College Students' Belonging and Loneliness in the Context of Remote Online Classes during the COVID-19 Pandemic

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Abstract
The COVID-19 pandemic has drastically affected how higher education operates, but relatively little is known about its effects on students enrolled in remote online classes. Across two data collection timepoints, we sought to examine college students' experiences, focusing particularly on their sense of belonging/loneliness, their course formats, and their experiences in the pandemic. Though some findings differed between data collected in fall 2020 and in spring 2021, we generally found that students' belonging/loneliness was linked with their class format, aspects of their virtual classes, social contact, and experiences in the pandemic. This research demonstrates the importance both of understanding students' experiences in general and of continuing to study students' experiences as we progress from one stage of the pandemic to the next.

Keywords: belonging, loneliness, online classes, COVID-19, college students

The COVID-19 pandemic has significantly disrupted higher education. In March 2020, many professors and students around the U.S. and the world were forced to switch to remote online teaching and learning with little time to prepare. By fall 2020, many universities were still operating classes remotely (Chronicle of Higher Education, 2020). Although faculty had more time over the summer to plan for their fall 2020 courses, aspects of both fall 2020 and spring 2021 remote online courses were still new to faculty and students alike, including whether courses were offered synchronously (with virtual meetings via videoconference) or asynchronously (with no virtual meetings). However, we know little about the impact of these types of online courses on students' sense of belonging and loneliness. In fact, although much research has begun investigating the effects of the ongoing COVID-19 pandemic, relatively little examines the context of college students' emotional and social experiences. In particular, the unique isolation brought on by the pandemic may have affected students' ability to form connections with their classmates and professors. Therefore, in a study conducted during fall 2020 and spring 2021 at a regional comprehensive public university in the Northeast United States, we aimed to examine college students' belonging and loneliness during remote online classes in the pandemic.

Literature Review

College Students' Belongingness and Loneliness

The need to belong is a powerful primary human motive, as identified by Baumeister and Leary (1995). This need fuels our drive to form and maintain close relationships with other people and helps explain why we form social bonds with others quickly and easily. We feel happy when we form new social bonds or when we bolster existing relationships, but when our need to belong is unfulfilled, we risk negative mental and physical health outcomes, including depression, loneliness, and worse immune functioning.

The need to belong significantly impacts college students' academic and mental health outcomes. Students who perceive acceptance from peers report greater belongingness to their academic institution (Freeman et al., 2007). Freeman and colleagues (2007) found student participation and peer classroom interaction were the most significant factors fostering students' sense of belonging, while other research identifies additional relevant factors such as college grades, social integration on campus, and participation in high-impact practices (Ribera et al., 2017). Students who perceive belongingness exhibit greater motivation and confidence that they can succeed academically (Freeman et al., 2007; Zumbrunn et al., 2014). Further, students who feel they belong in each course tend to have higher final grades in that course (Yust et al., 2021). Conversely, college students who experience threats to belongingness resulting from interpersonal stress or low social support face worse mental health outcomes (Hunt & Eisenberg, 2010).

Importantly, instructors play a role in students' sense of belonging. For example, tutors in online classes can facilitate students' sense of belonging through establishing trust, providing meaningful learning experiences, and encouraging reflection (Peacock & Cowan, 2019). Qualitative research shows that K–12 educators can foster belonging through demonstrating authentic care for their students (Miller, 2021). In fact, a recent meta-analysis found that teacher support was one of the strongest predictors of sense of belonging among students (Allen et al., 2018).

While students who perceive belongingness to their college community benefit psychologically from social and institutional support, students who experience threats to

belongingness may lack these protective factors. College students who lack social connections with peers do report more depressive symptoms and greater suicidal ideation (Ploskonka & Servaty-Seib, 2015). Suicidal ideation among college students correlates with decreased perceived belonging to the campus community (Van Orden et al., 2008). Interestingly, college students' sense of familial belonging significantly mitigates suicidal ideation, suggesting that college students benefit from the support of family members and are buffered from threats to their sense of college belonging (Ploskonka & Servaty-Seib, 2015). Thus, establishing a sense of belonging is important to college students' mental health and their academic pursuits.

Like lack of belonging, loneliness can be particularly detrimental to college students' success. Marangoni and Ickes (1989) define loneliness as subjective and aversive, typically resulting from relationship deficits. Importantly, a distinction must be made between loneliness and aloneness, as loneliness does not require physical aloneness and the number of relationships actively maintained is of little importance (McWhirter, 1990); however, Weiss (1984) found that loneliness is often a consequence of relationship disturbances. As humans are social creatures, prolonged feelings of loneliness can have severe implications. If unaddressed, loneliness can greatly impact physical health, mental health, and cognitive functioning (Hawkley & Cacioppo, 2010).

Loneliness is closely related to perceptions of social support. People who perceive high social support believe they are loved, thought highly of, and belong to a social network (Cobb, 1976), which protects them against life adversity (Lee & Goldstein, 2015). Loneliness is linked with dissatisfaction with social support (Jones & Moore, 1987). Even further, individuals with more social support report lower levels of loneliness, therefore increasing quality of life (Gan et al., 2020) whereas those with low social support are more likely to also experience low self-esteem and low quality of life (Kong & You, 2011). Similarly, Mellor and colleagues (2008) found a link between the need to belong and satisfaction with personal relationships, with low satisfaction around personal relationships predicting higher levels of loneliness.

