Mental Health Challenges in Architecture and Landscape Architecture Students

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ABSTRACT

Background: College students are experiencing increasing levels of stress, anxiety, and depression, but little research exists on factors weakening the mental health of design students.
Aim: This study investigates the prevalence and precursors of mental health challenges among architecture and landscape architecture students.
Methods: This study used a convergent mixed-methods research design with three data collection methods: The Depression and Anxiety Stress Scale (DASS-21; n = 399 students), an online wellness survey (n = 269), and semi-structured interviews (n = 37).
Results: Findings reveal that 33%, 46%, and 33% of students screened positive for moderate to extremely severe levels of depression, anxiety, and stress, respectively. The leading factors elevating stress included school deadlines and schedule, workload demands or amount of work outside of class, inadequate sleep, and time spent at work. Negative behaviors due to stress were discussed,

including neglect of self-care (e.g., poor sleep patterns, eating habits, and physical inactivity), inability to focus, emotional instability, and social withdrawal.

Conclusions: This study underscores mental health concerns among design students and identifies potential factors that contribute to unhealthy habits and compromise academic performance, including pedagogical approaches, learning and teaching culture, studio environment, and lifestyle choices.

Submitted 12 February 2023; accepted 23 April 2024
Keywords: college students, mental health, stress, anxiety, mixed methods

INTRODUCTION

There is undoubtedly a national mental health crisis among college-aged students (Center for Collegiate Mental Health, 2022). Data show that 30.6% of young adults aged 18 to 25 have a mental illness, which is higher than the 25.3% of adults aged 26 to 49 and the 14.5% of adults 50 years and older who have a mental illness (Center for Behavioral Health Statistics and Quality, 2021). The 2022 National Survey on Drug Use and Health surveyed 71,369 respondents aged 12 years and older in person or via the web. The survey aimed to capture the percentage of respondents living with a mental illness, classified as having "any mental, behavioral, or emotional disorder in the past year of sufficient duration to meet criteria from the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV), excluding developmental disorders and SUDs [(i.e., drug use disorder, alcohol use disorder, or both)]" (Substance Abuse and Mental Health Services Administration, 2023, p. 40). Results showed that the 18-to-25-year age group reported the highest incidence of mental illness of any age group studied. For this age group, a total of 36.5% (12.6 million people) reported having any mental health issue in the past year, and 11% (4.0 million people) reported having had a serious mental health issue. However, only 26.7% (9.3 million people) received any mental health treatment in the past year. Examples of treatments included seeking counseling or therapy, taking prescription medication, or having telehealth visits. The issue is evident: college students have higher rates of mental illness and receive less treatment.

When looking at students in college specifically, survey findings show that depression, anxiety, and stress are the most significant mental health challenges threatening healthy lifestyles and academic performance (Hernández-Torrano et al., 2020; Misra & Castillo, 2004). Despite recognizing the implications of mental health issues among college students, further research is needed to understand the specific stressors and to develop targeted interventions suited to their unique life stage and challenges (Pedrelli et al., 2015). Further, there is a lack of understanding about how mental health issues affect students in different academic programs and what interventions are needed. This study focuses on students in design programs, specifically architecture and landscape architecture. These are challenging disciplines due to the project-based curriculum, time spent each week on coursework, and the culture in design schools (Stead et al., 2022; Xie et al., 2021). The triggers and consequences of stress for students in these programs have not been empirically investigated. Nevertheless, design students, faculty, and professionals have felt the weight of design education, and there is growing awareness of the detrimental effects of this culture on academic programs and the profession (Ahuja, 2023; American Institute of Architecture Students

[AIAS], 2002). The primary goal of this study is to uncover the prevalence, contributing factors, and consequences of stress and mental illness for architecture and landscape architecture college students.

BACKGROUND

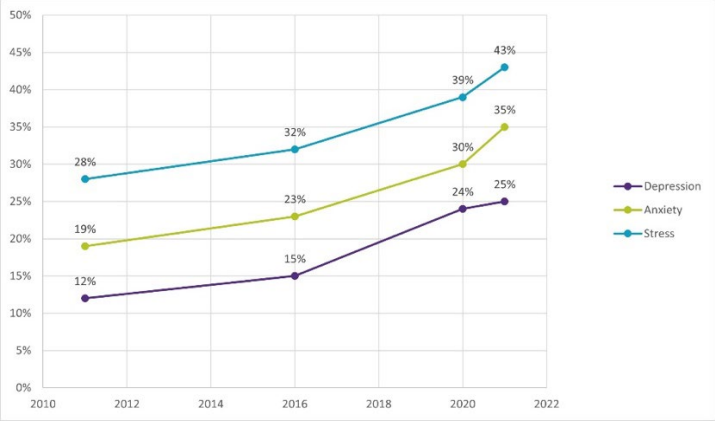
Collegiate Environments and Mental Well-Being

Survey findings consistently show that more than one in three students in the United States struggle with mental health challenges during their collegiate academic studies (Hunt & Eisenberg, 2010; Lipson et al., 2022). According to the Healthy Minds Survey from 2021-2022 (Eisenberg et al., 2021; n = 95,860 students from 373 institutions), only 32% of students reported overall positive mental health. A deeper dive into the data shows that 47% of students reported being diagnosed with a mental disorder during their lifetime. As for depression, 44% screened positive from the Patient Health Questionnaire (i.e., PHQ-9), and 33% reported a diagnosis of depression during their lifetime or other mood disorders from a health professional. In contrast, 37% screened positive for an anxiety disorder using the General Anxiety Disorder scale-7 (i.e., GAD-7), and 38% of students reported a diagnosis of anxiety (e.g., generalized anxiety disorder, phobias) during their lifetime from a health professional.

