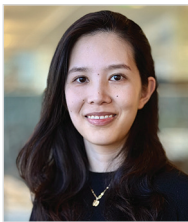




Establishing a Relationship Between Residence Hall Design and Depression in First-Year College Students

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THE WELL-BEING OF COLLEGE STUDENTS can be impacted by aspects of the physical environment, especially during key life transitions such as beginning college during a pandemic. This repeated cross-sectional study investigates the influence of a newly constructed living-learning neighborhood on first-year residents' mental well-being, specifically self-reported depression. The purpose of this study was to investigate (1) if residential first-year students' ratings of depression reflected differences between two built environments: old residential facilities and newer facilities that were part of a neighborhood, (2) if gender has an effect on these perceptions, and (3) if increased environmental satisfaction with different spaces in the new neighborhood drives lower depression scores. Students in two cohorts ($n_{\text{cohort 1}} = 120$; $n_{\text{cohort 2}} = 112$) were surveyed during the pandemic in the summers of 2020 and 2021. To improve the accuracy of predicting depression, participants' subjective satisfaction with their lives was controlled when investigating the influence of a change in the environment. First-year students who lived in the new neighborhood reported significantly lower depression scores than did their counterparts who lived in the old residential facilities. Results also reveal that this reduction in depression holds regardless of gender. Finally, as college residents' overall environmental satisfaction increases, their feelings of depression decrease, after controlling for their life satisfaction. Further, satisfaction within the personal residential (micro) environment has the strongest correlation with mental well-being. The findings from this study allude to the residential environment being the functional area that is most predictive of college residents' mental well-being. Implications for designers and administrators are discussed.

Note: We would like to thank Dr. Casey Lindberg for his valuable contributions and support during the early stages of this study, particularly in preparing for the Institutional Review Board (IRB) process.

College students' mental health and well-being have been on the decline since the beginning of the COVID-19 pandemic (Fruehwirth et al., 2021). Amidst family matters, socializing activities, health concerns, and disruptions to daily routines, reports of depression and anxiety have skyrocketed. In fact, in one study moderate to severe self-reported depression was observed in 31.7% of first-year students four months into the COVID-19 pandemic, as compared to 21.5% one year prior (Fruehwirth et al., 2021), and in another study 66% of college students surveyed reported that the pandemic had resulted in more financial stress (Martinez & Nguyen, 2020). Research has

established that the design of the built environment influences health and well-being (Beemer et al., 2021; Devlin, 2018; Renalds et al., 2010). Within the context of college and university campuses, residence halls have the potential to shape student outcomes more so than any other environment, influencing student life outcomes such as retention, persistence, graduation rates, openness to diversity, inclusive racial/ethnic attitudes, and satisfaction with the college experience (Mayhew et al., 2016). Previous studies have primarily investigated how the design of residence halls influences constructs associated with socializing and community (Clemons et al., 2005; Valins & Baum, 1973), but less is known about how aspects of the residential environment may influence the mental well-being of full-time, first-year students. The purpose of this study is to investigate the elusive relationship between the residential environment and students' mental well-being.

Prior to the pandemic, there was already a strong economic case for investing in facilities and programs to support student mental health and well-being, and modern or updated facilities are commonly utilized as a recruitment tool (La Roche et al., 2010). Student retention and persistence are also affected by potential stressors in the college residential environment, including commuting, improper nutrition, and financial constraints (Astin, 1977). Consequently, students who have significant personal and structural barriers that prevent them from fully engaging in their academic and campus life tend to drop out more frequently (Eisenberg et al., 2009).

Residence hall design has evolved as housing officials attempt to further impact student outcomes. Take the university that is the context for this study as an example: In addition to responding to the escalating need for affordable housing, it invested in a living-learning neighborhood with the overarching intent to positively influence student health and well-being, enhance social connection, and prioritize the resiliency of the surrounding ecological environment. The landmark 10-acre, 1.6-million-square-foot neighborhood brings to life the university's vision for a vibrant community that blends residential, academic, commercial, and cultural programming into a campus within a campus. This neighborhood addresses the university's growth and need for affordable on-campus living, as well as creating a welcoming environment that advances student success by addressing physical, social, and mental health through design. The purpose of this cross-sectional study was to investigate if the new neighborhood influenced the mental well-being of first-year student residents and if satisfaction with various environments within the neighborhood was associated with student well-being scores.