Mental health issues and loneliness are not uncommon in college. Interestingly, research has found that young men are most vulnerable to feelings of loneliness (Barreto et al., 2020). Good social support from friends has been identified as a protective factor (Gierveld, 1998; Lee & Goldstein, 2016). For example, shy college students with high-quality friendships are less lonely than shy students with low-quality friendships (Shell & Absher, 2019). Further, Samuolis and Griffin (2014) found students struggling with their identities, specifically in the areas of friendship, long-term goals, and career choice, are particularly lonely. In fact, both loneliness and lack of belonging are associated with poorer self-rated mental health (Jones & Schreier, 2021).

Thus, both lack of belonging and loneliness are potential threats to college students' mental health and college success. Both are likely to be affected not only by disruptive events like the COVID-19 pandemic, but also by disruptions to their education like the shift to remote online learning. Because both belonging and loneliness are crucially linked with social support and relationships with others, examining the relationships formed within college classes is also critical.

Peer Relationships in Classroom Contexts

Past research on loneliness has focused more on romantic loneliness than family and social loneliness (Bernardon et al., 2011), which neglects the importance of peer relationships. However, recent work shows that friendship can be more important than family or romantic relationships, as support from friends has a larger effect on perceived stress and loneliness (Lee & Goldstein, 2015). These inconsistencies in the literature can be explained not only by time but

also focus. Young adults' social bonds with friends are particularly important, as being able to form and maintain good peer relationships has a positive long-term impact on loneliness and mental health (DiTommaso & Spinner, 1997; Schwartz-Mette et al., 2020).

However, peer relationships are not always a focus in college classrooms. This lack of interaction can be detrimental when it prevents students from creating social bonds. Students who have more opportunities to interact and share ideas with their classmates feel supported by their peers and feel a greater sense of belonging within the classroom and the university (Gosnell, 2019). Similarly, other research shows that students with stronger peer relationships feel more connected with their classmates (Sollitto et al., 2013). In fact, peer-to-peer interactions are crucial for increasing students' belongingness, which facilitates positive outcomes (Sandstrom & Rawn, 2015).

What, if anything, can be done about the lack of belonging experienced by some students in college? Consider the literature on underrepresented minority and first-generation students, who experience lower belongingness compared to White students who are not first-generation (Fink et al., 2020; Gopolan & Brady, 2019). Minor interventions, such as daily journaling about one's experience in the classroom, can mitigate some of that deficit (Borman et al., 2019; Walton & Cohen 2007). Additionally, interventions that focus on improving peer-to-peer engagement within the classroom enhance school belongingness and life satisfaction (Dunleavy & Burke, 2019).

Little research has examined the impact of classroom peer relationships on belongingness. This is further complicated by the lack of research on the differences in belonging when comparing asynchronous, synchronous, and in-person learning. The pandemic has forced the majority of students at all levels into an online environment that they did not sign up for and were likely not prepared for.

In-Person vs. Online Classes

Research examining the differences between in-person and online classes, typically focusing on retention and success, has been mixed. For example, students taking online courses earn only slightly lower grades than students taking in-person courses (Fisher et al., 2020). On the other hand, students taking online courses earn a higher percentage of "A" grades but are also less likely to complete the course, compared to students taking in-person courses (Atchley et al., 2013). However, meta-analyses tend to produce overall effects close to zero (e.g., Bernard et al., 2004), suggesting that this general link is likely moderated by a variety of factors.

One such factor that may be particularly important is the frequency and quality of social interactions. Education researchers and teachers have long known that student interactions with their professor, their classmates, and the course content all facilitate learning (Anderson & Garrison, 1998). However, students taking online classes often feel disconnected from their peers; thus, opportunities for interaction with classmates via discussion boards and connection with professors and teaching assistants via tutorials are particularly helpful (Farrell & Brunton, 2020; Swan, 2002). Further, Jaggars & Xu (2016) found that rather than course organization or use of learning technologies, only interpersonal interaction with the course instructor predicts students' grades in traditional asynchronous online courses.

Notably, most existing research on online courses focuses on the traditional fully asynchronous model. During COVID-19, many professors shifted to a synchronous online format involving virtual meetings with students over videoconferencing platforms. Some existing research does examine students' experiences in synchronous online classes. For

example, Skylar (2009) found that synchronous online classes can simulate in-person classes, and McBrien and colleagues (2009) found that synchronous virtual classes offer important opportunities for interactions with professors and classmates. Attending more synchronous virtual classes as well as watching more recorded synchronous classes predicts students' final grades in a synchronous online class (Nieuwoudt, 2020). Students appreciate seeing their professors virtually and tend to think that synchronous classes are engaging (Chen et al., 2020). Additionally, Wang and Wang (2020) found that pre-service science teachers who learned with either in-person interaction or synchronous online interaction outperformed others who had either asynchronous interaction or no interaction at all during their courses. Further, synchronous discussions tend to produce better academic and social outcomes for students than asynchronous discussions (Peterson et al., 2018).

Thus, there are likely important differences between the experiences of taking fully asynchronous online classes vs. synchronous remote classes during the pandemic. It seems likely that remote online classes, particularly fully asynchronous classes, do not offer as many opportunities for students to develop bonds with their classmates and professors as in-person classes; thus, students may feel disconnected from their peers, professors, and their college. Indeed, past research has found that interaction, engagement, support, and general sense of community are crucial for online students' belonging and success (Peacock et al., 2020; Rovai, 2002; Shea et al., 2005). However, no existing research assesses whether participating in synchronous courses improves students' sense of belonging and decreases their loneliness, let alone what the effects of remote class format are during a global pandemic.