Lipson et al. (2019) analyzed ten years of data from the Healthy Minds Survey (representing 155,000 students from almost 200 campuses). They found that the rate of treatment "increased from 19% in 2007 to 34% by 2017, while the percentage of students with lifetime diagnoses increased from 22% to 36%. The prevalence of depression and suicidality also increased, while stigma decreased" (Lipson et al., 2019, p. 60). In comparison, the Fall 2021 survey from the National College Health Assessment (NCHA) and the American College Health Association (ACHA, 2021; n = 32,204 students from 41 institutions) found that nearly one in four students expressed moderate to severe psychological distress. Also, 37% of all students reported having at least one mental health condition, with anxiety being the most prevalent (27.4%) and depression close behind (21.7%). Furthermore, about 30% of American college students report that depression, anxiety, and stress negatively affect their academic performance (ACHA, 2021), and this number has been gradually increasing (Figure 1). This literature makes it abundantly clear that there is an existing mental health crisis among college students, and the crisis seems to be worsening.

Figure 1

Percentage of Students Reporting that Anxiety, Depression, and Stress Negatively Impacted Academic Performance within the Last 12 Months from 2011 to 2021



Note: Results from the ACHA-NCHA Surveys, 2011-2021

Emotional Disorders: Anxiety and Depression

The two most prevalent mental illnesses affecting adults are anxiety and depression (Goodwin et al., 2020). While anxiety is not a formal clinical diagnosis, the closest condition listed in the *Diagnostic and Statistical Manual – Fifth Edition – Text Revision* (DSM-5-TR) is a generalized anxiety disorder (GAD). A symptom of a GAD diagnosis is "excessive anxiety and worry (apprehensive expectation) about a number of events or activities" (American Psychiatric Association, 2022, p. 251). More specifically, GAD is characterized, in part, by frequent feelings of worry, fear, and intrusive thoughts associated with frequent restlessness or fatigue, irritability, trouble concentrating, muscle tension, and difficulty sleeping. Some anxiety disorders are severe: "Individuals with anxiety may be more likely to have suicidal thoughts, attempt suicide, and die by suicide than those without anxiety" (American Psychiatric Association, 2022, p. 216).

Depressive disorders also comprise common mental disorders. According to the DSM-V-TR (American Psychiatric Association, 2022), characteristics of those exhibiting depressive disorders may include significant weight loss or gain, insomnia or excessive sleep, lack of interest in daily activities, lack of energy, inability to concentrate, feelings of worthlessness, and even recurring thoughts of death or suicide. The prevalence of a major depressive disorder is notably higher among adolescents and young adults aged 18 to 29, and young women experience significantly elevated rates compared to young men (American Psychiatric Association, 2022).

Stress and its Effects (Physiological and Behavioral Responses)

Although anxiety and depression require clinical diagnoses to be identified, stress is a widespread physical and mental response to external pressures or environmental stressors. Stress often precedes a mental illness diagnosis (Paykel, 1976). According to Selye (1976), the founder of stress theory, stress is a "nonspecific response of the body to any demand" (p. 137). Selye identified three stress response phases: (1) the alarm phase, (2) the resistance phase, and (3) the exhaustion phase. Selye claims that "when individuals are exposed to a stressor, they are at first taken off

guard, then attempt to maintain homeostasis by resisting the change, and eventually fall victim to exhaustion in countering the stressor" (Tan & Yip, 2018, p. 171). While the susceptibility of every individual varies, research shows an association between stress and disease prevalence (Gallo et al., 2014; Han et al., 2024; Schneiderman et al., 2005; Uchino et al., 2007). Unrelenting or unmanaged stress will become highly problematic for the sufferer (Yaribeygi, 2017).

Practices in Design Education

Stress is a significant factor within design education due to the pressures experienced by students. Architecture and landscape architecture students often encounter stress during their educational studies (Bachman & Bachman, 2006). AIAS (2020) studied architecture schools around the country, and findings confirmed that pursuing a design degree is a grueling process that degrades student health and well-being. Design education has been criticized for having a culture that fails to explicitly describe expectations of sleepless nights and a fiercely competitive environment.

Since 2013, the Graduate Architecture, Landscape and Design Student Union (GALDSU) has conducted a health and well-being survey to better understand student experiences regarding lifestyle choices (e.g., eating and sleeping habits, workload, physical activity, and social activities), facilities, academic experience, final reviews, mental health, diversity, and equity. The survey consistently shows that these students relinquish healthy habits, have trouble achieving a work-life balance, and struggle with mental health issues (GALDSU, n.d.).

The design studio coursework—a cornerstone of design education—fuels unhealthy work habits and promotes harmful social norms that are deeply engrained within architectural education and practice. A recent qualitative study exposed the toxic yet normalized work culture in architectural education that diminishes student happiness (Xie et al., 2020). Their study illuminated the stressful experiences of 12 architecture students who described exhausting workloads with unrealistic expectations, an overemphasis on subjective appraisals of aesthetics by professors, and the scathing critiques of the visiting jurors.

Another factor that contributes to the stress is the covert or "hidden curriculum" (Jackson, 1968) within architecture and landscape architecture programs. The hidden curriculum has also been found to exist in other science, technology, engineering, and math programs. These programs often embody a culture characterized by unspoken rules, values, behaviors, and practices that are prevalent within the school setting, despite not being officially documented or explicitly stated. Design students are often introduced to the exclusive domain of trained architects as an "ivory tower" pursuit which prioritizes perfectionism and elitism. In this same vein, Webster's (2005) publication for *Arts and Humanities in Higher Education* discusses the idea of "disciplinary acculturation." These concepts of ivory tower and disciplinary acculturation help illustrate how students not only assimilate the technical culture of their chosen professions but also begin to internalize and manifest the discipline's cultural and often unhealthy norms in order to succeed. Stead et al. (2022) argue that the hidden curriculum in educational environments can subconsciously ingrain "societal values, constructs, power dynamics, and prejudices" in students, while also pressuring them to conform to instructors' design standards in architecture and landscape architecture (p. 89). This educational approach fosters a culture of perfectionism, as students' work is consistently "benchmarked

against the elites" (Stead et al., p. 91). These unrealistic expectations make an already difficult discipline even more challenging and stressful.

