STUDENT LEARNING PERSPECTIVES: DIFFERENCES BY RACE AND CLASS DURING THE COVID-19 PANDEMIC

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ABSTRACT

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Undergraduate students across the United States had to adapt to learning that was primarily on screen and off campus during the COVID-19 pandemic. With time, campus communities adjusted to the "new normal" of distanced coursework. Little is known about student perspectives on distanced learning after the campus shutdown and more than a semester had passed. Utilizing an online survey of 364 undergraduate students a large Midwestern university during Spring 2021, multivariate ordinary least squares regression is used to estimate the effect of learning perspectives of students of color and low-income students. Though results were insignificant, students of color and low-income students encountered important barriers to their education during the COVID-19 pandemic.

This thesis is dedicated to my aunt, Deborah “Debbie” Pahl, who unexpectedly passed during the writing process of this thesis in Fall 2021. Her passionate curiosity for the world has left a permanent mark on my soul.

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TABLE OF CONTENTS

LIST OF TABLES vi

INTRODUCTION 1

LITERATURE REVIEW 3
- Mental and physical health 3
- In the classroom: academics, instruction, and technology 3
- Marginalized student groups 6

METHODS 9
- Survey design 9
- Sampling strategy and data collection 9
- Measures 9
- Data cleaning 11
- Data analysis 12

RESULTS 13
- Demographic characteristics of sample 13
- Regression results 14

DISCUSSION AND CONCLUSION 23

REFERENCES 25

LIST OF TABLES

Table 1: Demographic characteristics 13

Table 2: Confidence and engagement in asynchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income 14

Table 3: Learning and motivation in asynchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income 16

Table 4: Self-discipline and time management in asynchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income 17

Table 5: Confidence and engagement in synchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income 18

Table 6: Learning and motivation in synchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income 19

Table 7: Self-discipline and time management in synchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income 20

Table 8: Other learning attitudes since the beginning of the COVID-19 pandemic by race, gender, and annual family income 21

Table 9: Course modality attitudes since the beginning of the COVID-19 pandemic by race, gender, and annual family income 22

INTRODUCTION

In response to the novel coronavirus pandemic that covered the globe in early 2020, colleges and universities across the world abruptly shut down when cases became too close for comfort. These institutions scrambled to adapt to changing state and federal regulations (Lederer et. al 2020), having cancelled courses for a brief time while faculty and teaching assistants changed modalities. Administrators instituted hiring chills and furloughed employees while students packed up their dorms. Undergraduate students struggled through the lost semester having been sent away from campuses, extracurricular activities, and coursework of all kinds. There was a need to adapt to a different kind of learning: one that is primarily on-screen and off-campus.

The following months saw the publication of a variety of studies analyzing undergraduate student's experiences during and in the months following the initial pandemic shutdown. Studies have shown that undergraduate students reported worse mental (Fruehwirth et. al 2021; Wang et. al 2020) and physical (Kowalsky et. al 2021) health outcomes during the pandemic. As a result of being sent home so suddenly, students experienced significant feelings of grief due to relocating from their campus communities (Conrad et. al 2021). Student performance dropped in the spring semester of 2020 (Orlov et. al 2021) while negative feelings toward the Zoom telecommunication platform emerged (Serhan 2020). Overall, students encountered a variety of barriers because of the pandemic (Gillis and Krull 2020; Hagedorn, Wattick, and Olfert 2021) and saw the sudden change to remote teaching as largely negative (Petillion and McNeil 2020). Marginalized college students experienced particularly difficult circumstances due to the pandemic shutdown, such as students of color (Molock and Parchem 2021), first-generation college students (Fraga 2020, Soria et. al 2020), international students (Firang 2020; Song, Zhao,

and Zhu 2021), student parents (Lin et. al 2021), and students with minority sexual or gender orientations (Gonzalez et. al 2020).

It is important to note that this literature has not assessed student's experiences once they had a semester or more of online coursework under their belt. With time, students and faculty adjusted to videoconferences and distanced coursework (Camilleri and Camilleri 2021). This study utilizes an online survey administered during spring semester 2021 of 363 Midwestern university undergraduates to evaluate perspectives on learning in the coronavirus pandemic context. This study examined the connections between student's race and engagement in synchronous courses and student's income and motivation in both asynchronous and synchronous courses. Due to race and class-based stressors amid the pandemic context, I predict students of color will be less engaged in synchronous coursework and lower-income students will have lower motivation in both types of courses since the pandemic shut down college campuses in March 2020. This analysis used ordinary least squares (OLS) regression to assess the extent by which engagement and motivation in academic coursework during the COVID-19 pandemic can be explained by student's race and class.