The COVID-19 Pandemic

Research examining the mental, emotional, and social impacts of the pandemic, along with its health effects, is already well underway. Several studies have found links between the COVID-19 pandemic and various mental health effects. In response to the coronavirus lockdown, researchers noted increased loneliness, depression, anxiety, and substance abuse (Labrague et al., 2021; Lee et al., 2020; Horigian et al., 2020). Loneliness has links to other mental health consequences of COVID-19 as well; for example, Arslan and colleagues (2020) found that anxiety about the coronavirus was correlated with loneliness. In a similar study, researchers found a link between greater coronavirus anxiety and lower college belongingness (Arslan et al., 2021). Overall, compared to 2018, the prevalence of mental distress among adults in the United States increased in 2020 (Twenge & Joiner, 2020).

Although the pandemic has affected all people across the world, it has had a particular impact on college students. Most of the changes that college students have reported experiencing are unfavorable (Lukács, 2021). For example, students have reported a lack of companionship, loneliness, and isolation as factors in their current causes of distress during the pandemic (Tasso et al., 2021). We have seen that relationships are critical to college students; in fact, college students have felt more worried and stressed over how COVID-19 would impact the health of their families and American society, compared to worry for themselves (Cohen et al., 2020).

The effects of the pandemic on college students stretch into classroom settings. Students have reported mental health issues and academic frustrations during COVID-19, including increased stress from the switch to remote learning and increased workload (Tasso et al., 2021). The intent of introducing remote learning was to mitigate the negative consequences of missing school. However, students whose classes transitioned online during spring 2020 reported decreases in course quality, including their enjoyment, interest, learning, attention, and effort in

those courses (Garris & Fleck, 2020). Despite this, some college students believe emergency remote learning due to COVID-19 has certain advantages over a regular classroom format, yet there are many areas in which they feel it can improve (Shim & Lee, 2020). There is much room for empirical investigations of remote online learning in the pandemic.

The Current Research

The purpose of the current research was to assess college students' experiences of belonging and loneliness in remote online classes during the COVID-19 pandemic. We were particularly interested in whether students' feelings of belongingness, loneliness, and connection with classmates and professors differed between students taking mostly synchronous classes and those taking mostly asynchronous classes, as well as what other variables may have impacted students' belonging and loneliness. We collected data to assess these questions during the fall 2020 semester and the spring 2021 semester.

Importantly, both semesters at the authors' and participants' institution consisted of majority remote online classes, where faculty made their own decisions about whether to offer courses synchronously vs. asynchronously. Students at this institution registered for fall 2020 courses during spring 2020, when all courses were listed with meeting times; two months before fall 2020 began, faculty were informed that classes would be offered remotely and allowed to decide in what format to offer their courses. Because students did not know until the beginning of the semester what format their courses would be offered in, they had little opportunity to choose their preferred format. In contrast, all spring 2021 courses were listed as either synchronous or asynchronous according to professors' preferences at the time when students registered; thus, students had more choice in their ability to select preferred learning formats during spring 2021. Therefore, by comparing data from both semesters with each other, we were able to test whether our findings still hold when students are in more control of what course formats they register for.

Method

Participants

We recruited participants for this study via the university's PSYC 100 participant pool through SONA during the fall 2020 and spring 2021 semesters.

Fall 2020 Sample

After deleting 14 duplicate responses and 11 incomplete responses from the data, the final sample size for fall 2020 was 160 participants. Our participants mostly identified as female (64%), with 35% identifying as male and 1% not disclosing their gender identities. The ages of our participants ranged from 18 to 36 ($M_{age} = 19.67$, $SD = 2.18$). The majority of our participants identified as Caucasian/White (78%), with 10% identifying as multiracial, 6% identifying as African American/Black, 2.5% identifying as Hispanic/Latino, 2% identifying as Asian/Asian American, and 1% self-identifying as Middle Eastern.

Spring 2021 Sample

After deleting 1 duplicate response and 1 incomplete response, the final sample size for spring 2021 was 188 participants. Our participants mostly identified as female (59%), with 40% identifying as male, 0.5% (1 person) identifying as non-binary and 0.5% (1 person) identifying as genderqueer. The ages of our participants ranged from 18 to 58 ($M_{age} = 20.56$, $SD = 5.04$). The majority of our participants identified as Caucasian/White (70%), with 14% identifying as African American/Black, 8% identifying as multiracial, 6% identifying as Hispanic/Latino, and 2% identifying as Asian/Asian American.

Materials & Procedure

       This study was reviewed and approved by the IRB before data collection. Participants first completed a digital informed consent form and then began the study, which included questions about students' academic backgrounds (current year in school, transfer student status, first-generation vs. continuing-generation student status), current work and family responsibilities (including living situation and time spent with family and friends), perceptions of online classes (including previous experience with online courses and general liking of online courses), characteristics of their current classes (synchronous vs. asynchronous vs. in-person format, involvement in experiential courses, frequency of student-professor interactions, frequency of student-student interactions), and plans for registration for the following semester (intention to register in more synchronous classes vs. more asynchronous classes). In the spring 2021 data collection, we also included measures of participants' experiences in their fall 2020 classes, mismatch in preferred course format (i.e., whether their remote synchronous vs. asynchronous classes this semester matched their preferred course content), and preference for online classes post-pandemic. For descriptive statistics of these collected variables, see the Supplemental Materials. Participants next completed measures of sense of belongingness, loneliness, and reactions to the COVID-19 pandemic. Lastly, participants completed demographic questions. At the end of all survey questions, participants were debriefed and thanked for their participation in the study.