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IMPACTS ON THE MENTAL WELL-BEING OF COLLEGE STUDENTS

The first year of college is a transitional stage of development when newfound freedom and independence often kindle new stressors (Canto et al., 2017). Students entering college study and live in an environment that they are unfamiliar with, interacting with diverse groups through various activities while exploring all aspects of academia and social connection that encompass student life. The rapid change in environments requires rapid adjustment and perseverance, which often impact well-being, highlighting the importance of putting supports in place to offset the negative impact of this transition.

Very few longitudinal studies to date capture the mental well-being of American college students from the onset of the pandemic through transitions back to normalcy. Therefore, there is a general lack of knowledge about the impacts of reactionary safety protocols such as physical distancing and remote learning. Savage and colleagues (2021) investigated the mental well-being and physical activity of 255 college students in the United Kingdom from before the onset of the pandemic through October 2020, just nine months after the first COVID-19 case was reported in the UK. Research revealed that the participants' mental well-being and their level of daily physical activity decreased significantly, indicating the detrimental effects of the pandemic. Further, studies comparing shifts in well-being metrics between younger and older adults due to the pandemic indicate a more profound decrease and lagged recovery (Vistisen et al., 2021) among young adults, demonstrating the increased toll the pandemic has had on the mental health of college students.

Gender Differences

Evidence from longitudinal self-report studies indicates that female first-year college students are more likely to experience moderate to severe depression (Fruehwirth et al., 2021) and higher levels of stress (Garett et al., 2017; Graves et al., 2021) than do their male counterparts. Further, female college students demonstrated significantly lower overall adjustment levels (Enochs & Roland, 2006) and used different mechanisms to cope with stress (Graves et al., 2021). Understanding the mechanisms that might underlie gender differences in first-year students' well-being can inform more targeted interventions. Studies suggest that the developmental processes for male and female students' adjustment to college may differ, partially due to the tendency for many female students to rely heavily on socialization experiences and interpersonal relationships (Kenny & Rice, 1995). Further, female students are thought to be more social and value social connection more than male students do, making distance from established relationships or difficulties in making new friendships a barrier for female first-years' adjustment to college (Gilligan, 1987). Therefore, considering the potential for gender differences is an important step in both designing and evaluating the built environment, as well as assessing satisfaction with the built environment and student well-being.

Prior to the pandemic, there was already a strong economic case for investing in facilities and programs to support student mental health and well-being, and modern or updated facilities are commonly utilized as a recruitment tool.

Residence Hall Architecture

Recent research that investigates the impacts of residence hall architecture on student outcomes reveals how design shapes or supports constructs associated with social connection. Differences in the architectural styles of traditional versus suite-style housing influence the number of social interactions students have (Brandon et al., 2008), and residence hall design affects residents' tendency to create social bonds with others, especially for Black students (Brown et al., 2019). However, recent work has suggested that architectural style alone does not directly influence student outcomes; how buildings are managed, in terms of the composition of their students, is more predictive (Bronkema & Bowman, 2017). Programs, services, and supports implemented by residence life staff are known to influence college student well-being, but the design of the built environment can also provide significant support for the organizational and programmatic initiatives of student life departments.

The residential environment has a direct impact on students' level of wellness (Adams et al., 2000), and the more they identify with their housing, the greater their psychological well-being will be (Meagher, 2020). In evaluating residents' perception of the occupied built environment, environmental satisfaction is often utilized as an indicator for environmental quality in many different contexts: the workplace, health-care, higher education, K-12, the laboratory, and private residential environments (Graham et al., 2021). However, less is known about students' satisfaction with their residential environments on a college or university campus and what spaces within these environments influence their well-being. This study intends to address this gap in the literature.

RESEARCH QUESTIONS

The context of this study is one of seven undergraduate residential colleges at a large public university in Southern California. With the need to address the rapidly growing student population in an area where housing costs in the surrounding community are 2.8 times higher than the U.S. average (Cost of Living in San Diego, California, 2021), a landmark 1.6-million-square-foot living-learning neighborhood, which blends residential and academic programming and retail outlets, was initiated. The new neighborhood implements innovative and evidence-based design strategies in the quest for supporting students' emotional, physical, and social well-being. Example design strategies applied in the new neighborhood include access to nature to improve mental health (Kaplan, 2001), multi-modal streets that are not only pedestrian-friendly (Painter, 1996; Sun et al., 2014) but also have bike/scooter paths and parking to encourage micro-mobility (Fraser & Lock, 2011), strategic staircase placement at prominent sites of the neighborhood to make the healthy choice the easy choice (Nanda et al., 2016;

Nicoll, 2007), and accessible communal kitchens (Kim et al., 2022) and food options (Martinez et al., 2021) to promote cooking and healthy eating habits.

