Examining the impact of Covid-19-related disruptions, dislocations and stressors on the academic performance of undergraduates at a diverse public university

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Objective: Investigate the influence of the stressors caused by the COVID-19 pandemic on the academic performance of undergraduate students, and their ability to concentrate on schoolwork.
Participants: 1,806 students attending a racially diverse 4-year university with a high rate of first generation college students.
Methods: An online survey utilizing measures of depression (PHQ-9), generalized anxiety (GAD-7), faculty and academic advising support, economic insecurity, studying conditions, family conditions, trouble concentrating on schoolwork, and academic performance. OLS regression is used to explain academic performance and trouble concentrating.
Results: Four of five students reported trouble 7 ve2Tf 0 Teconcentration-19, academic performance, s

Introduction

In March, 2020, as Covid-19 spread throughout California, California State University, East Bay (CSUEB) rapidly closed most campus offices and moved courses online. This move coincided with local and statewide shelter-in-place orders for everyone except for those engaged in essential activities. This study reports on the challenges students faced during the Spring 2020 semester, based on a survey of CSUEB undergraduates completed shortly after the end of the term. In addition to the fears and uncertainty of the global pandemic, students experienced dislocations and rapid changes in their work, family, school, and social lives. Therefore, we adopt a *social stress and social support model* [1,2] focusing on the disruptions and stressors affecting undergraduate students' academic performance and ability to concentrate on school work. Stressors included the shift to online instruction, facing disorganized courses after the move to online, lack of adequate studying conditions, financial and material insecurity, and stressful family conditions. We also test for the influence of three forms of social support – from family, professors, and university support systems, along with a measure of depressive symptomatology. We hypothesized that academic performance and the ability to concentrate on schoolwork would b (a)-f16 (y)16 (,)2 abi,hrmhrmty to c22tl (de)4 (m(,)-3 ( )5.9 (at)-6 (er)-1 (i)5 (s)-5 (f)-fj 0.254 20 ul (or

pandemic has been recognized as an imminent threat to the health and well-being of the public,[4] little empirical evidence exists on this relationship. And investigating this among college students could contribute to informing the development of courses of action and public health messaging that can better support college students in this "crisis."[5]

College students are known to already carry a high burden of psychological distress (depression and anxiety) as demonstrated across a wide range of peer-reviewed studies consolidated in recent systematic reviews.[6-8] Additionally, seminal works by Eisenberg et al.[9]

students to ask questions and vent. On top of the uncertainty and fear of the contagious and deadly virus, many

difficulty concentrating on schoolwork after the shelter-in-place began. Table 1 shows the responses to the five items making up our 'trouble concentrating and doing schoolwork' index (hereinafter 'trouble concentrating'). Over 4/5 of students (81%) reported that after shelter in place it was somewhat harder (26%) or a lot harder (56%) to focus on schoolwork. Just over half (51%) agreed that they had trouble completing schoolwork on time and 50% agreed that they often found schoolwork unimportant. Over 1/3 (34%) agreed that their lives were so disrupted that they could not do schoolwork.

[Insert Table 1 here]

Thus, we hypothesized that students' were facing a wide range of stressors and high levels of distress that had negatively influenced academic performance and their ability to focus on schoolwork. We also expected perceived family, professor, and other university support services to improve academic performance and ability to concentrate. We hoped to learn which factors most influenced academic performance and difficulty concentrating, with an eye to ways our university may better support students in our upcoming online Fall 2020 semester. In this regard, we were particularly interested in the role of living conditions, psychological distress, professor support, and other sources of university support.

