



Undergraduate Surveys Reveal That Instructors Are Key in Students Overcoming Classroom Struggles During the COVID-19 Pandemic

Randi L. Cannon^{1,2†}, Lauren R. Clance^{1,2†}, Kelly M. Correia^{1,2}, Blair H. Morrison^{1,2}, Madison T. Nelson³ and Jeremiah A. Henning^{3*}

¹ Department of Marine Sciences, University of South Alabama, Mobile, AL, United States, ² Dauphin Island Sea Lab, Dauphin Island, AL, United States, ³ Department of Biology, University of South Alabama, Mobile, AL, United States

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*Correspondence:

Jeremiah A. Henning
henning@southalabama.edu

[†]These authors share first authorship

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Many undergraduate students encounter struggle as they navigate academic, financial, and social contexts of higher education. The transition to emergency online instruction during the Spring of 2020 due to the COVID-19 pandemic exacerbated these struggles. To assess college students' struggles during the transition to online learning in undergraduate biology courses, we surveyed a diverse collection of students ($n = 238$) at an R2 research institution in the Southeastern United States. Students were asked if they encountered struggles and whether they were able to overcome them. Based on how students responded, they were asked to elaborate on (1) how they persevered without struggle, (2) how they were able to overcome their struggles, or (3) what barriers they encountered that did not allow them to overcome their struggles. Each open-ended response was thematically coded to address salient patterns in students' ability to either persevere or overcome their struggle. We found that during the transition to remote learning, 67% of students experienced struggle. The most reported struggles included: shifts in class format, effective study habits, time management, and increased external commitments. Approximately, 83% of those struggling students were able to overcome their struggle, most often citing their instructor's support and resources offered during the transition as reasons for their success. Students also cited changes in study habits, and increased confidence or belief that they could excel within the course as ways in which they overcame their struggles. Overall, we found no link between struggles in the classroom and any demographic variables we measured, which included race/ethnicity, gender expression, first-generation college students, transfer student status, and commuter student status. Our results highlight the critical role that instructors play in supporting student learning during these uncertain times by promoting student self-efficacy and positive-growth mindset, providing students with the resources they need to succeed, and creating a supportive and transparent learning environment.

Keywords: COVID-19, COVID-19 pandemic emergency measures, remote learning, student struggle, online instruction and learning

INTRODUCTION

Many undergraduate students encounter struggle as they navigate academic, financial, personal-emotional, and social contexts of higher education. To date, much of the research on college struggle has focused on student adjustment to college, how this adjustment is affected by antecedents and correlates, and how adjustment affects grades and retention (Credé and Niehorster, 2012). Students arrive at college with differing levels of preparedness and adaptability (Aspinwall and Taylor, 1992; Trimble, 2019); many students lack the knowledge or understanding to navigate the collegiate environment and may lack access to adequate resources, social support, and mentors (Horn and Nunez, 2000; Hickman and Andrews, 2003; Schneider and Ward, 2003; Mehta et al., 2011). Institutions often use correlates like SAT/ACT scores, socioeconomic status, first-generation college student status, transfer student status, and student commuter status to predict student persistence or to identify students that may need extra support while navigating campus life (Horn and Nunez, 2000; Longwell-Grice and Longwell-Grice, 2008; Mehta et al., 2011; Swecker et al., 2013). However, we know that college students are constantly adjusting to new social, institutional, and classroom environments throughout their college experience. Each semester, undergraduates must adjust to new instructors, courses, content, and course schedules, while also shouldering shifting external pressures and responsibilities (Li and Carroll, 2020). Balancing these ever-changing learning and social environments can be difficult for students, and struggling in one aspect may cascade to impact other aspects of the student's life (Napoli and Wortman, 1998; Credé and Niehorster, 2012). Students that cannot navigate and adjust to the class format (Akiha et al., 2018), adjust their study habits (Lammers et al., 2001; Proctor et al., 2006), find effective study methods (Patel et al., 2015), and balance external pressures (Rytönen et al., 2012; Li and Carroll, 2020), will struggle to succeed. The ongoing COVID-19 pandemic has placed additional challenges on the adjustment to new learning and social environments with the uncertainties surrounding viral spread and mitigation strategies as well as shifts to emergency remote instruction.

Over the last 18 months, the COVID-19 pandemic has disrupted university class structure, campus life, and the personal lives of college students worldwide, which has heightened student struggles and stress (Wang et al., 2020). This abrupt change in learning environments has increased student classroom struggles during March and April of 2020, as most students, instructors, and institutions were ill-prepared for the transition to virtual learning (Taylor et al., 2020; Jaggars et al., 2021; Shin and Hickey, 2021). The transition to remote learning reduced student sense of community, perceptions of learning, and perceptions of career preparation (Supriya et al., 2021). These impacts may have been felt especially hard within STEM disciplines like biology, chemistry, physics, and engineering, where much of the learning and career preparation is done during interactive, hands-on laboratory/field research opportunities or internships. The loss of internship opportunities, hands-on learning, and research experiences increased student concern for post-graduation job

prospects and future success (Aucejo et al., 2020; Lederman, 2020; Camfield et al., 2021; Gemelas et al., 2021).