METHODS

Research Approach

A convergent mixed-method research design (Creswell & Plano Clark, 2018) was selected to investigate the mental health challenges among architecture and landscape architecture students, the factors contributing to their stress, and the consequences of stress. Quantitative data were collected using two types of surveys, and qualitative data were collected from interviews. To satisfy compliance requirements, the study received Institutional Review Board approval before beginning the research. In addition, all researchers on the team received human subjects training and a certificate from the Collaborative Institutional Training Initiative Program.

Overview of Case, Participants, and Study Design Procedures

The study occurred during the fall of 2021 in a school of architecture at a four-year, public land-grant university in the southeast region of the United States. The research team invited all 645 enrolled students to participate in the study, including 398 undergraduate and 143 graduate students in architecture and 91 undergraduate and 13 graduate students in landscape architecture. Participation was voluntary, and all students were required to be at least 18 years of age. No names or personal identifiers were collected and each student was eligible to receive gift cards as an incentive for participating.

Data Collection Methods and Analysis

This study utilized three data collection methods: (1) a mental health screening tool, (2) a wellness survey, and (3) semi-structured interviews.

Depression Anxiety Stress Scale (DASS-21)

DASS-21 is a 21-item self-report questionnaire used to measure three emotional states including depression, anxiety, and stress (Lovibond & Lovibond, 1995). The DASS-21 is based on a dimensional rather than categorical conception of psychological disorders, meaning that the three emotional states may overlap and exist on a continuum that may vary over time. A total of 394 students participated in the DASS-21 of the 645 students, yielding a 61% response rate. Of these, 315 were architecture students and 79 were landscape architecture students.

The principal investigator and research assistants visited all design studios in the school and invited students to participate in the study. Following in-person verbal consent, students received a paper version of the DASS-21 screening tool and were asked to withhold their names. An online version was available for off-campus students. For the screening, students answered 21 questions to evaluate the frequency of occurrences of each item in the last

week using the following scale: 0 (*Never*), 1 (*Sometimes*), 2 (*Often*), and 3 (*Almost Always*). Seven questions measured each of the three negative emotional states, and three questions were asked about overall mental health, any clinical mental health diagnoses, and whether the student was seeking counseling or treatment.

The survey took 5 to 8 minutes to complete. Once students completed all questions, they calculated their score by adding the sum of the 21 questions for each emotional state, leading to a reading of normal, mild, moderate, severe, or extremely severe. Forms were collected by research assistants, placed in an envelope, and labeled by studio course number. DASS-21 data were compiled in Excel and imported into the Statistical Package for the Social Sciences (SPSS) software for descriptive analyses and Chi-square tests.

Wellness Survey

The research team developed a tailored wellness survey for the specific population and educational context. The survey was pre-tested for content and clarity. The cross-sectional survey had 17 questions, including closed-ended questions using a frequency Likert Scale and a limited number of open-ended questions. The survey was organized into five related sections: (1) informed consent, (2) demographics, (3) self-reported health and well-being, (4) factors contributing to stress, and (5) consequences of stress and anxiety. Participation was voluntary, and all data were de-identified before analysis. The online survey, administered through Qualtrics, took 10 to 15 minutes to complete. A total of 645 students received the invitation, and 277 students participated including 213 architecture students and 64 landscape architecture students, comprising a 43% response rate. Data were compiled in Excel and imported into the SPSS software for descriptive analyses and Chi-square tests.

Semi-Structure Interviews

Face-to-face or Zoom interviews were conducted with 37 students from undergraduate and graduate programs and lasted between 10 to 40 minutes. Before each interview, the researchers obtained verbal consent. All interviews were confidential, and personal identifying characteristics were anonymized and de-identified. Basic demographic, year level, and program questions were asked in order to understand if there were differences between architecture and landscape architecture and between undergraduate and graduate students.

Two primary research questions were asked about the triggers of stress and stress responses: (1) Have you experienced stress during your studies in architecture or landscape architecture? If so, what factors elevate your stress or make you feel anxious? (2) What unhealthy behaviors do you adopt when stressed or anxious?

Following each interview, audio recordings were transferred to a computer and analyzed using Atlas.ti version 23 software. The research team first identified a list of initial categories based on the sparse literature for the specific population. After reviewing these categories in the context of the interview transcripts, a set of codes was generated using an inductive approach (DeCuir-Gunby et al., 2011; MacQueen et al., 1998). Two researchers independently coded interviews in Atlas.ti, compared results, and discussed discrepancies in coding. Krippendorff's (2011) alpha value for the agreement of codes between the two coders improved from 0.41 to 0.72 after three rounds of consensus coding. Inclusion, deletion, and revision of codes resulted in a final list of 35 codes for the two

questions—23 codes were generated for the factors that elevate stress, and 11 codes were identified for the consequences of stress.

RESULTS

Results from the study indicated significant concerns. There were statistically significant differences in how students rated their own mental health compared to their peers. Also, there were concerning levels of undiagnosed and untreated mental health conditions among students, meaning students may not be receiving the care they need. These results show the magnitude and gravity of mental health challenges students are facing in design school.

Self-Reporting and Peer-Reporting of Health

A total of 40% of students rated their own health as poor to fair, while a majority (58%) rated their peers' health as poor to fair. Surprisingly, only 3% of students rated their health as excellent, and none rated the overall health of students in the school as excellent. The difference between the students' self-rating and peer-rating is quite large at 18%. This may point to the difficulty in objectively understanding one's well-being. It is also concerning that no students feel the overall health of the student body in the school is excellent.