In the current study, we investigate if this new living-learning neighborhood influences self-reported symptoms of depression in first-year college students, if gender affects this relationship, and if different functional spaces (private residential spaces, residential hall social spaces, campus social spaces) have different influences on students' self-reported depression after taking their level of life satisfaction into account. To that end, the following research questions were investigated:

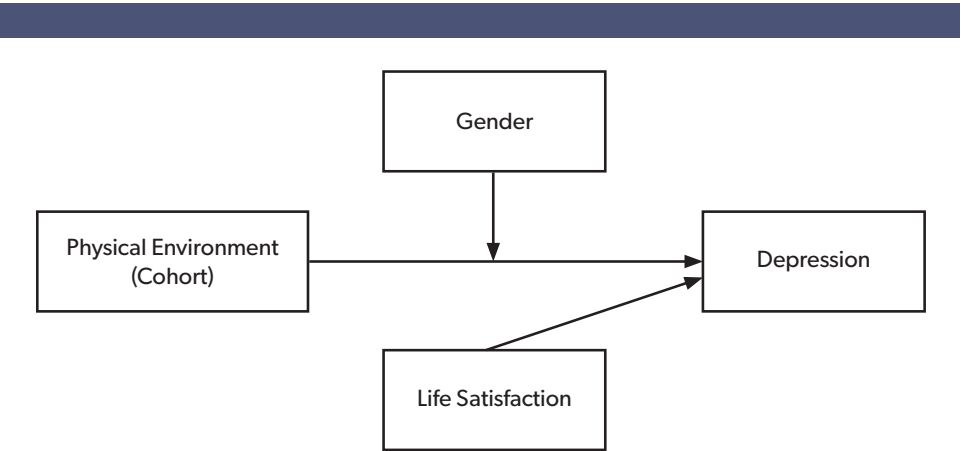
RQ1. *Is there a difference in the self-reported depressive symptoms of first-year residents in two housing conditions, when controlling for life satisfaction?*

The purpose of the first research question is to investigate if there is a difference between first-year students who lived in the old residential facilities and those who lived in the new neighborhood in terms of depression scores while accounting for levels of life satisfaction.

RQ2. *Does gender influence the relationship between living conditions and depression?*

We include gender as a potential moderator to investigate whether a modern living-learning neighborhood can provide a buffering effect for female students' transition to college. If no moderating effect of gender was found, we planned to investigate the main effect of gender, since past research has established that female college students are at a higher risk for developing and experiencing depressive symptoms than are male college students. See Figure 1 for the conceptual diagram of RQ2.

FIGURE 1
The Moderating Role of Gender in the Relationship Between Cohort and Depression Level with Life Satisfaction as a Covariate



Note. This diagram illustrates the conceptual model of a moderation analysis examining the effect of cohort on depression level and the moderating role of gender, while controlling for the influence of life satisfaction as a covariate.

RQ3. *Does students' satisfaction with their private residential spaces, residential hall social spaces, and campus social spaces influence their self-reported depressive symptoms, when controlling for life satisfaction?*

The intent of the third research question is to isolate specific spaces within the living-learning neighborhood to understand if environmental satisfaction with varying scales of the built environment is more impactful on student mental well-being.

METHOD

This study employed a comparative cross-sectional research design, meaning that the same survey instrument was deployed in a target population at two different time points with two different cohorts. Because we are interested in understanding the impact that the design of campus housing has on first-year college students, we administered the survey to students living in the old residential facilities and again one year later to a different set of first-year students residing in the new living-learning neighborhood. Data were collected through online surveys conducted one year apart. Data collection for residents in the old residential facilities (Cohort 1) took place in July 2020. Data for residents in the new neighborhood (Cohort 2) were collected in July of 2021. Since the pandemic began in the U.S. in March 2020, Cohort 1 lived in the old residential facilities for two quarters before temporarily moving off campus due to state-mandated lockdowns. Cohort 2 lived in the new neighborhood for three academic quarters with strict physical distancing guidelines in place before taking the survey.

Context of the Study

The undergraduate residents in Cohort 1 were housed on campus in either apartments or suite-style residence halls that collectively housed 1,597 first-year and sophomore students and were located on the eastern edge of campus in a strictly residential community. The suite-style halls were laid out in a cluster of two-story buildings. Each floor of the building has two suites, each consisting of five rooms, and a shared common room and bathroom on each floor (*see Figure 2, page 19*). The on-campus apartments offer three different layouts that include a kitchen, outdoor patio, dining room, living room, and a mix of bedroom options (*see Figure 3, page 19*).