The transition to remote learning heightened many of the already existing social and economic inequalities that students experience, including disparities in the accessibility of technology, secure employment, housing, social networks, and a dedicated workspace (Gillis and Krull, 2020; Lederman, 2020; Suprianto et al., 2020). The pandemic also caused major disruptions in students' lives outside the classroom, affecting overall mental health and wellbeing [e.g., sleeping habits, nutrition, and exercise (Copeland et al., 2021)], and student stress level (Son et al., 2020; Charles et al., 2021; Correia et al., in press). Thus, the pandemic's disruption of the academic and personal lives of students—in conjunction with the effect of external pressures on academic performance—may have created a feedback of student stress and anxiety that took a toll on success in the classroom (Grubic et al., 2020; Son et al., 2020; Copeland et al., 2021; Correia et al., in press).

While an abundance of literature has identified best practices for teaching online (Bailey and Card, 2009; Price et al., 2016; Woodley et al., 2017; Gillis and Krull, 2020), evaluated various technologies for teaching online (Persell, 2004), and measured learning outcomes of online learning for diverse student populations (Driscoll et al., 2012; Martin et al., 2019), the COVID-19 transition was marked by faculty-specific decision-making, which lead to the modification of content and resources and implementation of new learning technology in real-time (Westwick and Morreale, 2021). Thus, instructors may serve as critical front-line institutional agents that serve as a bridge to student success if they communicate expectations, communicate changes in class structure, demonstrate effective study methods and habits for class structure, and provide flexibility for students navigating changes in external pressures (Findley and Varble, 2006; Tanner, 2013). During the transition to emergency instruction, many students reported a reduction in mental health, they lacked motivation, felt distracted, reported feelings of uncertainty and anxiety, and worried about their ability to enroll or stay in college due to COVID-19 (Gillis and Krull, 2020; Murphy et al., 2020; Zhai and Du, 2020). Additionally, student perceptions of instructor preparedness, organization, and classroom learning environments were linked to student learning and emotional support and student wellbeing during the COVID-19 transition (Butler Samuels et al., 2021). Inversely, instructors can serve as barriers to student success if they fail to provide this type of learning environment. Students that report classroom struggles are more likely to withdraw from college relative to the general withdrawal rate of 40% nationally (Porter, 2003; Cortiella and Horowitz, 2014). However, the withdrawal rate increases two to three-fold when those students come from historically excluded racial/ethnic groups and/or first-generation college student households (Swail, 2003; Green and Wright, 2017).

The transition to online learning during the Spring of 2020 due to the COVID-19 pandemic provided an interesting opportunity to understand student struggle and persistence in the classroom. While many larger land-grant institutions, as well as smaller well-funded liberal arts colleges, may have had extra resources to

support student wellbeing and access to technology, smaller state institutions and community colleges simply lacked the resources to support students during the transition to online learning. To explore student struggle associated with the transition to emergency remote teaching at a medium-sized, R2 institution, we: (1) measured the prevalence of self-reported student struggle at the University of South Alabama in Mobile, Alabama, (2) tested whether struggle varied across demographic factors such as race/ethnicity, gender, first-generation college students, transfer students, and commuter students, and (3) determined what factors contributed to student struggle and the ability to overcome those struggles. To accomplish this, we surveyed undergraduate students enrolled in biology courses during spring 2020 and asked whether they experienced struggle and, if so, if they were able to overcome it. We define student struggle as any self-perceived barrier that a student may encounter navigating the college learning experience and may be internal or external to the student and/or the college classroom. Based on their responses, open-ended questions further assessed how or why they succeeded or failed in overcoming their struggle, or what they attributed their lack of struggle to. We did not provide students with any pre-defined definition of struggle because we were interested in student perceptions and experiences in biology courses during the transition to remote learning. We then used thematic coding to group student responses to evaluate why students struggled, how students were able to persist in the face of the transition to online classes, or what barriers they experienced that did not allow them to overcome their struggle.

MATERIALS AND METHODS

Student Participant Pool

Our participant sample included 238 undergraduate students enrolled across multiple undergraduate biology courses at the University of South Alabama, a public, R2 research institution in Mobile, Alabama. The student body of the University of South Alabama consists of 63% White, 20.6% African American/Black,

4.1% Latinx/Hispanic, and 3.7% Asian/Asian American students and consists of 67% female students, 32% male, and ~1% gender expressive students (45). Our pool of students included both biology majors (120 students) and non-majors (104 students) across 16 courses. Of these 16 courses, seven were introductory biology courses with students being a mix of biology majors and non-majors (130 students total) and nine of the courses classified as upper-level courses with students enrolled as biology majors or minors (108 students total).

Study Design and Questionnaire Development

Students enrolled in biology courses were emailed a link to the Qualtrics survey two times during the final week of courses as part of a larger post-course data collection during May 2020. The post-course survey measured student perceptions of their learning environments and how they were impacted by the transition to remote instruction. The full survey consisted of questions to understand which biology courses students were enrolled in, any struggles they experienced in their biology courses, how they accessed departmental and campus resources during the transition to remote learning, external commitments like course load and job commitments, questions to understand how their hidden and visible identities shaped their in-class experiences, science identity formation, intrinsic motivation, demographic information, and questions on perceptions of evolution. Questions aimed at student struggle were collected at the beginning of the survey, after questions asking students to list which biology courses they were enrolled in. The full survey can be found in Appendix 1. Student participation in the study was completely voluntary and no monetary or class incentives were provided. The survey was emailed to 2,234 students that were enrolled in a biology course during the Spring 2020 semester for a response rate of 10.6% and took the average student 25.4 min to complete. Survey items and methodology were granted an exemption from full review by the University of South Alabama IRB, # 1544421-1 to JH.