Mental Health – Clinical Diagnosis Versus Perceived Diagnosis

The wellness survey revealed that 25% of students reported being clinically diagnosed with a mental health condition in their lifetime and having received treatment for the condition. However, 57% of students reported suffering from anxiety or depression even though they had not been diagnosed by a professional such as a doctor or therapist. Therefore, the number of students who self-reported a mental health condition may be higher than the incidence of professional diagnoses. These differences are notable because many students are suffering without the help of a professional to cope with and address their mental health conditions.

Student Depression, Anxiety, and Stress in Design Education

A total of 33% of students screened positive for moderate, severe, or extremely severe depression, and this number increased to 52% when students who screened positive for mild depression were added. The numbers were higher for anxiety. A total of 46% of students screened positive for moderate, severe, or extremely severe anxiety, and this number increased to 62% when students who screened positive for mild anxiety were added. There were no statistically significant differences between architecture and landscape architecture students and between graduate and undergraduate students for depression or anxiety.

According to DASS-21 findings, 33% of students screened positive for moderate, severe, or extremely severe stress levels, and this increased to 57% when students who screened positive for mild stress were added. Although not statistically significant, the largest difference between undergraduate and graduate students appeared in the stress emotional state: 45% of graduate students and 33% of undergraduate students surveyed screened positive for

moderate, severe, or extremely severe stress. Similarly, though not statistically significant, the largest difference between programs appeared in the stress emotional state: 37% of architecture students and 29% of landscape architecture students screened positive for moderate, severe, or extremely severe stress. Findings from the wellness survey echo these findings: 80% of students selected often or always when asked if they had experienced stress or anxiety during their studies. Zero students reported that they had never experienced stress or anxiety during their studies. These findings show that a third or more of students are suffering from moderate, severe, or extremely severe depression, anxiety, or stress.

Factors that Contribute to Stress

Stressors - Wellness Survey

In the wellness survey, students were asked, "How often do the following factors elevate your stress and anxiety as a student in the School of Architecture?" A total of 22 factors were studied, and the top five factors increasing stress for students were school deadlines or schedule (71%), workload demands or amount of work outside of class (63%), inadequate sleep (59%), staying late in the school of architecture building outside of studio hours (50.2%), and feeling you or your work is not valued or adequate (49.1%) (Table 1). The percentages indicate the number of students who responded often or always to each factor studied. The only factor that showed a statistical difference between architecture and landscape architecture students was workload demands or amount of work outside of class. Architecture students were more likely to be stressed than landscape students for this factor.

Table 1

Factors that Elevate Student Stress and Anxiety in the School of Architecture

	Item	All Students *n* = 277			Architecture n = 213			Landscape Architecture *n* = 64			
		M	*SD*	%	*M*	*SD*	%	*M*	*SD*	%	*p*
1	Access to materials or supplies	2.35	0.79	36	2.36	0.76	36	2.33	0.90	36	0.241
2	Adjusting to life in a new environment	2.06	0.80	23	2.05	0.80	22	2.08	0.81	23	0.993
3	Being away from family and friends	2.06	0.83	23	2.09	0.85	25	1.97	0.76	18	0.639
4	Competition among peers	2.23	0.89	36	2.24	0.91	37	2.22	0.83	31	0.521
5	Feeling you or your work is not valued or adequate	2.54	0.90	50	2.53	0.90	50	2.56	0.89	49	0.992
6	Financial issues or cost of school	2.38	1.08	44	2.42	1.06	46	2.24	1.15	37	0.275
7	Inadequate sleep	2.74	0.91	58	2.80	0.92	61	2.56	0.88	49	0.274
8	Issues related to COVID-19	1.62	0.77	9	1.61	0.77	10	1.67	0.78	12	0.551
9	Personal issues	2.31	0.90	40	2.29	0.93	40	2.38	0.79	37	0.093
10	Physically inactive	2.11	0.93	30	2.11	0.95	29	2.11	0.88	31	0.537
11	Poor communication between professor and student	2.12	0.85	25	2.16	0.84	27	2.00	0.86	20	0.466
12	Poor communication between student and other students	1.70	0.71	12	1.76	0.75	15	1.49	0.56	3	0.063
13	Poor time management or procrastination	2.35	0.87	37	2.35	0.89	37	2.35	0.83	34	0.792

14	Social factors or expectations	2.22	0.89	30	2.24	0.91	31	2.16	0.83	26	0.772
15	School deadlines or schedule	2.95	0.82	70	2.98	0.84	71	2.84	0.77	66	0.339
16	School of Architecture building environment	1.73	0.83	15	1.70	0.84	14	1.83	0.81	20	0.226
17	Staying late in the School of Architecture building	2.62	1.01	50	2.68	1.00	54	2.41	0.99	35	0.102
18	Studio related issues	2.05	0.91	26	2.05	0.93	27	2.03	0.84	23	0.716
19	Transportation or parking	2.22	1.10	38	2.22	1.12	38	2.21	1.05	37	0.707
20	Unhealthy eating habits	2.12	0.86	28	2.18	0.89	31	1.94	0.74	17	0.191
21	Use of excessive drinking or substance abuse	1.38	0.71	9	1.34	0.66	8	1.49	0.82	14	0.468
22	Workload demands or amount of work outside of class	2.88	0.91	63	2.91	0.92	67	2.79	0.88	51	0.017*

Note. Mean (1 never, 2 sometimes, 3 often, 4 always). % = percent of respondents who responded often (3) or always (4). Statistical significance:
*p-value ≤ 0.05.

Stressors - Semi-Structured Interviews

During the semi-structured interviews, 37 students were asked an open-ended question about factors that elevate stress in school. Twenty-three codes emerged from the responses and categorized into seven themes (Table 2): (1) program culture and design-related factors, (2) human or social factors, (3) personal factors, (4) time-related factors, (5) mental or emotional factors, (6) environmental factors, and (7) Covid-related factors. Stressors expressed by most students fall under the theme of program culture and design-related factors, with most complaints revolving around deadlines, and heavy course workloads. Related comments existed in the human or social factors theme where students' stress was exacerbated by poor communication with faculty and between faculty, the expectations or behaviors of professors, and competition among peers, which can promote feelings of inadequacy.