Methods

Setting, Participants and Procedures

CSU East Bay is a public university in Hayward, California, 12 miles south of Oakland, CA in the San Francisco Bay Area. Undergraduate students at CSUEB (population 12,607 in fall 2019) match the Kaiser survey's profile of those most affected psychologically by coronavirus.[3] In addition to most students being in the 18-29 age category, 60% are women, 62% are first generation college students, 51% are Pell Grant eligible, and 85% are non-white – 37% Latino,

23% Asian American (Filipinos are the largest subgroup), and 10% African American. The CSUEB Covid-19 Student Survey was an online survey of undergraduate students conducted between May 18 and June 1, 2020. All enrolled CSUEB students received multiple email and text invitations to participate in the study beginning four days after the last day of final exams, to limit the influence of the immediate distress of finals week. The questionnaire took 15-20 minutes to complete and consisted of fixed-choice and two open-ended questions. A consent form appeared on the first page describing the purpose of the study, their rights, and the risks associated with participating. Students were encouraged to skip6 (g)1d6 (g)13r 4 (a)4 (nd c)r dacrf>(, t)-

schoolwork was easier or harder since COVID-19. (See Table 1 for wording.) Items were weighted equally with higher scores indicating greater difficulty concentrating.

Independent Variables

Our independent variables included eight social background variables, two control variables, and a range of social stress and social support explanatory variables that measured conditions created by or exacerbated by the pandemic.

Social background and control variables. We assessed age, gender, year in school, race/ethnicity, college within the university, if the respondent was born in the U.S., family income, and if the respondent was a first generation college student. For family income we expected that many students would not accurately know their family's income, so our question presented respondents with the median family income for Alameda County and asked if their family was lower, lower middle, middle, upper middle, or upper income. We included self reported GPA as a control for previous academic performance and as a proxy control for previous difficulty concentrating, reasoning that students with higher overall GPAs have had less difficulty concentrating in the past (GPA and trouble concentrating have a Pearson's r of .161, p<.001.) Proportion of classes online at the beginning of the term does double duty as a control for the change in the modality of teaching, thus focusing our findings on the broader COVID-19 crisis, while also providing an estimate of the cost of moving online.

Social stress and social support variables. We included measures of economic distress and dislocation, access to adequate studying conditions, family dynamics/conditions, the proportion of courses that students reported were "disorganized" after shelter-in-place, self-reported overall GPA, perceived university and faculty supports, proportion of online classes students began the term with, and psychological distress.

and perceived family support included three items—academic, financial, and “to talk with and get help from.”

Lastly, the ‘psychological distress’ measures were the PHQ-9 measure of depression (9 items) and the GAD-7 measure of generalized anxiety (7 items). The PHQ-9 turned out to be far more influential. It scores each of the nine DSM-IV criteria as 0 = “not at all” to 3 “nearly every day.” Its

dependent variables by generating unstandardized regression coefficients (Hompa, 1999). Factors significant at the bivariate level were tested in multivariate regression models predicting

depression range. PHQ-9 items ask respondents about experiences during the last two weeks. Thus, to assess the possible influence of finals week stress on depression scores we compared the 279 students who completed the survey more than two weeks after final exams to those whose two week window included part of finals week. The mean scores for respondents who completed the survey before and after the two week window were quite close, 10.7 and 10.5 respectively.

Table 3 reports bivariate unstandardized regression coefficients for all independent variables explaining our two dependent variables, academic performance and trouble concentrating. Looking at the influence of social background variables on academic performance we see that women, juniors and seniors, Asian Americans, and those from higher income families performed modestly better than men, freshmen and sophomore, whites, those born in the U.S., and lower income students. Both control variables, proportion of courses online at beginning of the term and overall GPA, were positively related to academic performance. Turning to the explanatory variables, with one exception, all of the family dynamics, economic distress and dislocation, studying conditions, university support, and psychological distress/functioning variables were associated in the expected direction with school performance at $p<.05$. The exception was a non-significant relationship with the respondent experiencing a job layoff. Having trouble concentrating on schoolwork was by far the most influential variable explaining school performance (b=.52), followed by having good study conditions (reliable internet, computer, quiet place to study) (b=.32), depression (b=.32), perceived professor support (b=.30), proportion of courses that were well-organized after shelter in place (b=.27), and generalized anxiety (b=.27).

Turning to the social background variables explaining 'trouble concentrating,' students in the humanities and social sciences, freshmen and sophomores, first-generation in college, Latinx, Middle Eastern, mixed race, those born in the U.S., and lower income students had more trouble

concentrating on schoolwork. These relationships are all weak to modest in strength. The two control variables were also significant in the expected direction, with overall GPA having a moderately strong relationship at b=.20. Among the explanatory variables, three stand out as very strongly associated with trouble concentrating: depression (b=.56), generalized anxiety (b=.46), and having adequate study conditions (b=.41). In addition, family conflict, caring for family members interfering with schoolwork, perceived family support, proportion of courses well-organized, perceived professor support, and perceived peer academic support all had betas above b=.25, indicating considerable strength (p<.001 for all). The economic distress/dislocation variables were the least influential, although homelessness, food insecurity, and financial insecurity all moderately increased trouble concentrating.