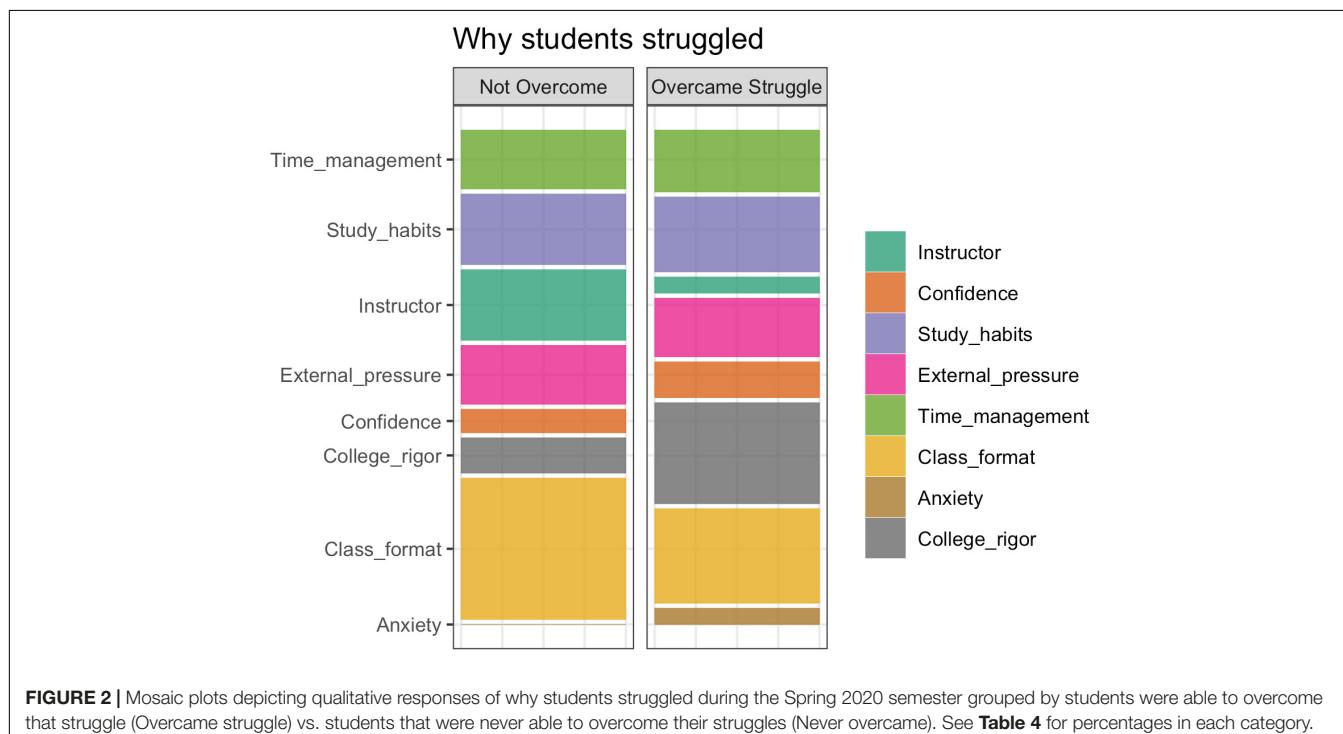
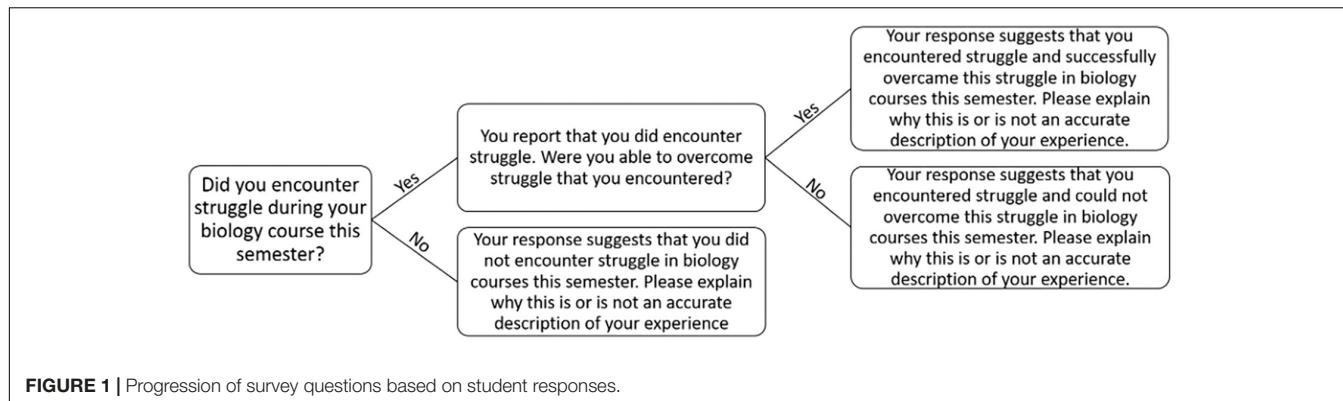
Student Struggle

Our survey instrument consisted of two yes/no questions to explore (1) whether students struggled in their biology courses and (2) whether students were able to overcome that struggle (Figure 1). We did not explicitly define struggle for students on our survey; our goal was to allow students to define struggle through their lived experiences over the course of the semester, which undoubtedly included in-class and external factors of struggle. To get a more nuanced understanding of how students interpreted their struggle, we asked students an open-ended question which was dependent upon how students answered the yes/no questions. For instance, a student that responded that they did not encounter struggle in their biology course received the question: "Your response suggests that you did not encounter struggle in biology courses this semester. Please explain why this is or is not an accurate description of your experience," termed "No struggle." However, a student that responded they struggled, were able to overcome their struggle was prompted with: "Your

TABLE 1 | Example responses from students that did not struggle (No struggle), those that experienced struggle but overcame it (Overcame struggle), and those that experienced struggle but did not overcome it (Never overcame).