The inability to have a work-life balance was a source of stress for students and may result from the pressure to perform at a consistently high level, which may not be a realistic expectation. These expectations were reported to be self-induced or influenced by the faculty or program. Unfortunately, some interviewees expressed guilt for adopting unhealthy habits such as skipping sleep, eating poorly, or not exercising regularly. Students voiced that they know the negative health consequences of their poor choices but hope to restore a work-life balance once they complete each semester. Many students expressed that these stressors are cyclical and often repeat each semester. Thus, schools must make changes to address the mental health challenges of the student body.

The stories shared by students reinforced that they have unique backgrounds, life experiences, resources, and obligations. There is no such thing as a "traditional" student. Further, findings show that not all students cope with stress in the same manner, and their experiences of coping with stress vary. Some students shared stories of the financial hardships of pursuing a degree, the struggle of managing jobs alongside their academic commitments, and the pressure to balance the demands of coursework and family obligations. There were common themes among students' stories as seen in Table 2.

Table 2

Factors that Elevate Stress for Architecture and Landscape Architecture Students

Theme 1: Program Culture and Design-Related Factors (61)		
Code	**Definition**	**Quotation Example**
Deadlines (21)	Oncoming deadlines; unnecessary, unexpected, or unrealistic deadlines; competing deadlines in different classes; last-minute changes to deadlines; unclear assignments or deadlines	▪ "Deadlines is the biggest one, like the mounting amount of work that needs to be completed in a short amount of time, you can feel very overwhelmed, and it can kind of set you off." ▪ "The classes are like eating each other, it is just too much when you have three or four projects, assignments or quizzes in the same week."
Heavy course workload (17)	Spend all my time working and it's never enough; too much to do; work piles up; back-to-back classes and no time to finish assignments; too many credit hours per semester; studio demands and workload; throw everything aside for studio; professors do not realize we have other classes	▪ "The biggest stressor is balancing like work for different classes, especially in a semester where it is like a lot of, I guess, time consuming classes." ▪ "The main problem is that professors are giving us assignments, that if we don't stay awake for thirty hours in a row, or the whole weekend, we won't get where they want us to be." ▪ "The credit hours to the amount of work in studio and outside of class do not match up."
Disorganized courses (7)	Disorganization and non-cohesion among faculty	▪ "Studio was very unorganized. We were not aware of all the assignment requirements until the Wednesday before."
Design reviews (6)	Desk crits; reviews; mid-term or final reviews; long reviews are a waste of time; stress is high during finals; public speaking; presenting; juries; too much emphasis on final deliverables in studio	▪ "I feel most anxious when, like there's a review coming up for studio. It just like getting everything done on time and making sure it looks good. Presenting makes me nervous because I am an introvert."
Design process (4)	Design is a time-consuming process; producing materials for design reviews is time consuming, takes 20 hours instead of five hours; open-ended process; subjective	▪ "It is not explicitly said, but it's kind of implied that you know you basically are expected to kind of spend a significant, more like most of your time in studio or just like working on your deliverables."
Team projects (4)	Social issues when working in groups; dynamics of teamwork	▪ "My partner in studio has a very toxic work habit. So, it makes me feel bad for having a somewhat healthy one." ▪ "When you are in a group project, you have to negotiate a lot of things."
Learning new software (2)	Do not know how to use the software or lack software knowledge and skills	▪ "Some of the online applications like AutoCAD, there's a lot of stuff I don't get about that right now."
Theme 2: Human or Social Factors (31)		
Code	**Definition**	**Quotation Example**
Poor communication (17)	Communication gap between faculty and students; poor communication between faculty; unclear assignments; vague tasks; unknown expectations	▪ "The class was not on the same page as the professor as to what was needed for the pinup." ▪ "There is like a lot of lack of communication between like the different sections in the studio.
Professors (7)	Fear of certain professors on reviews; expectations of being in school all the time; not valued by professor; professors don't respect our time;	▪ "Professors are constantly forcing us like to think school is like our whole life and you should be doing that 24/7." ▪ "I think studio professors forget we have other classes. They say studio is the most important course and it's where you should spend all your time."