LITERATURE REVIEW

Mental and physical health

The coronavirus pandemic upended the lives of undergraduate college students across the world, greatly affecting the mental and physical health of young people. In the United States, Fruehwirth, Biswas, and Perriera (2021) used longitudinal data from before and after the pandemic shutdown to assess 419 first-year students' mental health at a large North Carolina university. Results indicated both an increase in anxiety and depression, especially for women, students of color, and sexual and gender minorities (SGM). Social isolation negatively affected Black and SGM students, though being sent home positively affected Hispanic and first-generation college (FGC) students. A study specifically on campus relocation by Conrad et. al (2021) identified more anxiety, grief, and depression for several weeks in those mandated to relocate as well as those who had to leave personal belongings behind. In a larger sample (N = 2031) of both undergraduate and graduate students at Texas A&M University in April 2020, Wang et. al (2020) found similar results of an increase in anxiety and depression for a multitude of academic, social, and financial reasons. An interesting finding indicates lower anxiety associated with progressive year in college or type of graduate program, however, results are still alarming. In addition to mental health, the physical health of college students declined as a result of the pandemic. Kowalsky et. al (2021) surveyed 189 college students from various universities and findings showed increased time in bed, time to fall asleep, later bedtimes and wakeups, and lower amounts of physical activity during Spring 2020.

In the classroom: academics, instruction, and technology

Synchronous courses include a live meeting of both instructors and students at a shared time in a shared space. Due to the COVID-19 pandemic, traditional synchronous lecture hall or

classroom meetings were transferred to online formats. Synchronous class meetings can provide high interactivity and engagement (Racheva 2018) in addition to enabling a strong sense of community and providing valuable social interaction (Lin and Gao 2020; Muilenburg and Berge 2005). The primary tool for synchronous distanced courses became Zoom, a videoconferencing platform that allows for private meetings to be held across time zones and locations. This software allows both instructors and students to interact on video and audio. During these class sessions, students were encouraged (but not mandated) to turn cameras on to foster a sense of a shared learning environment. Students of color often kept cameras off due to concern over their physical location being shown, their physical appearance, and weak internet connection (Castelli and Sarvary 2020). Though Zoom allows for increased flexibility and for courses to continue at the height of the pandemic in March and April 2020, Serhan (2020) identifies that their sample of students overall had a negative attitude toward the software. In their sample of 31 undergraduate students at a United States university, 61.29% disagreed that Zoom helped their learning and 61.29% disagreed that the platform helped them participate in class. Overall, students in the Serhan (2020) study preferred the face-to-face classroom setting versus Zoom. These negative perceptions of the Zoom software and decrease in camera usage negatively affects student engagement in this type of course.

Asynchronous courses allow for increased flexibility in teaching and learning especially in the pandemic context, however, they often lack the sense of a learning community in the classroom. Although there is a lack of empirical evidence specifically linking lower motivation for low-income students in these types of courses, the lack of community and interaction in asynchronous courses has detrimentally affected students.

The abrupt shutdown of college campuses and change from in-person to distanced learning has created frustration for both students and faculty alike. Hagedorn, Wattick, and Olfert (2021) surveyed 2,643 undergraduate and graduate students about their productivity and quality of learning at the height of the pandemic in March and April 2020. Findings indicated (but are not limited to) struggles with internet connection (the lack of or low quality), less engaging or disorganized class material, and professors being either inflexible or ill-informed about how to use online course tools. Hagedorn, Wattick, and Olfert (2021) describe:

> Although online learning is touted to provide flexibility for students (Levy 2017), it also comes with limitations as retention rates and overall academic success rates are reported to be lower among students enrolled in courses fully online (Xu and Jaggars 2013). With the requirement to take on a larger responsibility in the facilitation of their learning (Levy 2017), many students may have lacked the preparation for online learning that was thrust upon them as a result of the COVID-19 pandemic if they traditionally took face-to-face classes prior to distancing requirements. Further, online learning requires specific online teaching pedagogies and understanding of technological resources for online learning (Levy 2017; Sinacori 2020). However, the COVID-19 pandemic also resulted in academic faculty having to abruptly switch classes to an online format without the time and professional development for learning a new pedagogy (Sinacori 2020). Thus, the transition to online learning thrust many students and faculty into an unprecedented situation.