Sense of Belongingness

       We measured participants' belonging at the institution with the Student Belongingness, Engagement, and Self-Confidence Survey (Yorke, 2016). This scale contains 16 items, each on a 5-point scale from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). We revised some items to specifically name the current institution and some wording to reflect typical American English language (e.g., changing "programme" to "classes"); however, we did not need to modify the scale to reflect online learning as the items are more general in nature rather than tied to in-person learning (see example items below). The scale contains three subscales: student engagement (6 items, sample item: "I am motivated towards my studies", $\alpha_{Fall2020} = .77$, $\alpha_{Spring2021} = .77$); sense of belongingness (6 items, sample item: "I feel at home at [university name]", $\alpha_{Fall2020} = .73$, $\alpha_{Spring2021} = .80$); and self-confidence in academic pursuits (4 items, sample item: "I'm confident of completing my classes successfully", $\alpha_{Fall2020} = .63$, $\alpha_{Spring2021} = .71$).

Loneliness

       We measured participants' feelings of loneliness with the UCLA Loneliness Scale (Russell et al., 1978); although originally developed many decades ago, this is still a commonly used scale to assess loneliness. This scale consists of 20 items, each on a 4-point scale from 1 ("*I never feel this way*") to 4 ("*I often feel this way*"). Example items are "I feel isolated from others" and "I am unhappy doing so many things alone". We summed all 20 items to create a loneliness score ($\alpha_{Fall2020} = .97$, $\alpha_{Spring2021} = .96$).

COVID-19 Experiences

       We included 9 items from a longer questionnaire developed by Conway and colleagues (2020) to measure participants' general experiences in the COVID-19 pandemic, nonspecific to college or online learning. These nine items assessed negative financial impact, job-related

income loss, difficulty acquiring resources, difficulty getting necessities, depression due to COVID-19, negative impact on mental health, feeling threatened, fear of the virus, and stress around other people, all rated on a scale from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). Because we selectively chose items from the full scale, we assessed items separately rather than creating a sum score.

Results

Belonging, Loneliness, and Remote Class Format

Table 1 presents the correlations between the belonging, loneliness, and class format variables of interest. Note that correlations for the fall 2020 data collection are reported above the diagonal, whereas correlations for the spring 2021 data collection are reported below the diagonal.

Table 1
Correlations Between Belonging, Loneliness, and Class Format

	1	2	3	4	5	6	7	8	9	10
1. Belonging		.56**	.38**	-.48**	-.20*	.03	-.16*	.21**	.09	-.03
2. Engagement	.53**		.43**	-.39**	.15+	.09	-.07	.20*	.08	.02
3. Self-Confidence	.29**	.48**		-.33*	-.19*	.02	-.001	.33**	.11	-.05
4. Loneliness	-.27**	-.10	-.33*		.17*	-.04	-.06	-.12	-.06	-.02
5. More sync classes	.02	.10	.02	-.09		-.22*	.03	-.15+	-.33**	.34**
6. More async classes	-.13+	-.08	-.03	-.09	-.002		.03	.03	.07	-.13
7. Previous online classes	.05	.22**	.24**	-.01	-.14+	.05		.05	-.04	-.01
8. Liking online classes	.16*	.43**	.38**	-.12+	-.04	-.02	.20**		.43**	-.31**
9. Plan to register more async	-.05	.04	.10	-.08	-.30**	.08	.06	.33**		-.79**
10. Plan to register more sync	.13+	.08	-.10	.07	.33**	-.18*	-.05	-.18*	-.67**	
11. Post-COVID online async	-.08	.13+	.25**	-.08	-.25**	.03	.14*	.57**	.53**	-.45**

Note. Number 11 was measured only in spring 2021. **p ≤ .01; *p ≤ .05; +*p* ≤ .10

Contrary to our predictions, belonging was negatively correlated with taking more synchronous classes in fall 2020 but unrelated in spring 2021, and belonging was unrelated to taking more asynchronous classes in fall 2020 but marginally negatively correlated in spring 2021. Taking more synchronous classes was also positively correlated with loneliness, negatively correlated with self-confidence, and marginally negatively correlated with engagement in fall 2020, but unrelated to all these variables in spring 2021. This difference

between semesters likely implies that either students' ability to choose their course formats and/or their experience with remote learning are particularly important.

We added an item in spring 2021 designed to assess students' sense of match or mismatch about their current course formats and what they would have preferred. We used independent samples *t*-tests to assess whether match/mismatch mattered for belonging, engagement, self-confidence, or loneliness; no tests were significant (for all $p > .17$). This variable likely would have mattered more in the previous semester when students were not able to choose their course formats.

Work and Family Commitments

Working more hours was not correlated with engagement, self-confidence, loneliness, taking more synchronous or asynchronous classes, previous experience with online classes, or liking of online classes in either data collection timepoint (for all $p > .12$). However, working more hours was correlated with planning to register for more asynchronous classes the next semester in both the fall 2020 data ($r = .17$, $p = .04$) and the spring 2021 data ($r = .15$, $p = .04$), planning to register for fewer synchronous classes the next semester in both the fall 2020 data ($r = -.16$, $p = .05$) and the spring 2021 data ($r = -.24$, $p = .001$), and positively correlated with wanting to take more asynchronous classes post-COVID in the spring 2021 data ($r = .15$, $p = .04$). Further, although working more hours was not correlated with belonging in the fall 2020 data, these variables were marginally negatively correlated in the spring 2021 data ($r = -.13$, $p = .07$).