Category	Examples
No struggle (81)	"The course materials were not difficult to understand for me. With a blend of my interest in learning biology and studying over time, I do not consider the entire experience a struggle , but rather enjoyable."
Overcame struggle (132)	"I did not do well on tests to begin with, but I met with my professor. He gave advice that was really helpful ."
Never overcame (25)	"When classes went online it was more difficult due to the layout of the tests. My grade significantly dropped from the first test to the second."

Parentheses indicate how many students were grouped into the respective category. Bolded terms/phrases in the student testimonials/examples represent the reason for coding the response with either "No struggle," "Overcame struggle," or "Never overcame".



response suggests that you encountered struggle and successfully overcame this struggle in biology courses this semester. Please explain why this is or is not an accurate description of your experience,” termed “Overcame struggle.” Finally, a student that reported struggle in biology courses and indicated they were not able to overcome those struggles were prompted with “Your response suggests that you encountered struggle and could not overcome this struggle in biology courses this semester. Please explain why this is or is not an accurate description of your experience,” termed “Never overcame.” The open-ended responses allowed students to communicate the various reasons they felt they may have struggled during the transition to remote learning and how they were able to overcome their struggles (**Figure 2** and **Table 1**). We were able to qualitatively codify student responses to understand how in-class and external factors shape student struggles during the transition to remote learning during the Spring 2020 semester.

Student Identities

In addition to the struggle questions, we also asked students to self-report their race/ethnicity identity, gender identity, if they are the first person in their family to attend college (i.e., first-generation college student), if they were a transfer student, and how far they commute to campus (**Table 2**). Additionally, we used data on which courses students were enrolled in to determine if they were enrolled in introductory biology or upper-level biology courses and determined whether students were biology majors.

Statistical Analysis

To understand how student identities impacted self-reported struggle and ability to overcome struggle, we used Chi-Square analyses and summed dichotomous responses across student identities to determine differences in the percentages of students across race/ethnicity, gender identity, first-generation college

TABLE 2 | Identity facets and their categories.

Facets of identity	Categories
Gender identity	Cis female (178), cis male (45), other (1) transgender (0), and non-binary (0)
Race/ethnicity	American Indian/Indigenous American (3), Asian/Asian American (14), black/African American (37), Hawaiian (5), Latinx/Hispanic (4), white (143), middle Eastern (1), and mixed/multiple races (16)
First-generation student	Yes (48) and no (176)
Commuter status	On campus (108), within 1 mile (35), within 5 miles (23), within 10 miles (33), and more than 10 miles (23)
Transfer students	Yes (47) and no (177)

Parentheses indicate how many students were grouped into each subcategory.

students, biology major, whether students were enrolled in introductory- or upper-level biology courses, and transfer and commuter students that (a) reported struggle and (b) were able to overcome that struggle. This allowed us to test whether there were demographic differences in student struggle and ability to overcome that struggle during the transition to online learning.

To analyze our open-ended survey questions, responses were first categorized into three major areas: students who experienced no struggles, students who experienced struggles and overcame them, and students who experienced struggles but were not able to overcome them. Responses within those three major categories were then coded into subcategories using open and thematic coding for each survey item (Saldaña, 2021), based on why students struggled or how students were able to overcome the struggle (Table 1). Coding was completed in a series of predetermined steps to ensure consistency between coders (RLC and LRC). First, RLC and LRC examined the student responses, and designed a proposed coding rubric, then met to create a tentative rubric. Then, the first 30–50 responses for each survey item were independently binned into coding themes. Coders then met and revised the rubric based on discrepancies. All student responses were then coded using the finalized rubric. Coders then met and determined the percent agreement among coders and coded to consensus (100% agreement). In Appendix 2, we have included the initial coding results among our coders which matched 92–100% of their codes. We were able to organize our student responses into seven subcategories (Table 3), which included: instructors, self-effort or confidence, study habits, external factors, time management, class format, anxiety, and general difficulty with college not covered by the other categories. In some instances, students' responses were grouped to more than one code, as responses and identities cannot always be defined by a single descriptor. Responses that did not fully answer the questions asked or were left blank were not coded and were excluded from our analysis. Out of the 350 students that were surveyed, 238 responses were analyzed. Once the data was organized and coded, a Pearson's Chi-squared test was run to determine if there was a significant difference among the reasons why students struggled or how students overcame their struggles

based on whether they were categorized as never struggled, struggled but overcame, or struggled and not overcome (Table 4). We calculated the frequency of responses within each theme by dividing the number of responses for a specific category and dividing it by the total data points gathered for one coding category.

TABLE 3 | Example responses from students that explain why they did or did not struggle, and how they were able or unable to overcome that struggle.