These sentiments are echoed both in a Canadian study by Petillion and McNeil (2020) and a United States study by Gillis and Krull (2020). These studies identify layered barriers to academic success for undergraduate students and suggest best practices for emergency remote teaching. Layered barriers for students included time zone difference, environmental distractions, and the loss of work and study space. Suggestions to make distanced learning more effective include low-stakes peer interaction, clear communication from professors, flexible assessments, and organized courses (asynchronous or synchronous). Later, a study by Orlov et. al (2021) identified faculty having prior online teaching experience and implementing peer-to-peer

interaction as mitigating factors to lower assessment scores in economics courses across four R1 United States institutions.

Marginalized student groups

Students of color, first-generation college (FGC) students, international students, student parents, and sexual and gender minority (SGM) students encountered additional barriers related to their identities during the coronavirus pandemic. Gillis and Krull (2020) identified nonwhite students being more likely to be worried about finances, having access to medical care, and confront inflexible coursework than white students. Aside from worries about only the coronavirus, Molock and Parchem (2021) identified additional stress in a sample of 193 ethnically diverse college students related to racial discrimination in the pandemic context. Of this sample, 52.85% witnessed racial discrimination mostly against Asian (64.86%) then Black (31.53%) individuals. In addition, students in this sample identified having to cope with the murder of George Floyd and ensuring protests in May and June 2020. Molock and Parchem (2021) illustrate:

> The overlap between the COVID-19 pandemic and the killing of George Floyd on May 25, 2020 uniquely impacted the young people of color in our sample demonstrating the intersection of these psychosocial stressors. Several students noted their mental health challenges resultant from adjustments related to COVID-19 were compounded by the growing visibility of systemic racism in the US. Coping with two public health crises, namely the COVID-19 pandemic and systemic racism, is unjust and taxing for young people of color who have many responsibilities to balance.

International students across the globe also encountered barriers specifically related to their immigrant and nationality status. Students from East Asia were especially prone to stress and anxiety from the pandemic given that many were forced to return home on short notice. In a study by Song, Zhao, and Zhu (2021) Chinese international students living in China during the pandemic encountered more stress, anxiety, depression, and post-traumatic stress disorder

(PTSD) symptoms compared to Chinese international students living in the United States. The authors reason that this is due to being academically delayed, forced toward an early entry into the labor market, and anti-Asian rhetoric that may prevent them from returning to their studies abroad. For international students who did not return home before countries halted cross-country transportation, Firang (2020) reported that one student from Ghana "go hungry and stress" every day because international money transfers experienced delays (Firang 2020:821). The Canadian government excluded non-permanent residents (i.e., international students) from the Canada Emergency Response Fund (CERB), a social and financial relief program designed to protect Canada's most vulnerable residents during times of strife.

Students who are the first in their family to go to college have encountered complex academic bureaucracies along the way to their degrees. Without a roadmap of academic and social capital, many have relied on university-based support to succeed. When California State University - Stanislaus shut down and these students were sent home, a study by Fraga (2020) discovered that Latinx FGC students were more likely to experience food insecurity than their non-FGC student peers. This finding is echoed through the Soria et. al (2020) SERU COVID-19 Survey of 28,198 undergraduate students across nine universities in May through June 2020. FGC students were more likely to experienced financial hardships, food insecurity, challenges in the transition to online learning, and mental health disorders than non-FGC student peers. FGC students were also less likely to live in safe environments compared to non-FGC students after universities sent students home, such as places away from physical, drug, emotional, or alcohol abuse.

College students with children often share intersecting barriers with students of color, FGC students, and low-income students but this population is often underserved and

underrecognized. In context of the pandemic, undergraduate student parents need to take part in care tasks that may have been lessened by childcare on top of other academic and financial stressors. An essay written by Lin et. al (2020) outlines specific points of pandemic-related stress for student parents and the methods by which to support this student group. Student parents are described as "invisible" on campus as parenthood status is often overlooked, leading to insufficient resources and advising for student parents both before and during the pandemic (Lin et. al 2020:3).

Upon the closure of college and university campuses in Spring 2020, sexual orientation and gender minority (SGM) students may have been sent home to unsafe environments. In a study conducted by Gonzalez et. al (2020) with a sample of 477 LGBT college students across 254 college campuses in the United States, 45.7% reported that their family is unaccepting of or is unaware of their LGBT identity. This same group were more likely to exhibit frequent mental distress compared to those families who were supportive of their identity. LGBT students who experienced mental distress were also unable to receive mental health care due to stay at home orders or telehealth options were insufficient through their college or university. Overall, the pandemic exacerbated barriers for LGBT students by being sent away from campus and community support.

This study examined the connections between student's race and engagement in synchronous courses and student's income and motivation in both asynchronous and synchronous courses. Due to race and class-based stressors amid the pandemic context, I predict students of color will be less engaged in synchronous coursework and lower-income students will have lower motivation in both types of courses since the pandemic shut down college campuses in March 2020.