Spending more time on family obligations was also not correlated with belonging, self-confidence, taking more synchronous classes, previous experience with online classes, or plans to register for more synchronous or asynchronous classes the following semester in either data collection timepoint (for all $p > .27$). However, although uncorrelated in the spring 2021 data, increased family obligations were positively correlated in the fall 2020 data with engagement ($r = .22$, $p = .01$), marginally less loneliness ($r = -.16$, $p = .053$), and marginally more current asynchronous classes ($r = .15$, $p = .06$). Although uncorrelated in the fall 2020 data, increased family obligations were marginally negatively correlated with liking of online classes in the spring 2021 data ($r = -.13$, $p = .09$).

First-Generation, Transfer, and First-Semester Students

There was no difference in belonging between first-generation and continuing-generation students in either the fall 2020 data, $t(157) = -.62$, $p = .54$, or the spring 2021 data, $t(184) = .54$, $p = .59$. Interestingly, in the fall 2020 data, transfer students felt marginally more belonging at the university ($M = 22.83$, $SD = 3.79$) than non-transfer students ($M = 21.37$, $SD = 3.78$), $t(157) = 1.88$, $p = .06$, 95% CI [-.07, 2.99], $d = .39$; this finding was not replicated in the spring 2021 data, $t(186) = -1.45$, $p = .15$. Furthermore, there was no difference in belonging when comparing students who were in their first semester at the university, had begun the semester previously during the shift to online learning, or who had been at the university longer than that, in either the fall 2020 data, $F(2, 156) = .32$, $p = .72$, or the spring 2021 data, $F(2, 185) = .28$, $p = .76$.

There was also no difference in loneliness between first-generation and continuing-generation students in the either the fall 2020 data, $t(155) = -.22$, $p = .83$, or the spring 2021 data, $t(182) = .22$, $p = .82$. In spring 2021, transfer students did feel more lonely ($M = 45.91$, $SD = 16.09$) than non-transfer students ($M = 40.10$, $SD = 14.74$), $t(184) = 2.07$, $p = .04$, 95% CI [.26, 11.37], $d = .39$, but there was no difference in fall 2020, $t(155) = -.56$, $p = .57$. There was again

no difference in loneliness when comparing students who were in their first semester at the university, had begun the semester previously during the shift to online learning, or who had been at the university longer than that, in either fall 2020, $F(2, 154) = .44$, $p = .64$, or spring 2021, $F(2, 183) = .09$, $p = .92$.

Social Contact and Living Situation

We measured variables related to social contact and living situation only in spring 2021. Living situation did significantly impact belonging, $F(4, 183) = 3.13$, $p = .01$, $\eta^2 = .07$. Specifically, students living with their partner/significant other ($M = 15.33$, $SD = 8.02$) felt significantly less belonging than students living with one or more roommates ($M = 23.00$, $SD = 4.39$) or students who chose the "other" option (e.g., living with a friend's family; $M = 25.11$, $SD = 3.14$), and felt marginally less belonging than students living with their family ($M = 22.03$, $SD = 4.46$). However, these findings should be interpreted very cautiously due to the extremely low sample size of participants who reported living with their partner/significant other ($n = 3$). Notably, living situation did not impact loneliness, $F(4, 181) = .21$, $p = .31$.

People who reported spending less time with family than before the pandemic also reported lower self-confidence ($r = -.15$, $p = .04$), more loneliness ($r = .29$, $p < .001$), taking marginally more synchronous classes ($r = -.14$, $p = .06$), working more hours ($r = .17$, $p = .02$), and spending less time with friends than before the pandemic ($r = .56$, $p < .001$).

People who reported spending less time friends than before the pandemic also reported more loneliness ($r = .39$, $p < .001$), taking fewer asynchronous courses ($r = -.20$, $p = .007$) and more synchronous courses ($r = .18$, $p = .01$), planning to take marginally fewer asynchronous courses the following semester ($r = -.14$, $p = .06$), and working more hours ($r = .16$, $p = .03$).

Experiences in the COVID-19 Pandemic

Correlations between the nine COVID experiences items and our measures of belonging and loneliness are presented in Table 2.

Table 2

Correlations Between Belonging, Loneliness, and COVID-19 Experiences

COVID-19 experiences items	Belonging		Engagement		Self-Confidence		Loneliness	
	F20	S21	F20	S21	F20	S21	F20	S21
1. The Coronavirus (COVID-19) has impacted me negatively from a financial point of view.	-.24**	-.10	-.14+	.00	-.33**	-.17*	.43**	.26**
2. I have lost job-related income due to COVID-19.	-.12	-.08	-.03	-.01	-.18*	-.15*	.14+	.20**
3. I have had a hard time getting needed resources (food, toilet paper) due to COVID-19.	-.25**	-.16**	-.11	-.04	-.20*	-.20**	.26**	.23**
4. It has been difficult for me to get the things I need due to COVID-19.	-.26**	-.14*	-.19*	-.08	-.33**	-.17*	.16*	.24*
5. I have become depressed because of COVID-19.	-.31**	-.12+	-.34**	-.03	-.32**	-.33**	.59**	.59**

6. The COVID-19 outbreak has impacted my psychological health negatively.	-.21**	-.19*	-.29**	-.02	-.27**	-.28**	.56**	.57**
7. Thinking about COVID-19 makes me feel threatened.	-.25**	-.19**	-.09	.02	-.26**	-.28**	.40**	.42**
8. I am afraid of COVID-19.	-.09	-.001	.06	.21**	-.17*	-.09	.18*	.29*
9. I am stressed around other people because I worry I'll catch COVID-19.	.08	.01	.14+	.17*	-.16*	-.03	.21*	.23*

*Note.* **$p \leq .01$; *$p \leq .05$; +$p \leq .10$

As expected, students who reported being more negatively affected by the COVID-19 pandemic in a variety of ways also generally experienced lower belongingness, engagement, and self-confidence, as well as more loneliness. Particularly notable are the strong correlations between items 5 and 6 with loneliness, indicating that increased loneliness is linked with increased effects of the pandemic on mental health.