Subcategory	Example
Instructor (78)	"I didn't experience much struggle because my professor was great! She was so helpful! Loved her! She made bio fun!"
Confidence (69)	"I did not struggle because biology is naturally easy for me to understand."
Study habits (64)	"I would say on my first test, I did not achieve the grade that I wanted. Throughout the course, I learned how to study more efficiently and therefore overcame this struggle and started achieving the grades I desired."
External factors (24)	"Having to teach myself at home made things difficult especially since I work at an essential job that wanted me to work more now that I am not physically at school."
Time management (25)	"In the beginning of the semester, I was not handling my time correctly for studying for my two major biology classes."
Class format (47)	"I felt that I struggled more in these classes than expected when we were forced to switch over to online learning. For some of my professors, the workload got surprisingly heavier. Being entirely online is not the same as face to face learning so I struggled with the concept of learning by entirely relying on a computer screen."
Anxiety (5)	"Nearing finals and now the amount of stuff due is overwhelming, I'm stressed over grades, and horribly depressed away from friends and other loved ones and having to move back into my parents. I stopped completing things to the best of my ability because I had so much to do and only so much energy. It was nothing the professors could really help with."
College difficulty/rigor (34)	"The class was very fast-paced, and I struggled with that at first. After the first exam, I realized I needed to put a lot more work into this course."

Parentheses indicate how many students were grouped into each subcategory.

TABLE 4 | Percentage of responses that attributed students' ability (Overcame) or inability (Not overcome) to overcome struggle, or why they did not struggle (No struggle) to each subcategory.

	No struggle (81)	Not overcome (25)	Overcame (132)
% Instructor	61.7% (49)	24.0% (6)	16.7% (22)
% Confidence	34.6% (28)	8.0% (2)	31.8% (43)
% Study habits	6.2% (5)	24.0% (6)	40.2% (76)
% External	0	20.0% (5)	15.2% (20)
% Time management	1.2% (1)	20.0% (5)	15.9% (21)
% Class format	4.9% (4)	48.0% (12)	23.5% (31)
% Anxiety	0	0	3.8% (5)
% College difficulty	0	12.0% (3)	23.5% (34)

Parentheses indicate how many students were grouped into each subcategory.

RESULTS

With the transition to online classes during March of 2020, 66.4% ($n = 158$) of the 238 students we surveyed reported that they encountered struggle. Fortunately, 83.5% (132 of 158) of the students that reported struggling with the transition indicated they were able to successfully overcome their struggle (**Table 5**). When we compared across our demographic groupings, we found no difference in reported struggle among racial/ethnic identities ($\chi^2 = 7.24$, $df = 4$, $p = 0.12$), gender identities ($\chi^2 = 0.911$, $df = 1$, $p = 0.34$), first-generation college students ($\chi^2 = 2.394$, $df = 2$, $p = 0.30$), transfer students ($\chi^2 = 0.84$, $df = 1$, $p = 0.36$), or commuter status ($\chi^2 = 2.53$, $df = 5$, $p = 0.77$). Similarly, we found no demographic differences in how students were able to overcome that struggle across racial/ethnic identities ($\chi^2 = 1.24$, $df = 4$, $p = 0.87$), gender identities ($\chi^2 = 0.175$, $df = 1$, $p = 0.68$), first-generation college students ($\chi^2 = 1.88$, $df = 4$, $p = 0.76$), commuter students ($\chi^2 = 1.72$, $df = 5$, $p = 0.89$), and transfer students ($\chi^2 = 0.06$, $df = 1$, $p = 0.81$). Additionally, we found no difference in introductory and upper-level biology courses ($\chi^2 = 1.75$, $df = 1$, $p = 0.19$), although biology majors reported higher struggle in their biology course relative to non-majors ($\chi^2 = 6.07$, $df = 1$, $p = 0.014$). However, whether students were biology majors or non-majors ($\chi^2 = 0.99$, $df = 1$, $p = 0.32$) or introductory- vs. upper-level biology courses ($\chi^2 = 1.92$, $df = 1$, $p = 0.17$) had any impact on whether students overcame their struggle. Thus, the transition to online learning due to the COVID-19 pandemic impacted our students broadly. No student groups were spared by the challenges of emergency remote instruction, although it appears our majors seemed to experience higher struggle within biology courses compared to non-majors. As a follow up, we coded our open-ended responses based on how students described the cause of their struggles and how they were able to overcome them.

Based on the open-ended responses that measured why students struggled during the transition to emergency remote learning, we found that students struggled for a variety of reasons. Of the 158 students who reported struggles, we found that 26% struggled with the class format, 22% reported the difficulty with the rigor of the course, 18% struggled because of poor or incorrect study habits, 15% reported that they struggled with both time management, and 14% struggled with external pressures (**Figure 2**). We found that 8% reported that their struggle was associated with lower self-confidence, 7% reported that the instructor was the reason they struggled, and 3% reported that high anxiety associated with the transition to online learning were the main reasons for their struggle (**Figure 2**). We found no significant differences in the reasons why students struggled

when we compared the students that overcame their struggle to the students that did not struggle ($\chi^2 = 13.42$, $df = 7$, $p = 0.06$), although the instructor was slightly higher in students that did not overcome their struggle. Thus, our results indicate that instructors can be a barrier for students navigating and attempting to overcome course struggles.

When we explored how students were able to overcome struggle or reasons why they did not struggle in class, we found significant differences between the “Overcame struggle” and “No struggle” groups ($\chi^2 = 55.17$, $df = 4$, $p < 0.0001$, **Figure 3**). Of the 81 students who reported not struggling in the course, over 60% of the students that did not struggle in biology courses (49 of 81) and 13% of students that overcame their struggle, mentioned positive interactions with instructors as one of the main reasons for their success throughout the transition (**Table 4**). Students that attributed their success to instructors also tended to report higher self-confidence and belief in themselves to succeed (**Figure 3**). We found that 35% (28 of 81) of the students that did not struggle and 20% (26 of 132) of the students that overcame their struggle reported belief in themselves or self-confidence as a contributing factor. Changing their study habits after a poor performance on an early exam allowed 34% (45 of 132) of students to overcome their struggles. Furthermore, over 70% (32 of 45) of those students indicated that they improved their study habits with assistance from their instructors. Demographic groupings had no influence on why students struggled with remote learning or how they were able to overcome their struggles (data not shown).