METHODS

Survey design

After this study was approved by the Institutional Review Board (IRB) at Michigan State University, an online survey was designed and hosted in Qualtrics and included 38 questions. After data was exported from the Qualtrics survey platform, variable names were renamed and labelled according to section and survey question. Of the four sections of the survey, two will be utilized for this study: demographics and perspectives on learning before and during the pandemic.

Sampling strategy and data collection

Convenience sampling was used for this study, which allowed the researcher to obtain as many responses as possible. The sample for this survey was undergraduate college students enrolled in the spring semester 2021 at a large Midwestern university who are over the age of eighteen. As this data was cross-sectional, it pertained to perspectives at a single point in time. The researcher distributed email invitations to 41 faculty members who shared the survey with students in their courses. Email invitations were sent to faculty members in mid-March 2021. Nineteen faculty members confirmed sharing the survey with their courses. In total, 362 undergraduate students began the survey and 269 fully completed the survey. The survey was closed on April 9, 2021.

Measures

All measures in this study were created independently. The demographics section included seven questions: the student's year in college, race, gender, annual household income, highest education level of student's mother and father, and the student's current living situation. The learning perspectives section included five questions. Four questions asked respondents to

rate their confidence, engagement, learning, motivation, self-discipline, and time management in asynchronous and synchronous courses before and after March 2020 on a 5-point scale ranging from “Very low” to “Very high” and “Not applicable”. These criteria were chosen to encompass some the multifaceted psychological aspects of a student enrolled in a college course.

Confidence is a psychological construct associated with belief in one’s own abilities, including meeting goals and striving through hardship (Kukulu et. al 2013). Engagement encompasses both physical and psychological dedication (Lin and Huang 2018), with Axelson and Flick (2011) specifically identifying involvement with academic tasks and connectedness to the learning environment. Learning involves processes of acquiring new knowledge, remembering information and finally reflecting and applying it to one’s own life (Entwistle and Peterson 2004). Motivation is the willingness and push to perform a certain action, and “[a]cademic motivation is the reason students engage in learning” (Marley and Wilcox 2021). Self-discipline is the ability to control one’s actions to remain focused on a goal (Şimşir and Dilmaç 2021). Finally, time management involves short and long-term planning around goals as well as deliberate structuring and monitoring how time is spent (Wolters 2020). These definitions were not provided to respondents during the survey to avoid restricting individual interpretations. In addition, defining these measures during distanced learning is difficult across both synchronous and asynchronous courses.

The last question of this section listed statements regarding student’s learning experience since March 2020 on a 4-point scale from “Strongly agree” to “Strongly disagree”. Statements included perspectives on their professors’ level of support, connection to resources, and enjoyment of course modalities. “Pre 2020” and “Post 2020” describe the period before and after the college campus shutdown in mid-March 2020 due to rising COVID-19 cases in the region.

"Post 2020" includes the 20-21 academic year, when the institution for this sample continued to host a majority of courses online.

Data cleaning

The software program used for data cleaning and analysis was STATA/IC version 16.1. Six measures were cleaned in the demographics section, resulting in dropping or combining observations if there were less than ten responses. The year in college measure was condensed from seven options (First, Second, Third, Fourth, Fifth, Sixth, Seventh or higher) to four (First, Second, Third, Fourth or higher). "Fourth", "Fifth", "Sixth", and "Seventh or higher" were combined into "Fourth or higher" due to low response rates. The measure of race and ethnicity was condensed from nine options (American Indian/Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Pacific Islander, Middle Eastern or North African, White, Other race, Prefer not to say) to five (Asian, Black or African American, Hispanic or Latino, White, Other race). "Prefer not to say" was dropped due to low response rates. The gender measure was condensed from four options (Man, Woman, Other gender, Prefer not to say) to two (Man, Woman). "Prefer not to say" and "Other gender" were dropped due to low response rates. The family income measure was condensed from 11 options into four income quartiles: "$0-$29,999", "$30,000-$59,999", "$60,000-$89,999", and "$90,000 or higher". Both measures regarding the highest education level of mother and father were condensed from eight options (Less than high school, High school degree, Some college no degree, Associate's degree, Vocational or technical degree, Bachelor's degree, Graduate or professional degree, I have no knowledge) to four (High school degree or less, 2 year degree, 4 year degree, Graduate or professional degree). "I have no knowledge" was dropped due to low response rates. The current living situation measure was condensed from five options (On campus dorm or apartment, Off

campus apartment or home, Family home, I am houseless, Somewhere else) to three (On campus dorm or apartment, Off campus apartment or home, Family home). “I am houseless” and “Somewhere else” were dropped due to low response rates.