The residents in Cohort 2 were housed in the new living-learning neighborhood which had been designed with the intention of enhancing student health and well-being, fostering social connection, and instilling environmental resilience. This neighborhood is an academic mixed-use design consisting of 2,048 beds, administrative and faculty offices, classrooms, dining, retail, public art, and a central green quad. Some suite-style halls have an innovative stacked double-floor configuration with a central stair connecting a shared common room with double rooms around the perimeter (*see Figure 4, page 20*).

The residential environment has a direct impact on students' level of wellness, and the more they identify with their housing, the greater their psychological well-being will be.

FIGURE 2

Cohort 1 Layout with Two Suites per Floor, Each Consisting of Five Rooms and Shared Common Room and Bathroom

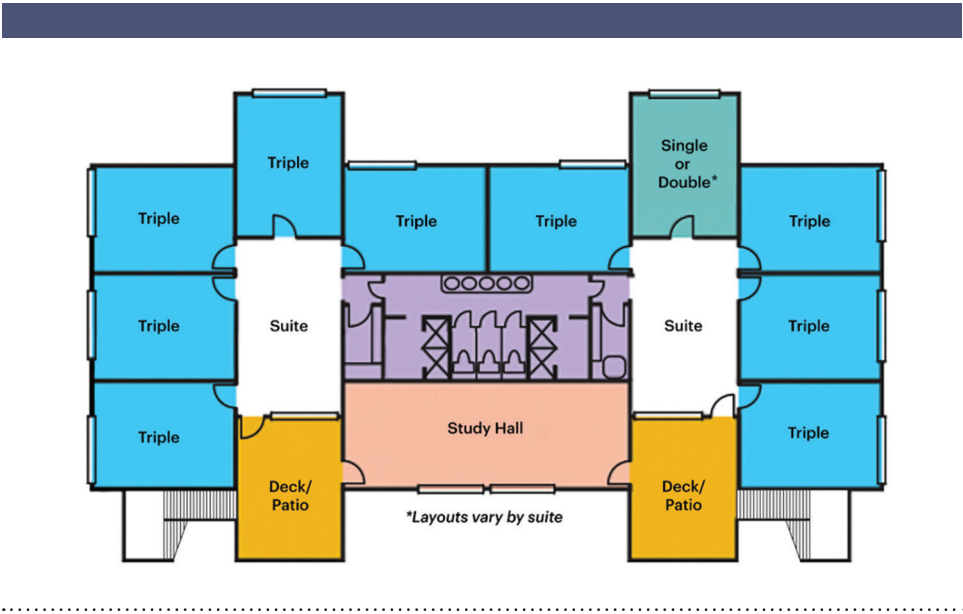


FIGURE 3

Three Cohort 1 Layout Options with Kitchens, Outdoor Patios, Dining and Living Rooms, and Various Bedroom Configurations



FIGURE 4

Stacked Double-Floor Configuration in Suite-Style Residence Halls with Central Stair and Double Rooms Around Perimeter



Participants and Procedure

To recruit participants, the residential college's provost office advertised the study in a weekly newsletter that is regularly distributed to all student residents, and those who elected to participate in the study were contacted by the research team. A total of 120 first-year students (50.5% female, 46.2% male, 3.3% nonbinary) were in Cohort 1, and 112 first-year students (53.8% female, 44.0% male, 2.2% nonbinary) were in Cohort 2 (note that, as detailed below, these are two separate groups of participants). No other demographic information besides gender was collected. All students who participated were compensated with \$10 for their time taking the survey.

Surveys were administered online in July 2020 for Cohort 1 and in July 2021 for Cohort 2. The survey included several measures concerning student experiences, including depressive symptoms, satisfaction with life, and satisfaction with functionally different built environments. Only those with signed informed consent forms were included in this study. The survey took approximately 15–20 minutes to complete and was approved by the Institutional Review Board at the institution.

Measures

This research study is primarily focused on investigating relationships between students' mental well-being and satisfaction with their physical on-campus residential environments. All assessments were in the Likert scale format. Not all variables assessed on the cohort surveys were analyzed. Only the variables relevant to the aims of this study are described below.

Depression. The Center for Epidemiological Studies Depression scale (CES-D) is used to assess students' levels of self-reported depressive symptoms and to operationalize their mental well-being (Radloff, 1977). Participants were asked to report how often they felt what is described in each statement. CES-D has 10 items, and each provides four possible responses that were later coded numerically (1 = *rarely or none of the time*; 2 = *some or a little of the time*; 3 = *moderately or much of the time*; 4 = *most or almost all the time*). An example item of the scale is "I was bothered by things that usually don't bother me." CES-D has been validated in the college student population (Yen et al., 2000) and is widely used to assess depression in non-clinical populations.

