative to the operational definition of homophily opportunity, as a measure related to academic performance, homophily opportunity is conceptually unrefined. Improvements to this measure might incorporate actual student-to-student interactions, track individual students across multiple years and residence hall types, or include more fine-grained units of analysis at the apartment or floor level.

### **Implications for Future Research**

As this study and prior research have shown, the influence of university residential environments on social, cultural, and academic processes is a complex matter with unresolved conclusions that warrant further examination. We suggest three areas for additional inquiry and exploration on this topic. First, improved measures of homophily processes should be established that provide an improved examination of the in-group formation that occurs within the university residence hall setting. This is important for all students, given that many are required to live on campus during their first year of college; but it is particularly relevant for students of Color. Second, future studies should consider incorporating additional social processes (i.e., homophily) rather than simply examining categorical divisions of participants (i.e., race). A focus on the former would enable researchers to identify underlying mechanisms in social and organizational processes influencing students. For example, a social network analysis could be employed within various residence hall designs to examine the influence of architecture on student friendship formation and academic performance (McCabe, 2016). Moreover, multiple measures throughout the semester would further illumine the role that residence hall architecture plays in shaping the formation of such networks over time. Third, given the recent widespread expansion of residence halls on U.S. universities, future work should incorporate comparative data from a diverse array of college campuses sampled on strategic differences, such as geographic placement (e.g., centrality to campus) and multi-use facilities (Eisenhardt, 1989). Further understanding the “residential paradox” and its complexities will keep colleges and universities from inadvertently replicating within their residence halls the social inequalities that persist in the environments from whence some of their students come.

### **Conclusion**

Student enrollment pressures over the past decade have influenced university administrators to maintain a competitive recruiting advantage by offering residence hall facilities that catered to student preferences. While the new apartment-style design offered students has increased privacy, technology, and amenities at high financial costs to the university (McClure et al., 2017), the social or academic costs associated with the new isolating design have remained unclear. Prior research highlighted the existence of a “residential paradox” whereby student preferences and student academic outcomes seemed to conflict with one another (Bronkema & Bowman, 2017). This study

examined whether residence hall design shapes new student outcomes in particular ways for particular student groups. It demonstrates that race and contextual factors interact in meaningful ways within organizations that warrant thoughtful attention from postsecondary leaders. More specifically, it highlights that programming based solely on the students' race may fall short if homophily opportunity is not supported by both the physical and organizational structures of the college or university.

### Acknowledgments

The authors would like to acknowledge the valuable feedback from the reviewers, Josipa Roksa, Nichole M. Garcia, Carol Anne Spreen, Sarah Mosseri, Jeff Doyle, Michele Darling, Denise Deutschlander, and Irene Toussaint. Any remaining errors or omissions are solely their own.

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