Intriguingly, additional analyses revealed that in the fall 2020 data collection, the sixth COVID item ("The COVID-19 outbreak has impacted my psychological health negatively") was also positively correlated with taking more synchronous classes ($r = .22$, $p = .007$), but uncorrelated with taking more asynchronous classes ($r = -.06$, $p = .44$), much like belongingness. Although we cannot determine causality from this correlational data, it is possible that the students taking synchronous classes felt particularly isolated and negatively affected by the pandemic because synchronous classes are so different from traditional in-person classes; in other words, perhaps the surprising link between taking more synchronous classes and feeling less belonging and more loneliness in fall 2020 is explained by COVID distress.

To test this post-hoc hypothesis, we first ran partial correlations between taking more synchronous classes and both loneliness and belonging, controlling for the sixth COVID item. The partial correlation for loneliness disappeared ($pr = .06$, $p = .46$), indicating that the bivariate correlation between taking more synchronous classes and loneliness only exists because COVID distress is correlated with both. However, the partial correlation for belonging was weakened but remained marginally significant ($pr = -.16$, $p = .051$), indicating that this bivariate correlation is not fully eliminated by controlling for COVID distress.

However, perhaps COVID distress helps explain why the correlation between taking more synchronous classes and belongingness exists. We ran a mediation model to test this possibility using PROCESS (Hayes, 2012) and bootstrapping methods with 5,000 resamples (Preacher & Hayes, 2008). Our results showed that the tendency for people taking more synchronous classes to feel less belonging was statistically mediated by their higher pandemic-related mental health distress, indirect effect $b = -.11$, BootSE = .07, 95% BootCI [-.2776, -.0020].

Figure 1
*COVID Distress Mediates the Link Between Taking More Synchronous Classes and Lower
Belongingness*

Direct Effect, b = -.44, BootSE = .22, $t(155)$ = -1.97, p = .05

Indirect Effect, b = -.11, BootSE = .07, 95% BootCI [-.2776, -.0020]
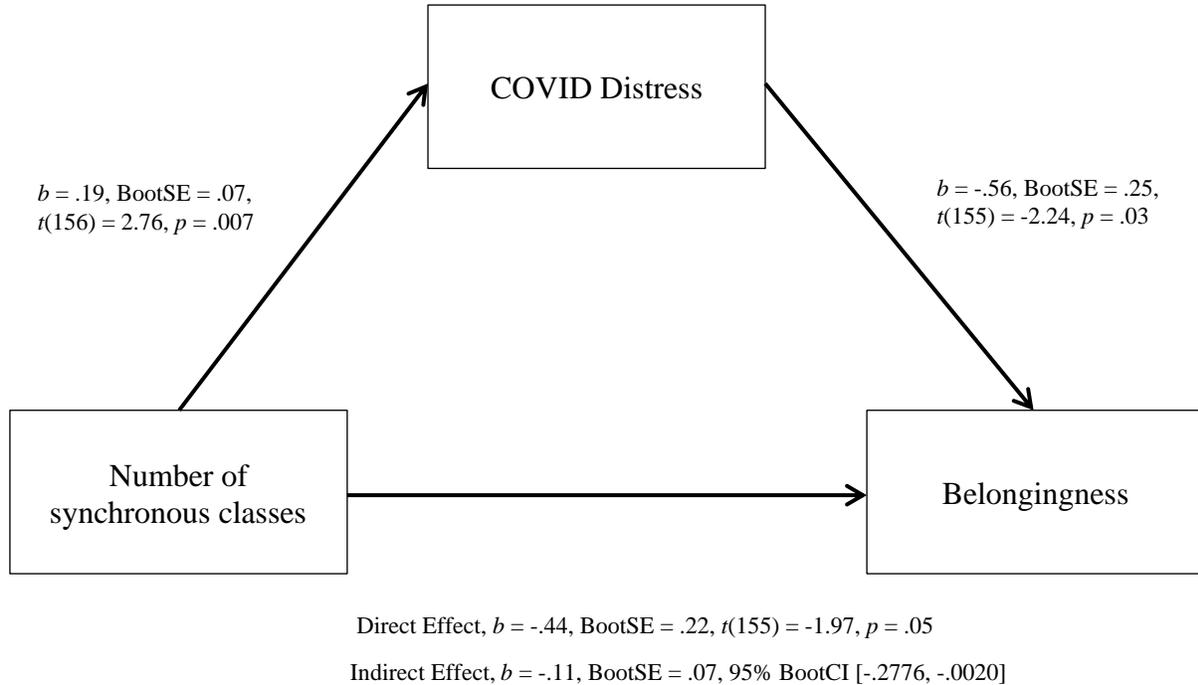
Importantly, we could not replicate these post-hoc analyses using the spring 2021 data, as belongingness was not correlated with taking more synchronous classes at that timepoint. Thus, although these findings are intriguing, they seem to be limited to fall 2020 alone.

Experiences in Remote Online Classes
We included several items regarding students' experiences in their remote online classes in spring 2021 that were not measured in fall 2020. Correlations between belonging, engagement, self-confidence, loneliness, and all 15 of our self-created experiences in online classes items are shown in Table 3.