Life satisfaction. The Satisfaction with Life Scale (SWLS) was used to assess life satisfaction, a global and stable construct of how satisfied a person is with their life as a whole (Pavot et al., 1991). Participants were prompted to respond to five items on a 1–5 agreement scale. An example item of the scale is "If I could live my life over, I would change almost nothing." In the current study, life satisfaction was regarded as a covariate in the analyses when depression was the response variable. This is because life satisfaction is a stable representation of happiness, and controlling for its influence on self-reported depressive symptoms improves model accuracy.

Environmental satisfaction. A single item was created to measure students' satisfaction with their physical residential spaces for each of the three functional areas (private residential spaces, residential hall social spaces, and campus social spaces). A shared lead-in ("Overall, how satisfied or dissatisfied are you . . .") was followed by a description of the area to complete the question: "with the physical environment of social areas in academic buildings," "with the physical environment of where you socialize in your residential space (e.g., shared kitchen, student lounge)," or "with the physical environment of where you live (e.g., your room, suite, apartment)." Responses were in a 7-point Likert format with responses ranging from *very dissatisfied* to *very satisfied*, with *neutral* in the middle.

ANALYSIS

To investigate if residing in a living-learning neighborhood designed to promote student health and well-being reduces the psychological strains of transitioning into college, the effect of cohort (two levels: Cohort 1 versus Cohort 2) on self-reported depressive symptoms was tested with an analysis of covariance (ANCOVA), with self-reported life satisfaction as the covariate. To understand if living in the new neighborhood could reduce the gender gap in first-year college students' psychological well-being, a moderated regression with interaction effects was deployed with *gender* as the moderator

(omitting gender non-binary participants due to low sample size and analyzing only the self-identified male and female participants); *cohort* as the predictor (two levels: Cohort 1 versus Cohort 2); *life satisfaction* as the covariate; and *depression* as the outcome variable (see Figure 1). To examine the relative magnitude of the effects of satisfaction with different areas on well-being, a regression with Type II Sums of Squares was conducted with *depression* as the outcome, *life satisfaction* as a covariate, and *satisfaction scores* for the three areas (private residential spaces, residential hall social spaces, and campus social spaces) as the predictors. The standardized regression coefficients of the three areas were compared to indicate relative importance. All significance tests in the study were two-tailed, and $\alpha = 0.05$ was used as the cut-off. The statistical analyses were conducted in R.

RESULTS

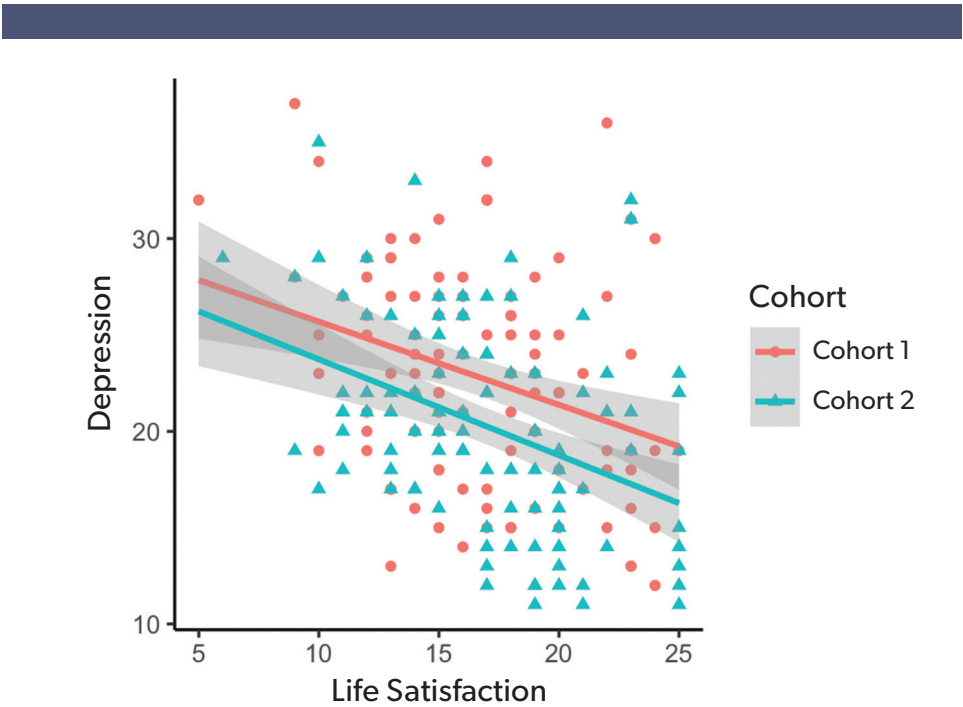
The first research question inquired whether living in the old residential facilities or the new living-learning neighborhood significantly predicts students' self-reported depressive symptoms. Cohort, or living condition, had a significant main effect on depressive symptoms after controlling for life satisfaction, $F(1, 216) = 12.51, p < .001$. The adjusted mean of depression scores is significantly lower in Cohort 2 ($M = 20.31, SD = 0.49$) than in Cohort 1 ($M = 22.72, SD = 0.47$). Three statistical assumptions of this analysis were satisfied: (1) There was no association between cohort and life satisfaction, (2) cohort and life satisfaction did not interact when predicting depressive symptoms, and (3) life satisfaction, which is included as a covariate in the model, is significantly and negatively correlated with depression, $r(217) = -.35, p < .001$. See Figure 5 (page 23) for the visualized result of this research question and Table 1 (page 23) for detailed ANCOVA output.