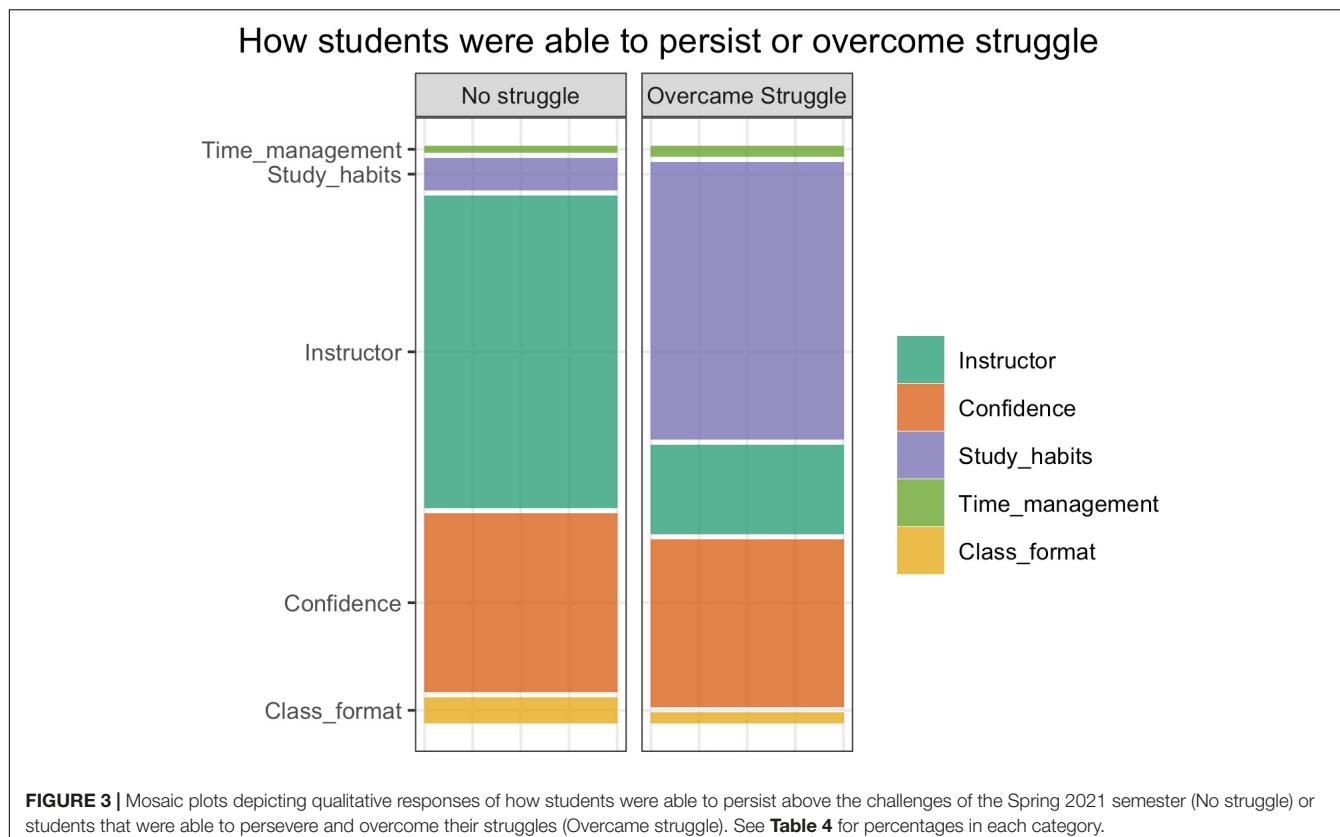
DISCUSSION

The transition to emergency remote instruction during the Spring of 2020 because of COVID-19 provided an interesting case study to better understand college student struggle and how students overcome their struggle. Overall, we found ~66% of our students struggled during the transition and this struggle was ubiquitous across all measured demographic identities. Additionally, we found that student struggle did not change between introductory- or upper-level biology courses, however, students enrolled as biology majors experienced more struggle relative to non-majors, although this did not impact their ability to overcome their struggle. We found that the transitional class format, poor study habits, difficulties with instructors, shifting external pressures, and time management were the main reasons why students struggled during the transition to remote instruction. Fortunately, most of our struggling students (~84%) were able to overcome that struggle. Students reported that improved or altered study habits and improved self-confidence were the main reasons they were able to overcome the struggles. Students who could not overcome their struggles mostly attributed this to the abrupt transition to remote learning, while some also attributed struggle to poor study habits and their difficulties communicating and understanding the expectations of instructors. Students that did not struggle attributed their success to effective instructors and high self-confidence or belief in their abilities to navigate course content. In general, four main

TABLE 5 | Percentage of students that struggled (Struggle) but overcame their struggles (Overcame struggle), students did not struggle (No struggle), and students that could not overcome their struggles (Not overcome struggle).

No struggle	Struggle	Not overcome struggle	Overcame struggle
33.6% (80)	66.4% (158)	16.6% (25)	83.5% (132)

Parentheses indicate how many students were grouped into each subcategory.



attributes (instructors, study habits, self-confidence, and class format) explained most of the student struggles, or lack thereof, at our university during the transition to remote instruction. Thus, instructors directly and indirectly impact student persistence and ability to overcome struggles within the classroom through their ability to boost self-confidence and self-efficacy, provide organized and well-thought-out course formats, and their ability to instruct students on study habits best suited for their course.