Multivariate Regression Analyses

Models Predicting Academic Performance

disruption, family dynamics, study conditions, and university support (including proportion of well-organized courses). Five variables were non-significant and were dropped from the analysis: food insecurity, being laid off or furloughed, number of children home from school or daycare, perceived academic advising support, and perceived psychological counseling support.

Model 1 in Table 4 includes all the stressor and support variables which had significant independent effects ($p < .05$) in the preliminary regressions. It shows that having good study conditions (b=.15), perceived professor support (b=.13), and having well-organized classes (b=.13) were most influential in explaining academic performance. The remaining variables were also significant at $p<.05$ except for having a family member lose a job. The model as a whole explains 24% of the variance in academic performance.

Model 2 adds the PHQ-9 depression scale to the background and control variables (b=

(not shown) adding to Model 4 an interaction term for perceived professor support x trouble concentrating. Figure 1 plots this interaction showing that indeed professor support improved academic performance much more for students with high levels of trouble concentrating.

[Insert Figure 1 here]

Models Predicting Difficulty Concentrating on Schoolwork

The tremendous influence of 'trouble concentrating' on academic performance and the prominence of this variable in students' qualitative responses led us to explore its correlates in a series of regressions explaining trouble concentrating. We first computed a regression with the social background and control variables (not shown) finding that students in the humanities and social sciences (b=.05), Latinx (b=.06) and Middle Eastern (b=.08) students, and those born in the U.S. (b=.04) had modestly more difficulty concentrating compared to students in the 'hard' sciences, whites, and those born outside the U.S. respectively (p<.05 for all). In addition, the two controls were significant at p<.001: students who began the term in a higher proportion online classes (b=.07) and students with higher overall GPAs (b=-.19) had lower levels of trouble concentrating. Combined the social background angr,.07 (s)-1 (> (()s)-1 (t) (r)3 (o (i)-2 (n)-dt)-2 (he)4

organization (b=.14). Combined, the variables explained an additional 29.6% of variance in trouble concentrating. Neither of the remaining economic stress and dislocation variables had a significant relationship controlling for the other variables.

Model 2 reports the influence of depression (PHQ-9) on trouble concentrating. With controls, moving from low to high on depression changes predicted values fully .54 of the trouble concentrating range (b= .54) and depression explains an additional 29.9% of the variance. Removing the concentration item from PHQ-9 only slightly lowers the influence of depression (b= .53). Model 3 reports the full model which adds the significant social risk and social support explanatory variables in Model 1 to Model 2. Model 3 explains 45.3% of the variance in the trouble concentrating with depression being by far the most influential variable (b=.37). Good studying conditions, (b=-.11), family conflict (b=-.11), and course organization (b=-.10) are the most influential of the remaining variables.

Finally, we compared the reduction in unstandardized betas for the stressors and support variables between Model 1 and Model 3 to consider the ways depression is implicated in these variables. The biggest reduction is a 74% decline in the beta for perceived family support, which is also moderately strongly correlated with depression. In addition, betas for Perceived Peer Academic Support and Perceived Academic Advising Support declined 45% and 50% respectively (both are negatively correlated with PHQ-9), suggesting that institutional academic support may have reduced trouble concentrating in part by lowering levels of psychological distress.

Discussion

We conducted a survey of 1806 undergraduates at CSUEB, applying a social stress and social resilience model to understand how the disruptions and stressors of COVID-19 affected students' academic performance and ability to concentrate on schoolwork during the Spring 2020

semester. Our most important findings were higher percentage of students who reported difficulty focusing on schoolwork – more than 4/5 (81%) of students said it was harder to focus on schoolwork after Covid-19. Further, we found that students' difficulty concentrating greatly in(he)-

conflict, perceived academic advising support, perceived peer advising support, and access to good study conditions.