	unhealthy work environment; desire more freedom to design what we want; lack of empathy; inconsistencies across faculty; some professors don't know the students	▪ "Professors don't realize we have lives outside of the program. I don't think they realize how much work we have in other courses. It takes a toll on us."
Competition among peers (7)	During reviews you see where everyone stands, which is good and bad; feelings of being stressed when you think you are behind your peers; comparing the amount of time others spend in studio; my work doesn't live up to everybody else's; I am not as efficient as others	▪ "I naturally compare myself to other people, which has a flaw not in a constructive way as I would hope it would be, but more I just kind of get frustrated with myself." ▪ "It is a very strong competitive program, and you feel that sense of competition between you and the other students on and off. We are always comparing ourselves to the other students like I'm doing better than them or worse than them which means mine is not good enough."
Theme 3: Personal Factors (26)		
Code	**Definition**	**Quotation Example**
Work-life balance (13)	Feelings of guilt for doing things outside of architecture; conflicts with what to sacrifice; balance between seeing people and doing schoolwork; challenges with juggling competing demands (balancing paid employment outside of school, assistantship/job duties, school coursework, personal issues, family obligations, etc.)	▪ "The atmosphere of architecture being an all-consuming all-day thing that is kind of promoted by the faculty, and then perpetuated by the students. It makes you feel like you don't have time to do anything else even like basic necessities, like sleep and eat, and just have a moment of silence." ▪ "I don't feel like I do enough, you know, to promote my own mental health. I don't leave my apartment. I feel like I am kind of nailed down."
Personal issues (8)	Personal issues (family obligations, financial issues, relationship issues, work, etc.); death in the family; unfortunate chain of events that I cannot control; bad communication with partner; car problems; health issue	▪ "I work and that is another stressor because there would be some days where I was like, well, I am scheduled to work, but I also have something due tomorrow. I don't know if I am going to be able to finish it or should I stay up all night. Just the thought of knowing I'm going to stay up all night is stressful." ▪ "I worry about finances."
Unhealthy lifestyle (5)	Develop bad habits during my studies (lack of sleep, not enough exercise, poor diet, self-neglect, etc.)	▪ "Just sitting in front of your computer all day is so draining especially for your health, and you are sitting in the same spot."
Theme 4: Time-Related Factors (21)		
Code	**Definition**	**Quotation Example**
Feeling of not enough time (11)	Takes a lot more time than expected; feeling like you don't have enough time; lack of time; feeling we don't have time to do anything other than schoolwork; long amounts of time consumed by studio; inexperience of knowing how long it takes to complete a task	▪ "It just seems like we don't really get weekends, we don't, they kick our ass all week. And then we don't get weekends to kind of, you know, kind of bring yourselves back to Earth. You know, get yourself out of your head. You are just kind of asked to keep going and keep pushing. It is really hard when you're not given a chance to breath." ▪ "I will spend multiple hours outside of class working on a project. And then I am still staying up past like 3 or 4:00am... and then I get home and I sit there thinking I should be doing something else. Like I feel like I should always be doing something."
Poor time management (7)	Leaving assignments to the last minute; feeling behind; procrastinating;	▪ "I have been really surprised by how hard it is to foresee time commitments." ▪ "I think definitely procrastination is like the biggest habit of

	underestimating the amount of time needed to complete tasks	mine which I have not been able to successfully break, and it comes on strong especially when I am stressed. I will get stuck in a pattern of wasting time for several hours… to kind of ignore whatever like, you know current school subjects or whatever."
Time is wasted (3)	We do busy work to share during the review and then we throw it away; I am making stuff that will not end up in my final project	▪ "And so, I think that gives me a lot of stress thinking, like having to understand that I'm making stuff that probably won't even wind up later on my project."
Theme 5: Mental or Emotional Factors (12)		
Code	**Definition**	**Quotation Example**
Feeling inadequate (7)	Not knowing how to do something; imposter syndrome; feeling I am not good enough; being a student we are at the bottom and not valued; hierarchy	▪ "I don't know if sad is the word, but I have a feeling of never being enough, you know, like I am trying and trying and trying, but never enough throughout my whole journey here." ▪ "Sometimes I feel like I am behind or sometimes my work does not live up to everybody else's."
Adjusting to new environment (3)	Adapting to a new environment; new to architecture and not sure what is ahead or what is going to come; learning skills for a new major is tough	▪ "I am completely new to design and architecture. And so I am not able to see ahead of what's going to come."
Loneliness (2)	Need for social contact; isolation	▪ "I feel like I don't have time to hang out with my friends because I'm so focused on school."
Theme 6: Environmental Factors (6)		
Code	**Definition**	**Quotation Example**
Accessing resources and materials (3)	Accessing 3D printing; fabrication lab; light tables; printing; accessing studio supplies	▪ "Sometimes over the weekend we need to get into the woodshop. But no one is going to be in the woodshop or DDS lab over the weekend. So, everyone is in a panic."
Parking and transportation (2)	Parking issues on campus; transportation issues to and from school	▪ "I don't have my own transport. So, using the university transport or asking people for a lift every time I come to school is difficult."
Physical environment (1)	School of Architecture building (spatial issues, equipment, issues, desks, noise, crowding, etc.)	▪ "The noise in the building is loud."
Theme 7: COVID-Related Factors (5)		
Code	**Definition**	**Quotation Example**
COVID implications (5)	Preference for in-person classes; switching between in person classes and online	▪ "I think everybody has a little bit of like PTSD with that COVID, but also just not everybody following the rules."

Note. The numbers in parentheses indicate the total number of responses from the interviews.

Consequences of Stress

The consequences of stress were also studied in the wellness survey and the semi-structured interviews. Many of the consequences students report are also essential lifestyle behaviors that contribute to wellness. This means design students are struggling to meet the basic requirements of a healthy lifestyle.

Consequences of Stress - Wellness Survey

A total of 16 factors were studied in the wellness survey to assess the consequences of stress when pursuing a degree. Table 3 depicts descriptive and inferential statistics of student responses to the question, "How often do you experience the following negative behaviors, consequences, or effects when stressed?" The top five stress responses reported were poor sleep patterns, inability to focus, physical inactivity, emotional instability, and unhealthy eating. Notably, four essential lifestyle behaviors that contribute to wellness from the literature are the same factors students struggle with balancing when stressed. These include sleep, nutrition, physical activity patterns, and social support. The only consequence students reported that is not essential to a healthy lifestyle is an inability to focus, which has obvious implications for academic performance. Additionally, results revealed statistical difference between the architecture and landscape architecture students for two factors – harmful or invasive thoughts and self-harm (Table 3).