Our data demonstrate that instructors play key roles in preventing students from struggling in the classroom. Several students ($n = 32$) reported an effective change in study habits and exam performance after directly seeking help from their instructors. During difficult times, such as the ongoing COVID-19 pandemic, it is especially important for instructors to not only support students who need help, but also to create a virtual course that sets students up for success (Camfield et al., 2021; Supriya et al., 2021). According to our survey results, effective professors also assisted their students by making the transition to online learning as seamless as possible, while ineffective instructors were cited as a reason that students could not overcome their struggle. For example, students cited effective instructors as those who provided structure, clearly communicated course expectations (especially with exam material), and were accessible and approachable during the transition, with a willingness to help students as best they could. On the other hand, students cited ineffective instructors as those that did not provide structure, did not clearly communicate expectations, and even drastically

altered the planned content and material. Several students also noted the increased workload during the transition to remote learning. Our results emphasize how essential it is for instructors to adjust their teaching style in a way that benefits students during this emergency transition, reinforcing the findings of many recent studies (Gillis and Krull, 2020; Kamble et al., 2021; Orlov et al., 2021; Tsang et al., 2021). Because instructors can be so influential, those that support their students as much as possible likely have positive influences on their students' success, while those who do not may contribute to their students' adversity (Gillis and Krull, 2020). A recent study highlighted how cognitive and social interventions contributed positively to student engagement, sense of belonging, and resilience during the transition to remote instruction, which positively improved student self-efficacy during remote instruction (Camfield et al., 2021). Instructors can ultimately function as a bridge or barrier for student success.

Our students indicated that efficiency of study habits and higher self-confidence played a large role in their successes in the classroom during the transition. Study habits were the main reason that students were able to overcome their struggles or not. Past studies support that it's not just the time that students devote to studying, but how they study that affects academic performance (Lammers et al., 2001), including parameters such as motivation and concentration (Nonis and Hudson, 2010). During COVID-19, students that were able to adjust their study habits and adjust to the new instruction methods were able to

maintain their academic performance (Limniou et al., 2021). However, students that struggled to adjust to learning style had reduced course performance and satisfaction in learning (Tsang et al., 2021). This ultimately leads to difficulty with development of effective study habits and assessment of their own learning (Bjork et al., 2013; Dunlosky et al., 2013). Because of this, instructors have been encouraged to include study strategies as part of their lessons (Hora and Oleson, 2017), to positively impact student study habits and learning outcomes (Brown-Kramer, 2020). A recent study demonstrated during the COVID-19 transition to online learning that instructor-student dialogue was a significant predictor of student initiative (i.e., motivation) which ultimately shaped student satisfaction with online learning (Tsang et al., 2021). Instructors play a critical role in encouraging students and demonstrating a positive-growth mindset, which constructively benefits student self-confidence, self-efficacy, and motivation (Zimmerman, 2000; Yeager and Dweck, 2012). Self-confidence can be linked to academic performance (Hansford and Hattie, 1982; Ugwuanyi et al., 2020) and can help reduce student anxiety and increase participation in class (Akbari and Sahibzada, 2020), which is vital during remote learning in a format that increased anxiety and separated students from each other and their classmates. Therefore, active instructor participation and explicit demonstration of best study habits is a necessary aspect during times with abrupt changes in class format/instruction.

Our results indicate that class format played the biggest role in students not being able to overcome their struggles. Nearly half of the students that could not overcome their struggles indicated that they could not adjust to the new class format. These results were not overly surprising, given the fact that our instructors and students were given little time or resources to make the transition from in-person classes to remote learning. Students were also forced to adjust to losses in routine, structure, peer interaction, and instructor interaction, as well as potential losses of on-campus housing, employment, etc. During the early part of the transition to online learning, student mental health declined rapidly; self-reported depressive and anxious symptomology among students increased, reducing motivation, and focus of students (Gillis and Krull, 2020; Grubic et al., 2020; Zhai and Du, 2020). When given the choice, most students prefer in-person course formats as opposed to remote learning (Driscoll et al., 2012), making the transition to online learning even harder and more likely to affect motivation to learn in an online learning environment (Gillis and Krull, 2020). The transition to online learning created additional challenges such as stable access to the internet, implementation of new software and online programs, limited technical support, and a lack of motivation and engagement in classes (Lederbogen et al., 2011; Gillis and Krull, 2020; Lederer et al., 2020; Son et al., 2020; Charles et al., 2021). These added challenges contributed to lower student retention, as seen in increased withdrawal rates or leaves of absence at schools nationally (Hope, 2021).

We did not find any significant relationship between student struggles in the classroom and the ability to overcome them across any student demographic groupings we compared. Regardless of race/ethnicity, gender, first-generation college

student status, transfer status and commuter status, 66% of our student population struggled and 85% of them were able to overcome those struggles equally. This was surprising, given the many recent reports of COVID-19 inequality being experienced on many college campuses (Gillis and Krull, 2020; Pellicano and Stears, 2020; Fisher and Ryan, 2021). Given the fact that COVID-19 has exacerbated social and economic disparities across the nation (Fortuna et al., 2020; Hooper et al., 2020; Millett et al., 2020; Panchal et al., 2020; Gemelas et al., 2021), we expected to see first-generation students and students from historically excluded racial/ethnic backgrounds to experience higher levels of struggle associated with external pressures (loss of income, increased family commitments, increased stress, work/life balance, etc.; Swail, 2003; Green and Wright, 2017; Li et al., 2020). However, several recent studies have demonstrated that student struggle and performance was more correlated with how instructors were choosing to teach online courses rather than who they were teaching in those courses (Forakis et al., 2020; Orlov et al., 2021; Supriya et al., 2021) which is in-line with our results. Interpreted a slightly different way, our results highlight that the abrupt transition to remote learning caused struggle for most students, regardless of their demographic background. As COVID-19 continues to spread in waves with subsequent mutations, we suggest instructors follow best practices for remote instruction (recently reviewed in Adedoyin and Soykan, 2020; Gillis and Krull, 2020).