The second research question was concerned with understanding if gender moderated the relationship between living conditions and depressive symptoms. The moderated regression with Type III Sums of Squares showed no significant interaction between gender and cohort ($p > 0.05$). Thus, gender is not a moderator of the association between cohort and depression. The main effect of gender on depression adjusted for life satisfaction reached significance ($p < 0.001$) in our study, and the gender difference is aligned with results from previous literature showing that female college students reported higher depression scores than did males. The statistical assumption for this analysis that there was no interaction between gender and life satisfaction was met. See Figure 6 (page 24) for the conceptual diagram with results for this research question and Table 2 (page 24) for the detailed moderated regression output.

The third research question investigated whether students' satisfaction with different functional areas (private residential spaces, residential hall social spaces, campus social spaces) of the new living-learning neighborhood had an influence on (1) students' self-reported depressive symptoms and (2) the predictive power of these three sub-areas on reduced depressive symptoms. In addition to life satisfaction, satisfaction with private residential and campus social spaces is significantly

FIGURE 5

Depression as a Function of Life Satisfaction for Cohort 1 and Cohort 2



Note. Depression is operationalized as the self-reported depressive symptom measured by CES-D, which has a lower limit of 10 and an upper limit of 40. Life satisfaction is operationalized as the self-reported life satisfaction measured by SWLS, which has a lower limit of 5 and an upper limit of 25. The ribbons represent 95% confidence intervals.

TABLE 1

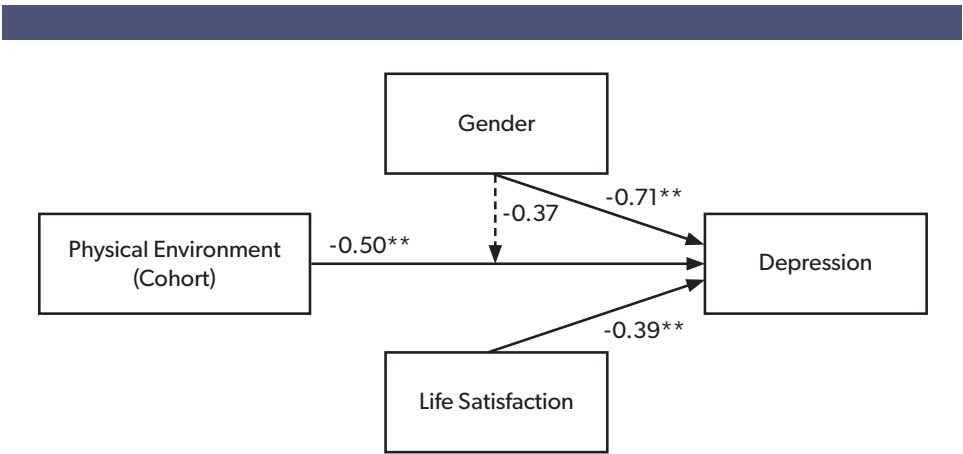
One-Way ANCOVA Results Using Depression as the Criterion

Predictor	Sum of squares	df	Mean square	F	p	Partial η^2	Partial η^2 95% CI [LL, UL]
(Intercept)	8919.74	1	8919.74	351.72	<.001		
Life satisfaction	789.29	1	789.29	31.12	<.001	.13	[.05, .21]
Cohort	317.21	1	317.21	12.51	<.001	.05	[.01, .12]
Error	5477.80	216	25.36				

Note. LL and UL represent the lower limit and upper limit of the partial η^2 confidence interval, respectively.