Data analysis

Ordinary least squares (OLS) regression was used to estimate the average change in learning perspectives of undergraduate students during the coronavirus pandemic given unit changes in race and annual family income. OLS regression accounted for missing values in the survey through automatic listwise deletion. For the race measure, “Asian”, “Black or African American”, “Hispanic or Latino”, and “Other race” respondents were used as dummy variables, and the option for “White” was omitted. For the family income measure, the lowest ($29,999 or less), middle ($30,000 to $59,999), and upper middle ($69,000-$89,999) quartile respondents were used as dummy variables, while the upper quartile ($90,000 or higher) option was omitted.

RESULTS

Demographic characteristics of sample

Table 1: Demographic characteristics					
		N	Cumulative N	Percent	Cumulative Percent
Student year in college					
	First	153	153	46.50%	46.50%
	Second	77	230	23.40%	69.90%
	Third	56	286	17.02%	86.92%
	Fourth or higher	43	329	13.07%	100.00%
Living situation					
	On campus dorm/apartment	44	44	13.37%	13.37%
	Off campus house/apartment	119	163	36.17%	49.54%
	Family home	166	329	50.46%	100.00%
Father education					
	High school or less	62	62	18.84%	18.84%
	2-year degree or equiv.	71	133	21.58%	40.43%
	4-year degree or equiv.	110	243	33.43%	73.86%
	Graduate/professional degree	86	329	26.14%	100.00%
Mother education					
	High school or less	57	57	17.33%	17.33%
	2-year degree or equiv.	73	130	22.19%	39.52%
	4-year degree or equiv.	130	260	39.51%	79.03%
	Graduate/professional degree	69	329	20.97%	100.00%
Race					
	Asian	38	38	11.59%	11.59%
	Black	37	75	11.28%	22.87%
	Hispanic/Latino	21	96	6.40%	29.27%
	White	219	315	66.77%	96.04%
	Other race	13	328	3.96%	100.00%
Gender					
	Man	111	111	33.94%	33.94%
	Woman	216	327	66.06%	100.00%
Annual family income					
	Less than $29,999	38	38	11.62%	11.62%
	$30,000 - $59,999	54	92	16.51%	28.13%
	$60,000 - $89,999	67	159	20.49%	48.62%
	Greater than $90,000	168	327	51.38%	100.00%

The majority of the sample were returning students, white students, women, affluent, continuing generation, and lived at a family home during Spring 2021 (Table 1). Though first year students are not the majority, they constituted nearly one half (N = 153, 46.50%) of the sample. Students of color represented one third of the sample, with Asian (N = 38, 11.59%) then Black (N = 37, 11.28%) students being the largest race groups. Women students constituted about two-thirds (N = 216, 66.06%) of the sample. Students whose families make more than $90,000 annually account for a slight majority of the sample (N = 168, 51.38%), with students from the lowest income group ($29,999 or less annually) compromising near one-tenth of the overall sample (N = 38, 11.62%). Most of the students are not first-generation college students, with the majority having mothers (N = 272, 82.67%) and fathers (N = 267, 81.15%) with at least one two-year postsecondary degree or higher.

Regression results

Table 2: Confidence and engagement in asynchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income

		Confidence		Engagement	
		Pre 2020 *N = 285*	**Post 2020** *N = 284*	**Pre 2020** *N = 284*	**Post 2020** *N = 283*
Race					
	Asian	.26	.21	.18	.36*
	Black	.58*	.20	.33	.36*
	Hispanic/Latino	-.30	-.42	-.45	-.38
	White				
	Other race	-.59	.35	-.27	.58*
Gender					
	Man				
	Woman	-.41*	-.01	-.22	-.02
Annual family income					
	Less than $29,999	.29	-.30	.44	-.10
	$30,000 - $59,999	.07	-.10	.28	.02
	$60,000 - $89,999	-.00	.13	.21	-.01
	Greater than $90,000				

*p<0.10, **p<0.05, ***p<0.01

Table 2 covers the results of OLS regression between undergraduate student's confidence and engagement in asynchronous courses before and after the March 2020 campus shutdown and demographic characteristics. All coefficients in Table 2 were not significant with a p-value less than .05, though five coefficients were significant with a p-value of less than .10. Black students showed a .58 change in confidence in asynchronous courses before the March 2020 campus shutdown. Women students showed a -.41 change in confidence in asynchronous courses before the March 2020 campus shutdown. Both Asian and Black students showed a .36 change in engagement in asynchronous courses after the March 2020 campus shutdown. Students who identify as "Other race" showed a .58 change in engagement in asynchronous courses after the March 2020 campus shutdown. These results indicate that Black students had a positive correlation with confidence in asynchronous courses before the COVID-19 pandemic, and women had a negative correlation with confidence before the pandemic. During the pandemic, Asian, Black, and "Other race" students shared a positive correlation with engagement in asynchronous courses.