Table 3

Negative Behaviors, Consequences, or Effects when Students are Stressed

	Item	All Students $n = 277$			Architecture $n = 213$			Landscape Architecture $n = 64$			
		M	*SD*	%	*M*	*SD*	%	*M*	*SD*	%	*p*
1	Emotional instability	2.25	0.88	35	2.26	0.90	36	2.23	0.83	29	0.518
2	Excessive drinking or substance abuse	1.41	0.70	9	1.37	0.66	7	1.55	0.83	15	0.219
3	Harmful or invasive thoughts	1.64	0.80	13	1.59	0.78	13	1.80	0.88	14	0.046*
4	Inability to focus	2.64	0.80	55	2.62	0.81	54	2.69	0.75	57	0.753
5	Miss class	1.63	0.65	8	1.60	0.64	8	1.72	0.70	11	0.596
6	Miss assignments or turn them in late	1.73	0.72	12	1.68	0.71	12	1.86	0.75	19	0.383
7	Neglect personal hygiene	1.53	0.72	10	1.54	0.72	10	1.50	0.76	12	0.592
8	Panic attacks	1.73	0.79	14	1.73	0.80	14	1.73	0.78	14	0.990
9	Poor academic performance	1.78	0.66	10	1.77	0.66	9	1.80	0.67	11	0.939
10	Poor attitude	2.04	0.77	25	2.05	0.77	26	1.98	0.79	17	0.108
11	Poor sleep patterns	2.68	0.91	56	2.70	0.93	57	2.58	0.85	49	0.441
12	Physical inactivity	2.29	0.96	36	2.29	1.00	36	2.27	0.84	32	0.210
13	Self-harm	1.09	0.34	.8	1.06	0.28	.9	1.17	0.49	2	0.020*
14	Sickness	1.65	0.69	11	1.64	0.72	12	1.66	0.62	5	0.065
15	Social withdrawal	2.12	0.87	30	2.13	0.88	32	2.09	0.89	25	0.464
16	Unhealthy eating habits	2.17	0.91	35	2.20	0.95	34	2.05	0.79	29	0.115

Note. Mean (1 never, 2 sometimes, 3 often, 4 always). % = percent of respondents who responded often (3) or always (4). Statistical significance: *p-value ≤ 0.05.

Consequences of Stress - Semi-Structured Interviews

Students were asked, "What unhealthy behaviors do you adopt when stressed or anxious?" Eleven codes emerged from the research question, and these were grouped into two themes: (1) unhealthy behaviors or symptoms of being unwell and (2) poor judgment of time or use of time. Table 4 provides an overview of the findings from this research question and is organized by themes, code categories, definitions, and quotation examples. Many students reported compromising sleep, skipping meals, and not getting adequate exercise during their studies. Stress responses manifest in many ways, including eyes twitching, nail-biting, shaky hands, emotional instability, and

intrusive thoughts. Other students shared stories of how chronic stress led to sickness, eating disorders, facial paralysis, panic attacks, hospital visits, and suicidal ideation. These consequences are troubling and serious in nature.

Table 4

Stress Responses of Architecture and Landscape Architecture Students

Theme 1: Unhealthy Behaviors or Symptoms of Being Unwell (97)		
Code	**Definition**	**Quotation Example**
Sleep problems (27)	Inadequate sleep or too much sleep; work instead of sleep; all-nighters; take extended naps at night	▪ "I have like a talent to stay awake, you know, for the last four years, I have been able to stay up for 24 hours, or even 30 hours at once if needed." ▪ "This semester I averaged between four and six hours a night. Unless it is the weekend at which point, I sleep for about 12 to 18 hours. Yeah, and that's not an exaggeration. I will just straight up coma it out."
Unhealthy diet (24)	Skipping meals; forgetting to eat; eating too much or unhealthy eating; poor eating habits; overeating comfort foods; eating disorder	▪ "I forget to eat. I used to be really bad. I would have to set timers when it's time for me to eat." ▪ "I have unhealthy eating habits because sometimes you don't have time to cook or don't want to because you have no energy. So we all just order food. I will eat things that are of course not healthy, and they are not healthy for my pocket." ▪ "I stress eat or have bad eating behaviors."
Symptoms of being unwell (10)	High anxiety; get shaky; eyes twitch; dizziness; nauseous; panic attacks; cannot move; frozen in place; bite nails; pick skins on my lips; sickness; self-harm; emotionally unstable (cry a lot, grumpy, prone to anger, emotionally drained, nitpicky, etc.); poor attitude; harmful or invasive thoughts (overactive mind, racing mind, dark thoughts, negative thoughts, dwelling on worst possible scenario, etc.)	▪ "My eye twitches when I get stressed and anxious. And I get like lightheaded and dizziness when I'm anxious. I get nauseous a lot too from stress." ▪ "After a period of like long term stress my mood gets so much darker. Then there's like it's just harder to regulate, like intrusive thoughts and stuff so yeah it's like a snowball where little things build on top of each other." ▪ "Last semester I had facial paralysis from extreme amounts of stress." ▪ "I used to have trichotillomania, where I would literally pull my hair out because of how stressed I got." ▪ "I get shaky hands." ▪ "I have panic attacks."
Inadequate exercise (10)	Lack of exercise or movement; physically inactive	▪ "When the all-nighters start coming into play, I get too much into my workload and I don't eat at all. And then I just don't really get up from my chair. So I am not moving around at all."
Neglect self-care (9)	Sit for a whole day and forget to get up; don't walk around; self-neglect; prioritize schoolwork over myself	▪ "When you have so much to do, you're like what am I going to sacrifice today? Is it showering? Or is it sleeping? I am trying not to shower too much. But it is the sleep, the sleep does get lost pretty quick, it's the first thing to go." ▪ "A lot of things fall by the wayside when I am stressed."
Substance abuse (6)	Excessive drinking of alcohol or substance abuse; excessive smoking	▪ "I tend to drink a lot more when I'm stressed. Well I use that to relieve some stress. Definitely not a healthy decision."
Social withdrawal (5)	Social isolation due to work; neglect my family, friends, and pets	▪ "I socially withdraw because I'm just like too emotionally drained. I don't want to interact with people because I'm too stressed thinking about other things."
Large caffeine consumption (4)	Consume too many drinks with caffeine	▪ "I drink more coffee than I should." ▪ "I see my classmates like drinking those energy drinks with lots of caffeine."
Burnout (2)	Mental and physical exhaustion; fatigue; lack energy; being tired of work; drowning in work; continuous stress from school; lack of motivation	▪ "I feel like there's a lot of burnout and it's so easy to get drowned out in the work." ▪ "I don't know if teachers realize how much time after hours we are putting in and like, I know, being tired. I reach a point where I'm just like, I'm done with this."