FIGURE 6

Conceptual Diagram for Moderated Regression Model Predicting Depression with Results



Note. Standardized regression coefficients (β) are provided on each line. The arrow from gender to depression is added in this diagram to represent the main effect of gender, as gender does not moderate the influence of cohort on depression.

** indicates $p < .01$.

TABLE 2

Moderated Regression Analysis of Gender with Type III Sums of Squares

Predictor	<i>b</i>	<i>b</i> 95% CI [LL, UL]	<i>p</i>	Fit
(Intercept)	0.51**	[0.24, 0.78]	< 0.001	
Life satisfaction	-0.39**	[-0.52, -0.25]	< 0.001	
Gender[male]	-0.71**	[-1.10, -0.33]	< 0.001	
Cohort[2]	-0.50**	[-0.87, -0.14]	0.007	
Cohort*gender	0.37	[-0.16, 0.91]	0.168	
				$R^2 = .258$ 95% CI [.14, .35]

Note. A significant *b*-weight indicates that the semi-partial correlation is also significant. *b* represents unstandardized regression weights. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.

** indicates $p < .01$.

College residents' satisfaction with their private residential space is the most predictive of low levels of depression. . . . This finding suggests that investing in quality residences may have a higher return on investment than other amenity-type spaces within residence hall architecture, especially in the context of unpredictable social stressors like the COVID-19 pandemic.

associated with reduced depressive symptoms: private residential, $F(1, 91) = 7.62$, $p = 0.007$; campus social, $F(1, 93) = 5.51$, $p = 0.021$. The association between satisfaction with residential hall social spaces and depression did not reach significance ($p = 0.052$), although it shares the trend with the other two areas. The linear regression with life satisfaction and all three areas of satisfaction entered as predictors showed that residents' satisfaction with their private residential space had the strongest negative association with depression ($\beta_{\text{private residential}} = -0.22$; $\beta_{\text{campus social}} = -0.17$; $\beta_{\text{residential hall social}} = -0.01$). Further, environmental satisfaction with their private residential area has a negative and partially significant ($p = 0.060$) effect on depressive symptoms, after including life satisfaction as a covariate and controlling for other area satisfaction. See Table 3 for the detailed multiple regression output.

TABLE 3
Regression Results Examining the Relative Importance of Satisfaction with Different Areas on Depression

Predictor	<i>b</i>	<i>b</i> 95% CI [LL, UL]	<i>p</i>	Fit
(Intercept)				
Life satisfaction	-0.29**	[-0.49, -0.09]	0.005	
Campus social spaces	-0.17	[-0.37, 0.04]	0.108	
Private residential spaces	-0.22	[-0.46, 0.01]	0.060	
Residential hall social spaces	-0.01	[-0.25, 0.22]	0.906	
				$R^2 = .245^{**}$ 95% CI [.07, .36]

Note. A significant *b*-weight indicates that the beta-weight and semi-partial correlation are also significant. *beta* indicates the standardized regression weights. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.

** indicates $p < .01$.

One recommendation for practitioners is to design student housing facilities with mental health in mind, as the built environment can play a significant role in college students' mental health, especially during times of high need for counseling and clinical resources.

DISCUSSION

Longitudinal research efforts in the field of architecture are rare (Evans, 2003), but they are important in holding design decisions accountable, because they link design strategies to metrics that reflect the effectiveness of initial goals. Results from this study begin to shed light on the relationship between how first-year students perceive their built environment and their mental health.

The depression level of first-year students who lived in the new neighborhood for a year is significantly lower than that of first-year peers who lived in the old residential facilities for a year. With anxiety and depression rates in college students at an all-time high, and given that students of both cohorts were responding to the survey at the time of a public health epidemic and intense social unrest, this finding provides evidence to support the role of the built environment in enhancing college students' mental health. The design of student housing can serve as a potent means of countering situations where there is a significant demand for counseling and clinical resources or where students are hesitant to seek help (Canto et al., 2017). One recommendation for practitioners is to design student housing facilities with mental health in mind, as the built environment can play a significant role in college students' mental health, especially during times of high need for counseling and clinical resources. For instance, increasing access to natural elements was one of the promising design strategies utilized in the new living-learning neighborhood.