Table 3: Learning and motivation in asynchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income

		Learning		Motivation	
		Pre 2020 *N = 283*	**Post 2020** *N = 282*	**Pre 2020** *N = 284*	**Post 2020** *N = 283*
Race					
	Asian	.21	.44**	.39	0.50**
	Black	.45	.07	.41	.20
	Hispanic/Latino	-.27	-.29	-.22	-.28
	White				
	Other race	-.52	.42	-.35	.63*
Gender					
	Man				
	Woman	-.36*	-.08	-.26	-.07
Annual family income					
	Less than $29,999	.61	-.06	.49	-.15
	$30,000 - $59,999	.30	.11	.16	.15
	$60,000 - $89,999	.14	.10	.02	-.11
	Greater than $90,000				

*p<0.10, **p<0.05, ***p<0.01

Table 3 reports the results of OLS regression between undergraduate student's learning and motivation in asynchronous courses before and after the March 2020 campus shutdown and demographic characteristics. Two coefficients in Table 3 were significant with a p-value less than .10. Woman students showed a -.36 change in learning in asynchronous courses before the March 2020 campus shutdown. Students who identify as "Other race" showed a .63 change in motivation in asynchronous courses after the March 2020 campus shutdown. The most significant results (p>.05) were for Asian students after the March 2020 campus shutdown. There was a .44 change in learning and a .50 change in motivation for Asian students after the March 2020 campus shutdown. These results show no correlation between a student's family income and their motivation in asynchronous courses after the March 2020 campus shutdown.

Table 4: Self-discipline and time management in asynchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income

		Self-discipline		Time management	
		Pre 2020 *N = 284*	**Post 2020** *N = 283*	**Pre 2020** *N = 283*	**Post 2020** *N = 283*
Race					
	Asian	.05	.27	.21	.31
	Black	.17	.15	.05	.03
	Hispanic/Latino	-.54	-.19	-.26	-.09
	White				
	Other race	-.50	.22	-.48	.09
Gender					
	Man				
	Woman	-.30	.09	-.24	.07
Annual family income					
	Less than $29,999	.61*	-.10	.60*	-.19
	$30,000 - $59,999	.09	.11	.18	.03
	$60,000 - $89,999	.06	.04	.08	-.08
	Greater than $90,000				

*p<0.10, **p<0.05, ***p<0.01

Table 4 details the results of OLS regression between undergraduate student's self-discipline and time management in asynchronous courses before and after the March 2020 campus shutdown and demographic characteristics. All coefficients in Table 4 were not significant with a p-value less than .05, though two coefficients were significant with a p-value of less than .10. Students whose families made less than $29,999 annually showed a change of .61 in self-discipline and a change of .60 in time management in asynchronous courses before the March 2020 campus shutdown. These results suggest that students from families in the lowest income quartile had a positive correlation between self-discipline and time management in online asynchronous courses before the COVID-19 pandemic.

Table 5: Confidence and engagement in synchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income

		Confidence		Engagement	
		Pre 2020 *N = 282*	**Post 2020** *N = 283*	**Pre 2020** *N = 281*	**Post 2020** *N = 282*
Race					
	Asian	.06	.15	-.07	.19
	Black	.05	-.31	-.14	-.41
	Hispanic/Latino	-.36	-.38	-.53	-.20
	White				
	Other race	-.81*	.23	-.42	.30
Gender					
	Man				
	Woman	-.41**	-.12	-.21	-.07
Annual family income					
	Less than $29,999	-.25	-.07	-.15	.01
	$30,000 - $59,999	-.13	.14	-.32	.27
	$60,000 - $89,999	-.06	-.13	-.17	-.18
	Greater than $90,000				

*p<0.10, **p<0.05, ***p<0.01

Table 5 covers the results of OLS regression between undergraduate student's confidence and engagement in synchronous courses before and after the March 2020 campus shutdown and demographic characteristics. Two coefficients were significant in Table 5 with p-values less than .10, with one being significant with a p-value less than .05. Students who identify as "Other race" showed a change of -.81 in confidence in synchronous courses before the March 2020 campus shutdown. The most significant coefficient indicates a -.41 change in women student's confidence in synchronous courses before the March 2020 campus shutdown. For engagement in synchronous courses, there were no significant coefficients, indicating that there are no definitive correlations between a student's race and their engagement in synchronous courses during the COVID-19 pandemic.