Although we saw no differences in student struggle or their ability to overcome those struggles based on any student demographic variables, we found that students that were biology majors indicated higher struggle compared to students that were non-majors. It is worth noting, our non-majors pool of students includes students that are both fulfilling general education requirements in introductory courses as well as students that are enrolled in upper-level biology courses pursuing a minor. While the broadness of our open-ended questions may not have allowed us to understand the nuance of what biology students perceive as struggle compared to non-majors, recent investigations conducted on biology students reported many negative impacts on their learning, sense of community, and biology career preparation during the transition to remote learning in the Spring of 2020 (Driessen et al., 2020; Supriya et al., 2021). The loss of the formal and informal time spent with instructors and peers during a largely hands-on lab learning environments may contribute to negative impacts on student learning (Supriya et al., 2021), as well as loss in motivation and self-efficacy within biology students (Camfield et al., 2021). The reduction of self-efficacy during the transition to remote instruction may have led students to perceive higher struggle during courses that rely heavily on lecture delivery of information while simultaneously removing the opportunity of hands-on learning experiences within the laboratory (Camfield et al., 2021). However, the differences in perceived struggle among majors and non-majors within our study remain unknown.

Many undergraduate students encounter struggle as they navigate academic, financial, and social contexts of higher education. While much of this work has historically focused on student adjustment to starting college, there are many

lessons that can be applied to the ongoing COVID-19 pandemic. For instance, the ability of students to adjust and transition to a new learning environment is predictive of college grades and retention (Credé and Niehorster, 2012). Adjustment is driven by a multitude of factors that include individual traits (Aspinwall and Taylor, 1992; Trimble, 2019), social support (Schneider and Ward, 2003), students' relationship with their parents or guardians (Hickman and Andrews, 2003), demographic variables (McDonald and Vrana, 2007; Gray et al., 2013; Melendez, 2016), prior achievements (Adelman, 1996; Garavalia and Gredler, 2002), coping approaches (Matthews, 1998; Jantzer, 2006), and psychological independence. Once enrolled in college, instructors, along with other university agents like academic advisors, research mentors, and program heads, serve as critical social supports for students and can foster a strong sense of belonging, improve self-confidence and self-efficacy, and promote student growth and development. Our results highlight the direct and indirect role of instructors as focal points for student success while navigating the college experience. The importance of instructors to student success has been heightened during a global pandemic and the transition to remote learning environments.

Limitations

In conducting this research, we came across several limitations within the student sampling pool as well as within the sampling methods. While using an open answer format in the questionnaire allowed for a variety of student responses, it was difficult to gain insight on student experiences during the transition with students choosing not to answer the open-ended questions. It is also important to note that these are student perception surveys, meaning all the information we have of the student's struggles is from their perspective and lived experience. If a student cited an instructor as the reason they could not overcome struggle, we don't fully understand the reasoning behind this unless the student chose to divulge more information, nor do we have the experiences and perspectives of the instructors teaching these courses. Additionally, after binning student responses into not struggling, overcoming struggles, or not overcoming struggles, we asked an open-ended question why this is or is not an accurate description of their experience. However, if we asked why student struggled and how they were able to overcome those struggles may have provided us with more straightforward student responses. Furthermore, being a smaller institution that has a predominantly White and female student body, we may not have collected a large enough sample size of students from diverse gender, racial and ethnic backgrounds, and lived experiences to distinguish differences among our students.

Future Directions

Given the resurgence of COVID-19 across the United States with the rapidly spreading Delta and Omicron variants and other potential variants to come, universities may again be forced to transition to online learning. Thus, it is critical to understand the drivers of student struggles, persistence, and ability to overcome struggles during the transition between in-person and online course environments. We advocate for instructors facing a

transition to remote learning to familiarize themselves with best practices in teaching online (Bailey and Card, 2009; Price et al., 2016; Woodley et al., 2017; Adedoyin and Soykan, 2020; Gillis and Krull, 2020; Westwick and Morreale, 2021). We also recommend that instructors conduct surveys at the start of the semester to understand differences in success and engagement between the two class formats and to address concerns or questions about a potential transition. These surveys can also be used to determine what resources students need to succeed in both in-person or online formats, informing the instructor about what additional resources need to be made available. We have learned a tremendous amount about what works and what doesn't during the transition to remote learning; given the reality of facing another spike in COVID-19 cases, instructors should put this gained knowledge into practice during future transitions.

DATA AVAILABILITY STATEMENT

The datasets and R scripts generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the University of South Alabama IRB, # 1544421-1. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

JH conceived of the idea and put together the questionnaire. JH and MN organized questionnaire and data. RC and LC coded student response data. JH, RC, and LC conducted the statistical analysis. RC and LC coordinated the first draft with writing input by KC, BM, and MN. All authors contributed to the editing of the subsequent drafts of the manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2022.841060/full#supplementary-material>

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