Access to the basic material conditions of studying – reliable internet, a working computer, and a quiet place to study – substantially and robustly decreased students trouble concentrating and increased their academic performance. In another study,[21] we found that African American, Latinx, low income, and first generation students were least likely to have access to these basic studying conditions. Levels of family support, family conflict and responsibilities for caring for family members also substantially affected difficulty concentrating and academic performance. Future pandemic studies should explore family patterns in greater detail. Somewhat surprisingly, economic distress and disruption (e.g., job loss, financial insecurity, food insecurity) were not as influential as expected. Among our measures of economic insecurity, food insecurity was most strongly and robustly associated with difficulty concentrating and homelessness was most strongly associated with lower academic performance.

Students' perceived university support substantially and robustly influenced academic performance and lowered levels of trouble concentrating. The great influence of professors was highlighted by the robust influence of perceived professor support and proportion of courses that were well-organized on academic performance. The former was especially important for students with high levels of trouble concentrating. Other sources of university support were also influential. Perceived support from peer mentors and tutors was robustly associated with both academic performance and less trouble concentrating, and perceived support from academic counselors robustly lowered trouble concentrating. We must add that the four types of perceived university support (including professors) are strongly inter-correlated, suggesting that they constituted a united web of support to help students through this difficult semester.

This brings us to two important practical takeaways as we look to the new school year. First, this study highlights the crucial role faculty support played in student success. A growing body of literature indicates that undergraduates' levels of anxiety and depression are strongly linked to feeling unsupported by faculty and teachers.[8] While we can expect that courses will be, on average, better organized and we can hope that students and faculty will be better adjusted to our Covid-19 conditions, we urge professors to continue regular check-ins with students and make extra efforts to reach out to students who are struggling or falling behind. Connecting students with various university support systems is always important, but never more so than in the upcoming year. This will be especially challenging when most or all contact between faculty and students will be online.

In conclusion, this study highlights the many disruptions and dislocations that students experienced amid the Covid-19 pandemic and the extent to which these challenges impacted students' academic performance and ability to concentrate on school work. Major strengths of this study include that it is one of the first to examine such challenges in U.S. college students in a Covid-19 context and the wide range of stressors investigated. However, causal inferences cannot be made due to the study's cross-sectional design and it is possible that there was a sampling bias in the 15% of CSUEB students who completed the survey.

As we are writing, media coverage of academia is reporting the high levels of psychological distress that students faced in spring and the difficulty students had gaining access to mental health services.[22,23] Our study adds weight to this concern. We urge faculty, advisors, peer mentors, counselors, and the full range of student support services to expand their networks of communication about mental illness and support for those who are in distress.

Table 1. Trouble Concentrating on and Completing Schoolwork						
	Strongly disagree	Somewhat disagree	Neither	Somewhat agree	Strongly agree	N=
I had trouble concentrating on schoolwork	10%	9%	8%	29%	44%	1801
I had trouble completing my school work on time	21	16	13	24	26	1799
It often seemed like schoolwork was unimportant	18	13	19	26	24	1802
My life was so disrupted that I couldn't do schoolwor	27	19	20	21	13	1801
	A lot easier	Somewhat easier	Same	Somewhat harder	A lot harder	N=
Since Covid 19, was it easier or harder to focus on y schoolwork, or was there no change?	3%	5%	10%	26%	55%	1801
Percentages are rounded to the nearest whole percent.						

Table 2 Academic Performance					
	No	Yes, one	Yes, two	Yes, three +	N=
Did worse in a class after we moved to shelter in pla	47%	26%	16%	11%	1782
Did betterin a class after we moved to shelter in pace	50	22	14	14	1790

	Declined great deal	Declined somewhat	Same	Improved somewhat	Improved great deal	N=

Table3. Univariates and

Table 4. OLS Regressions Explaining Academic Performance					
	Model 1	Model 2	Model 3	Model 4	% b, Models 1 to 4
	b	b	b	B	
Overall GPA	-.01	.02	-.02	-.05	
Proportion courses online at star	.05*	.07***	.04*	.03	
Family conflict	-.05**			.01116%0Tw[(Tj EM2.337	