Table 6: Learning and motivation in synchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income

		Learning		Motivation	
		Pre 2020 *N = 280*	**Post 2020** *N = 282*	**Pre 2020** *N = 281*	**Post 2020** *N = 282*
Race					
	Asian	.22	.37	.24	.34
	Black	-.23	-.40	.05	-.21
	Hispanic/Latino	-.54	-.27	-.54	-.25
	White				
	Other race	-.67	.59	-.56	.95**
Gender					
	Man				
	Woman	-.14	-.10	-.29	-.15
Annual family income					
	Less than $29,999	-.16	-.00	-.22	-.22
	$30,000 - $59,999	-.23	.41*	-.36	.14
	$60,000 - $89,999	-.09	.05	-.31	-.16
	Greater than $90,000				

*p<0.10, **p<0.05, ***p<0.01

Table 6 reports the results of OLS regression between undergraduate student's learning and motivation in synchronous courses before and after the March 2020 campus shutdown and demographic characteristics. Two coefficients were significant with a p-value less than .10 and one was significant with a p-value less than .05. Students whose families made between $30,000 and $59,999 annually showed a .41 change in learning in synchronous courses after the March 2020 campus shutdown. The most significant coefficient was for students who identified as "Other race". "Other race" students showed a .95 change in motivation in synchronous courses after the March 2020 campus shutdown. Results indicate that students from families who made between $30,000 and $59,000 had a positive correlation between motivation and synchronous courses during the COVID-10 pandemic, though these results are insignificant. In context of our hypothesis, there is no support for a negative correlation between lower income students and motivation in synchronous courses.

Table 7: Self-discipline and time management in synchronous courses before and after the COVID-19 pandemic by race, gender, and annual family income

		Self-discipline		Time management	
		Pre 2020 *N = 281*	**Post 2020** *N = 282*	**Pre 2020** *N = 281*	**Post 2020** *N = 282*
Race					
	Asian	.11	.22	.26	.27
	Black	-.13	-.52*	-.18	-.64**
	Hispanic/Latino	-.59	-.42	-.58	-.36
	White				
	Other race	-.51	.52	-.70	.67
Gender					
	Man				
	Woman	-.18	-.13	-.14	.01
Annual family income					
	Less than $29,999	-.09	-.09	-.23	.11
	$30,000 - $59,999	-.31	.26	-.29	.38
	$60,000 - $89,999	-.13	-.24	-.17	-.11
	Greater than $90,000				

*p<0.10, **p<0.05, ***p<0.01

Table 7 details the results of OLS regression between undergraduate student's self-discipline and time management in synchronous courses before and after the March 2020 campus shutdown and demographic characteristics. There were two significant coefficients with a p-value less than .10 with one coefficient being significant below the .05 level. Black students showed a -.52 change in self-discipline in synchronous courses after the March 2020 campus shutdown. The most significant coefficient showed a -.64 change in time management for Black students in synchronous courses after the March 2020 campus shutdown. For Black students, there is a negative correlation between self-discipline and time management in synchronous courses during the COVID-19 pandemic, supporting literature that described the additional stressors for students of color since 2020.

Table 8: Other learning attitudes since the beginning of the COVID-19 pandemic by race, gender, and annual family income

		Learning just as much	Professors want me to succeed	Professors are flexible w deadlines	Have resources needed to succeed	Know how to search for resources to succeed
		N = 284	*N = 284*	*N = 283*	*N = 284*	*N = 284*
Race						
	Asian	.46***	.08	.13	.12	.06
	Black	.28	.15	.43**	.28*	.34**
	Hispanic/Latino	-.32	-.18	-.06	-.25	-.37*
	White					
	Other race	.87***	-.07	-.08	.20	.17
Gender						
	Man					
	Woman	-.08	.01	-.09	.02	-.03
Annual family income						
	Less than $29,999	.05	.02	-.20	-.14	-.29*
	$30,000 - $59,999	.14	.27**	.03	.06	.03
	$60,000 - $89,999	.12	-.04	-.06	-.01	.06
	Greater than $90,000					