Table 3
Correlations Between Belonging, Loneliness, and Experiences in Online Classes

Experiences in online classes items	Belonging	Engagement	Self-Confidence	Loneliness
1. In virtual class meetings, I have my camera on most of the time.	.28**	.24*	.15*	-.11
2. In virtual class meetings, other students have their cameras on most of the time.	.18*	.03	.03	-.08
3. I participate in class regularly.	.32**	.45**	.15*	-.01
4. I interact with my classmates regularly.	.23**	.28**	.15*	-.04

5. I interact with my professors regularly.	.36**	.42**	.18*	-.10
6. My professor(s) are friendly and approachable.	.35**	.22**	.27**	-.26**
7. I feel like my professor(s) care about whether I succeed in class.	.44**	.39**	.41**	-.26**
8. My professor(s) are comfortable using the videoconferencing platform (e.g., Zoom).	.32**	29**	.25**	-.17*
9. I take advantage of one-on-one meetings with my professor(s).	.23**	.32**	-.003	-.06
10. I feel like I learn more in classes with virtual meetings than classes without them.	.30**	.33**	.18*	-.04
11. I like having the routine of attending class meetings.	.40**	.40**	.14+	-.06
12. I appreciate the feeling of connection I get from having virtual class meetings.	.44**	.40**	.20**	-.14+
13. I had a pre-existing friendship with at least one of the other students in my classes.	.18*	.12	.04	-.14+
14. I have developed a friendship with at least one of the other students in my classes.	.18*	.19*	-.02	-.06
15. I miss taking in-person classes.	-.03	-.16*	-.18*	.12

Note. **$p \leq .01$; *$p \leq .05$; +$p \leq .10$

Belongingness was correlated with nearly all items, including participation in classes, interactions with professors, and interactions with classmates. Interestingly, a Hotelling's *t*-test showed that belongingness was significantly more strongly correlated with professor interaction (item 5) than student interaction (item 4), $t(184) = -2.09$, $p = .04$. Thus, although interacting with peers in remote online classes matters, it seems that interacting with professors matters more for belonging.

Similarly, engagement and self-confidence were positively correlated with many items. On the other hand, loneliness exhibited far fewer significant correlations with these variables. Loneliness was associated with perceiving that professors were less friendly, cared less about the student's success, and were less comfortable using videoconferencing technology. Loneliness was also marginally negatively correlated with appreciating the sense of connection in virtual classes and having a pre-existing friendship in a class. The direction of causality is unclear here based on this data; we do not know whether loneliness produces these perceptions, or whether feeling uncared for etc. contributes to greater loneliness.

Discussion

Across two data collection timepoints in fall 2020 and spring 2021, we found many correlates of students' experiences in remote online courses during the COVID-19 pandemic. Importantly, we were able to compare students' perceptions during a pandemic semester in which they did not have control over their course formats compared to a semester in which they did. Our findings have several important implications.

Belonging, Loneliness, and Remote Class Format

Among our results was the finding that the link between class format and students' belonging/loneliness differed depending on the semester. Although unexpected, perhaps the context of the two data collection timepoints can help explain these findings. When students at this university registered for fall 2020 classes, all classes were listed with days and times, as the university administration was hopeful for a return to in-person classes after the disruption of the spring 2020 semester. About two months before fall 2020 began, faculty were informed that courses would be conducted remotely and were offered the choice to conduct their courses asynchronously or synchronously, but information regarding the updated format of the classes was not conveyed to students. Thus, although students knew the courses would be conducted remotely before the semester began, they did not know whether the courses they had registered for would have virtual meetings or be fully asynchronous. It is possible that this lack of choice contributed to these surprising findings. Perhaps students in more synchronous classes felt less belonging and more loneliness because class meetings held via Zoom are quite different to class meetings held in person. For example, peer-to-peer interactions are much more difficult to successfully facilitate in Zoom vs. in-person, particularly if the professor is not comfortable using the intricacies of the videoconference software (e.g., breakout rooms and the chat function). Further, although faculty members had two months before the semester to convert their courses to their chosen format, faculty at this university have a 4/4 teaching load; perhaps faculty members were overburdened during the fall 2020 semester and did not have as much time to facilitate relationships with students in remote online classes as compared to regular in-person classes.

However, we did not replicate this finding in the spring 2021 data. There are many possible reasons why this was the case. First, the context of registration was very different, as students in the spring 2021 data collection had known the format of their classes (synchronous vs. asynchronous) before registering. Perhaps that aspect of choice and expectation produced these different results. Further, spring 2021 participants had been through more of the pandemic than fall 2020 participants, due to the effects of time. Over the course of spring 2021, COVID-19 vaccines were being approved and distributed, which may also have improved students' optimism about the end of the pandemic and thus diminished the negative link found in the previous study. Further research is needed to disentangle the various effects of the pandemic on students' course format experiences.

Work and Family Commitments, Social Contact, and Living Situation

We found that neither working more hours nor spending more time on family obligations were strongly linked with students' belonging/loneliness, though working more hours did predict preferences for course format. Interestingly, while fall 2020 participants were unable to choose their course format and those working more hours had reported wanting to register for more asynchronous and fewer synchronous classes the following semester, spring 2021 participants who were working more hours were indeed taking fewer synchronous classes in the current semester.

These results are promising. Specifically, neither working longer hours nor having increased family obligations seemed to have a negative impact; in contrast, increased family obligations has somewhat of a protective effect on engagement and loneliness. This is in line with previous findings that individuals who perceive higher familial belonging are afforded

protection from perceiving threats to belonging within their college community (Ploskonka & Servaty-Seib, 2015).

Less optimistic was our finding that students' current living situation and social contact with friends and family were all linked with belonging/loneliness to varying degrees. It seems clear that spending less time with friends and family during the pandemic is linked with negative effects for students, particularly greater loneliness. However, the direction of causality is unclear based on the current data. Future research should further examine this question.