Theme 2: Poor Judgment of Time or Use of Time (16)		
Code	**Definition**	**Quotation Example**
Poor time management (12)	Put things off; poor time management; procrastination	▪ "I procrastinate to just try to avoid situations."
Feeling of not enough time (4)	Not enough time to finish work; not enough time to do what I wanted to do	▪ "I have this mentality of, I don't have enough time which effects everything – so I don't eat or exercise."

Note. The numbers in parentheses indicate the total number of responses from the interviews.

DISCUSSION

This study showed that students in a school of architecture experienced significant and problematic impacts on their health and well-being as a consequence of depression, anxiety, and stress, influenced by the culture of design education. These concerns were notable and wide-ranging. When architecture and landscape architecture students were asked what they liked most about their education, the overwhelming majority quickly noted the school's sense of community, family-like atmosphere, and people in the school. Students appreciate the camaraderie, even if the social bonds are built through commiseration. This sense of community and camaraderie may be leveraged to address the health and well-being of the student if used in a constructive and productive way. Students struggled with finding a work-life balance, which may originate from an inability to self-regulate, perfectionism, or the pressure from peer comparisons. Students had different backgrounds and life experiences that shaped their ability to be resilient. Some students accrued financial debts, worked two jobs while in school, managed families including spouses and children, and had other personal issues or obligations that elevated stress. Other students suffered from health issues, were riddled with insecurities, and grappled with a feeling of being inadequate. Isolation and loneliness surfaced in the study, and some design students said they did not have a safe space or companion they could confide in during their education.

Findings from this study showed that stress and mental health issues can weaken the health and well-being of design students. While the incidence of anxiety and depression in the DASS-21 data is not synonymous with clinical diagnoses, student perceptions of ill health are problematic: 40% of students rated their health as fair to poor, and 58% rated their classmates' health as fair to poor. Surprisingly, the wellness survey showed that 57% of students reported feeling like they suffer from anxiety or depression, even though only a quarter (25%) reported being diagnosed by a professional. This finding suggests that some students may benefit from new programs like embedded counselors or health promotion services.

The survey and interviews confirmed that time constraints, deadlines, scheduling, and heavy workloads were the main factors negatively affecting student well-being. Academic programs should reassess workloads each semester, seek better ways to coordinate schedules and deadlines, improve the organization of courses and clarity of assignments, and pursue avenues to foster better overall communication. While this is a long list of items that can be addressed, it also shows the vast potential for improvement. Simply addressing a couple of these items could have a significant impact on students.

Students voiced concerns about achieving healthy lifestyle habits in school, such as balanced nutritional meals, physical activity recommendations, adequate sleep, and maintaining social connections. Since anxiety and depression

are related to poor academic outcomes (Chapell et al., 2005; DeRoma et al., 2009), fostering an environment that supports students will benefit educational programs and may provide an incentive for educators to commit to changes.

In the *Redesign of Studio Culture* document published in 2002 by the AIAS, the authors reference back to a 1991 seminal article by Thomas Fisher, "Patterns of Exploitation." The article raised concerns about the unhealthy pressures and expectations placed on students by noting the death of an architecture student who lost control of his car when he went home to change for a design review. The death was presumably linked to sleep deprivation due to studio coursework. Fisher argued that the culture in architectural education frequently exploits one's mind and body. Unfortunately, little has changed since his article was published over 30 years ago (Fisher, 1991). Later findings from the 2004 Studio Culture Summit (AIAS, 2004) discovered results that echoed the same concerns. Even the most recent *2020 Learning & Teaching Culture Policy Project* (AIAS, 2020) continues to find the culture in design schools at odds with students living balanced, healthy lives.

Limitations

Although the results are consistent with other studies (e.g., AIAS, 2020), there were limitations. First, this study focused on one school of architecture. Second, there was an overrepresentation of undergraduates due to the differences in program sizes. Finally, there was underrepresentation of students from minority racial groups and genders other than male and female.

The DASS-21 instrument is a widely used scale for screening for depression, anxiety, and stress; however, findings should still be interpreted with caution (Eleftheriades et al., 2020). Moreover, researchers collected DASS-21 data during the middle to later part of the semester based on course and studio availability. Thus, researchers collected data at different points in time across course sections which means there was not consistency in terms of the semester calendar and could have been impacted by factors like midterms and finals. Another limitation stems from the low participation rates of the off-campus programs.

CONCLUSION

Findings from this study identify an unhealthy trend in design programs. The discipline would benefit from educators assessing and understanding the threats to mental health and implementing strategies to promote student well-being by creating a healthy academic culture and campus community. Addressing mental health at the root, namely the formative environment of education, may help to improve the culture of overall academic well-being in design students and dcontribute to healthy, life-long professional careers. This endeavor necessitates a multifaceted approach that includes securing support from academic leaders, informing educators of stress factors, convincing faculty to change unhealthy academic practices, understanding student coping mechanisms, recognizing the impact of mental health on academic performance, and identifying and supporting students at high risk of mental health issues. This comprehensive understanding and proactive stance can significantly enhance student wellness and academic success in design programs. Further research is needed to understand how to remedy the problems and create health learning environments for design students that all educators should support and champion.

Acknowledgments

The authors would like to thank all the graduate students enrolled in the ARCH 8210 Research Methods graduate seminar in 2021 and all the students in the School of Architecture. In addition, the authors are grateful for the funding to support the research provided by the School of Architecture and the Clemson Architectural Foundation.

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Author's Note

The authors declared no potential conflicts of interest concerning this article's research, authorship, and/or publication.