*p<0.10, **p<0.05, ***p<0.01

Table 8 and 9 report on other learning attitudes since the March 2020 campus shutdown. In Table 8, eight coefficients were significant below the .10 level, five below the .05 level, and two below the .01 level. The most significant coefficients indicated a .46 change for Asian students and .87 change for "Other race" students in "Learning just as much" since the beginning of the COVID-19 pandemic. Students whose families made between $30,000 and $59,999 annually showed a .27 change in "Professors want me to succeed". For Black students, there was a .43 change in "Professors are flexible with deadlines" since the beginning of the COVID-19 pandemic. There was also a .28 change in "I have the resources I need to succeed" and a .34 change in "I know how to search for the resources I need to succeed" for Black students since the beginning of the COVID-19 pandemic. On the other hand, there was a -.37 change in know-how for resource searching for Hispanic students and a -.29 change for students in the lowest income quartile since the beginning of the COVID-19 pandemic. These results indicate positive

correlations for students in the middle income bracket and Black, Asian, and Other race students in learning and institutional support, but negative correlations for students in the lowest income quartile and Hispanic students in resource-searching.

Table 9: Course modality attitudes since the beginning of the COVID-19 pandemic by race, gender, and annual family income

		Enjoy synchronous *N = 284*	Enjoy asychronous *N = 284*	Enjoy in-person courses *N = 283*	Enjoy distanced learning *N = 283*
Race					
	Asian	.18	.40**	-.11	.45**
	Black	-.09	.01	.043	-.08
	Hispanic/Latino	-.28	-.28	.03	-.52**
	White				
	Other race	.06	.63**	-.19	.34
Gender					
	Man				
	Woman	-.01	.22*	-.03	.17
Annual family income					
	Less than $29,999	-.23	-.25	-.21	.20
	$30,000 - $59,999	-.09	.21	-.15	.37**
	$60,000 - $89,999	-.20	.01	-.10	.06
	Greater than $90,000				

*p<0.10, **p<0.05, ***p<0.01

In Table 9, there are 6 significant coefficients below the .10 level and 5 significant coefficients with p-values less than .05. Regarding enjoyment of asynchronous courses since the beginning of the COVID-19 pandemic, there was a .40 change for Asian students, a .63 change for "Other race" students, and a .22 change for women students. Concerning enjoyment of distanced learning, there was a .45 change for Asian students, a -.52 change for Hispanic students, and a .37 change for students whose families made between $30,000 and $59,999 annually. These results show mostly positive correlations between students of color and women students in enjoyment of asynchronous and distanced coursework.

DISCUSSION AND CONCLUSION

In this study, the connections between race and engagement and income and motivation in synchronous and asynchronous courses in an academic year were analyzed using multivariate ordinary least squares (OLS) regression. Results for all three hypotheses were insignificant. Students of color in this sample were not found to have a significant decrease in their engagement in synchronous courses from before to after the campus shutdown (Table 5) and lower income students did not show a significant decrease in motivation in both types of courses after the campus shutdown (Table 3, Table 6).

Given that all hypotheses were insignificant, it is imperative to assess the limitations of the study. It is possible that the hypotheses were unable to be assessed accurately with this sample. This data collection method, an online survey, could have contributed to selection bias. As students self-selected, only students with a positive engagement, motivation, or self-discipline took part in the survey. Rosy retrospection, or recalling the past more fondly than the present, could have affected responses as well. This is important because of the difficulty in predicting the impact of the COVID-19 pandemic. More effective sampling would include the same group of students across waves, such as before campus shutdowns in early 2020, during the height of the pandemic, months afterwards, and once they returned to in-person learning. However, this may be difficult due to the transition from emergency remote teaching to a more traditional in-person learning experience. In addition, as the COVID-19 pandemic continues, this theory is relatively new and selected variables may not have been operationalized efficiently. For example, different students may have different understandings of what motivation, self-discipline, and engagement mean, especially while pursuing higher education in a global pandemic. In addition, the hypotheses could be faulty. Though race and income level have been

connected to negative student experiences during the pandemic (Gillis and Krull 2020, Lin et. al 2021), there is little prior research to support race and class differences in specific aspects of engagement and motivation in distanced courses during the pandemic.

As many colleges and universities have returned to face-to-face learning with the addition of vaccine and mask mandates, future research in this area will be assessing the short and long-term effects of the pandemic. Some studies have already been published on the "post-pandemic" undergraduate student, namely on online versus on-site courses in ecology (Pagani-Núñez et. al 2022), loneliness on campus (Vaterlaus 2022) and students' desire to continue with distanced learning (Clary et. al 2022) or return to on-campus (Steimle et. al 2022). In the end, a variety of literature has shown that undergraduate students, particularly those that are minority and underrepresented, encountered difficulty adjusting to college during the coronavirus pandemic.

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