The effect of cohort on depression found in Research Question 1 does not depend on gender as hypothesized. The change in living conditions influences the level of depression in male and female first-year residents in comparable ways. In line with an established gender gap in mental well-being, we observed a trend for female first-year students reporting higher levels of depression than did their male counterparts. To shed light on the potential effect of gender on the experiential aspects of student housing facilities, future studies should investigate the mechanism through a theory-driven framework or manipulation. For example, a study that specifically investigates gender differences in college students' housing preference shows that female participants have a higher preference for private spaces and were more sensitive to noise. Male participants, on the other hand, were found to prefer more public socialization spaces, such as common areas and lounges (Amole, 2012). Adapting to these gender-related preferences in housing design can be useful in creating a more comfortable living environment for all students. Further, by taking gender into account in student housing management, students might feel that their needs are heard and validated, which leads to an enhanced sense of belonging.

College residents' satisfaction with their private residential space is the most predictive of low levels of depression. Importantly, room satisfaction remains a relevant predictor for lower depression levels even when considering the influence of life satisfaction on depression. This finding suggests that investing in quality residences may have a higher return on investment than other amenity-type spaces within residence hall architecture, especially in the context of unpredictable social stressors like the COVID-19 pandemic.

LIMITATIONS

There are several limitations to this study. First, the project has an underwhelming sample size. Recommendations for future studies would be to follow best practices for recruiting student-participants. The timing of the pandemic and the move off campus likely influenced the low response rate. In addition, gender was the only demographic information collected in the survey, limiting any further analysis of how living conditions influence different social groups and the ability to ensure that the sample is representative of the target population. Further, it would be interesting to know from Cohort 1 if living in the suite-style housing or an apartment makes a difference. However, we did not collect this detailed housing information. Larger sample sizes and more detailed housing conditions would help us understand and explore differences among the subgroups.

There are many other factors that might lead to differences in college students' well-being than the change in housing environment. For instance, in addition to the pandemic, police brutality caused nationwide emotional turmoil and a turbulent societal movement (Fruehwirth et al., 2021). This might have negatively impacted students' well-being, especially during the summer of 2020, when Cohort 1 was surveyed. Another factor is that each cohort completed the survey after the semester ended, when they were no longer living in student housing. Students in the older residential facilities experienced much of the school year living on campus before the pandemic hit. Students in the new neighborhood lived under strict physical distancing and operational guidelines. Even though the environmental context was defined by their residential setting on campus, the actual context within which they took the survey was different. Even though this study was completed during the atypical conditions of the pandemic, therefore limiting the scope of the study, this empirical research contributes to the field by tracking and investigating how a well-designed built environment can alter the well-being of college residents during a challenging time.

The depression level of first-year students who lived in the new neighborhood for a year is significantly lower than that of first-year peers who lived in the old residential facilities for a year.

CONCLUSION

Living in the new living-learning neighborhood was associated with lower levels of depressive symptoms in first-year students, supporting the role of the built environment in enhancing college student mental health. This emphasizes the importance of designing student housing with mental health in mind. Both female and male first-year students experienced changes in depression levels based on living conditions. Understanding gender-related preferences in housing design can create a more comfortable environment for all students and enhance their sense of belonging. One recommendation for practitioners is to design student housing facilities with mental health in mind, as the built environment can play a significant role in college students' mental health, especially during times of high need for counseling and clinical resources. These findings provide valuable insights for college and university administrators and decision-makers in housing planning, emphasizing the need to prioritize private residential spaces and address gender-related preferences. By creating more supportive living environments, higher education institutions can contribute to students' mental health and overall well-being. ■

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DISCUSSION QUESTIONS

1. What are some ways that your institution can ensure intentional residential facility design to promote socialization and wellness in the occupants, without having to alter the physical structure of the living spaces?
2. How can your housing department provide resources to residents who experience depression or other mental health conditions?
3. In times of public health crisis, how can your department promote socialization and belonging in residential spaces while still ensuring physical distancing?
4. The authors mention gender differences but do not specifically discuss gender-inclusive housing options for the residents who were surveyed. What trends might you observe in data collected from residents in gender-neutral or gender-inclusive housing?
5. As the article notes, recent research indicates that architectural style by itself doesn't directly affect student outcomes. How do you believe architectural styles affect your students living in different residential configurations?
6. The article examines how physical environments affect residents' mental health. How can we encourage residents to personalize their living space to reduce depression and create a sense of belonging?
7. The authors note that studies indicate a higher level of depression in females than in males. What have you observed on your campus that might contribute to this phenomenon?
8. How does the residential experience compare across different occupancy types such as single-, double-, and triple-occupancy rooms?

Discussion questions developed by Taylor Lawson and Eric Massey, The University of Texas at Dallas