First-Generation, Transfer, and First-Semester Students

We also found no links between first-generation status or first-semester status and students' belonging/loneliness, though our findings for transfer students reversed between semesters. Our finding regarding transfer students warrants future study, as we did not expect transfer students to feel marginally more belonging than non-transfer students. Perhaps their experiences at multiple universities helped transfer students adapt to another format of classes more easily than other students. However, the pattern of results flipped in spring 2021, suggesting that these results should be interpreted with caution and explored further in future research.

These results are again promising, particularly for first-generation college students. Although much other research shows a belongingness deficit for first-generation college students (e.g., Stebleton et al., 2014), the current study conducted during the pandemic showed no such difference. The context of the university may have contributed to this; the university in question is a regional comprehensive public university, with a large proportion of first-generation students (approximately 53%). At another type of university (e.g., a research university, a private university), or any university where first-generation students are in the minority, the results may have been different.

Finally, our finding that belonging and loneliness did not differ as a function of time spent at the university was also promising. Many of our participants in each timepoint were in their first semester at the university, meaning they had likely never been on campus or met faculty or fellow students in-person. Based on comments from students in the first author's classes, we expected those students to feel less belonging at the university, but fortunately this was not the case. Perhaps this is a testament to faculty members' welcoming presence in remote classes, or perhaps instead this is due to those students never knowing a different college experience than the remote one. Future research may help examine this in more detail.

Experiences in the COVID-19 Pandemic

Lastly, students' experiences in the pandemic were linked with their belonging/loneliness, particularly their perceptions of how the pandemic affected their psychological health. Although in fall 2020 COVID experiences were negatively correlated with engagement, in spring 2021 those correlations are no longer significant, suggesting perhaps that engagement in remote online classes was no longer impacted by negative mental health consequences of the pandemic, perhaps due to having more experience with remote online classes. Further, our exploratory mediation analysis showed that the link between fall 2020 participants' lower belonging and greater number of synchronous classes was statistically explained by their COVID distress. This might suggest that synchronous classes feel particularly bad for students, as they are a constant reminder of the ongoing pandemic. However, because belonging was not correlated with synchronous classes in the spring 2021 data, we were unable

to replicate this mediation model. Additional research is warranted to further explore these findings; for example, a qualitative study asking students to reflect on their experiences during the 2020–2021 academic year might produce greater insight into these questions.

Overall Implications

This study, conducted during the first full academic year of the COVID-19 pandemic, shed light on students' experiences in their remote online classes. Importantly, although we are now at a later stage in the pandemic as of the time of this writing, it is far from over. At the authors' institution, during the 2021–2022 academic year classes were held almost entirely in-person, with a vaccine mandate and a mask requirement. Though this campus experience is more similar to pre-pandemic classes than remote online classes were, it is still quite different, given masking and social distancing. Further, many college students have grown accustomed to the practices of remote online learning (e.g., online quizzes, posted slides) and may have difficulties adjusting to the expectations of in-person higher education again, or for the first time. Thus, future research should continue examining college students' experiences at each later stage of the pandemic.

Additionally, though many college students are returning to in-person classrooms, the ongoing pandemic may yet preclude a full return to pre-pandemic norms in higher education. For example, as many students and institutions now have experience with virtual settings, online virtual classes may become increasingly common. While much research has explored the predictors of students' success within the traditional classroom or within asynchronous online classes, future research should explore this relationship further (e.g., in post-pandemic synchronous online classes).

Lastly, another area ripe for future research involves replicating our findings in the post-pandemic era. One question which the current research cannot answer is how college students who choose to take virtual classes, whether synchronous or asynchronous, would compare to the present participants who were compelled to take their courses virtually. Perhaps post-pandemic students who freely choose to take remote synchronous courses or asynchronous online courses would not demonstrate the same links we found in the current research. Regardless, more research attention is certainly needed on the question of how to effectively foster belonging and social connection in both remote synchronous and online asynchronous courses moving forward, especially after the transitions both students and faculty have faced during the pandemic. Research might also examine the question of how to implement advising practices which help students make the best choices for classes that will meet their belongingness needs while still making progress toward their degree and balancing their multiple commitments. Identifying factors that promote positive outcomes, as well as those which contribute to negative outcomes in virtual academic settings, has the potential to impact institutions and students significantly going forward.

Limitations

The current study was conducted during two different semesters at a regional comprehensive university in the northeast United States, so the results we found may not generalize to students at other types of universities, in other parts of the United States, or in other parts of the world. Further, our findings were limited by the types of questions we asked; for example, though our questions about course format mismatch did not produce results in spring 2021, this variable may have been important in the context of fall 2020. Further, the study was

correlational in nature, which means we are unable to determine causality. For example, do negative virtual class experiences produce greater loneliness, or vice versa? We hope research will continue to study these topics and help remedy the limitations of the current work.

Conclusion

As higher education continues to change because of the COVID-19 pandemic, it is increasingly important for university administrators, staff members, and faculty members to understand the impact on their students. Knowledge is the first step toward implementing new policies and interventions to help students feel a sense of belonging at their institutions, even during unusual times like the pandemic. The current study offers insight into students' experiences during the 2020–2021 academic year, along with numerous avenues for future research. As we continue to reach each new stage of the pandemic, we believe gaining this knowledge and taking actions based on it are vital to the health of specific universities and higher education.

Declarations
The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors assert that approval was obtained from an ethics review board (IRB) at Bridgewater State University, USA.

The authors declared that they received no financial support for the research, authorship, and/or publication of this article.

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