



The Impact of Academic Disruption on Stress Among College Athletes

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Student-athletes are subject to high levels of stress due to their combined academic and athletic responsibilities, which can have a negative impact on health and academic performance. The COVID-19 global pandemic caused unparalleled academic disruption and increased stress for all college students. This study examined perceptions of academic stress specifically, both prior to and during the pandemic, and factors that contribute to increased stress levels. One-hundred forty-eight student-athletes from a division three institution completed a quantitative stress questionnaire prior to and during the pandemic. Results showed that females experience more academic stress than males, that stress increased significantly during the pandemic, and that GPA and hours spent studying were predictors of academic stress, while number of credits, sport season, and use of support services were not. This research indicates that support for academic stress management and academic performance is warranted and should target high risk groups, especially during times of academic disruption.

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Student-athletes are a unique subgroup of students who often experience high levels of stress due to their combined academic and athletic responsibilities. Stress caused by academic pressures exists among nearly all college students, but student-athletes' stress levels are compounded by their athletic expectations, time commitments, and heavy travel schedules (Humphrey et al., 2000; Wilson & Pritchard, 2005). Many resources exist to provide student-athletes with time management strategies, stress coping skills, and academic support. Depending on sport, division, and academic need, student-athletes often have a combination of academic advisors, tutor coordinators, and academic learning specialists (Blum, 2020; William et al., 2010). These resources are put into place to ensure that student-athletes have the best opportunities to succeed in the classroom while also competing for their athletic team.

The environment created for student-athletes has predominantly assumed a 'typical' college experience, meaning on-campus, in-person classes, face-to-face support from instructors and an advising team, and a cyclical in- and out-of season athletic schedule depending on the sport. However, in March 2020, due to the expanding global pandemic, college student-athlete experiences became anything but typical. The majority of educational institutions shut down for live, on-campus experiences, restricted travel, and instituted stay-at-home orders (Kamenetz, 2020). Classes shifted to an online or virtual format, athletics seasons were abruptly postponed or cancelled, and students and faculty alike were forced to adopt technology platforms intended to support continued learning. Even months later when colleges and universities partially reopened, every aspect of college life remained atypical. In short, this pandemic's impact on higher education, and on students and student-athletes specifically, was unprecedented and one for which many were unprepared.

With these changes came heightened levels of stress and mental health challenges across college campuses (Sutton, 2021). Student-athletes specifically were dealing with a transition to online learning, coupled with limited access to training facilities and practice structures to which they were accustomed, and cancelled or postponed seasons (Bullard, 2020; Johnson, 2021). An NCAA initiated well-being survey revealed that mental health concerns among student-athletes were one and one half to two times higher than usual during the pandemic (NCAA student-athlete well-being survey, Fall 2020). Collectively, the pandemic seems to have had clear negative impacts on student-athletes in terms of stress.

The current study aims to specifically address how levels of academic related stress in student-athletes changed from pre-pandemic to during the pandemic. There is limited information available specific to academic related stress among student-athletes. While the pandemic was a world-changing phenomenon that everyone hopes will not occur again, it provides an opportunity for exploration of how stress levels among student-athletes change during a time of academic disruption. Better understanding this change, and any moderating factors that either minimized or exacerbated levels of academic stress, could be valuable in future situations where student-athletes face periods of heightened uncertainty and subsequent stress. Factors such as gender, class year, and GPA have all been previously linked to stress in college students (Bullard, 2020; Kecojevic et al., 2020; NCAA, 2020; Prowse et al., 2021; Struthers et al., 2000; Wilson & Pritchard, 2005). Other factors such as number of credits enrolled, hours spent preparing for exams, sport season, and use of academic support services have been linked to parallel issues such as perceptions of workload and academic performance, thus were also included as potential moderating variables in this study (Bedewy & Gabriel, 2015; Dilley-

Knoles, 2010; Kausar, 2010; Scott et al., 2008; Williams et al., 2010). Therefore, the purpose of this study is to assess how perceptions of academic stress in student-athletes have been impacted by the academic disruption caused by the pandemic, and what factors have influenced this.

Literature Review

Student-Athletes and Stress

Many college student-athletes experience high levels of stress related to their combined academic and athletic responsibilities. While all college students experience academic stress as one of their primary stressors (Kottler & Chen, 2011), the stress upon athletes is often compounded by an intense schedule and unique internal and external pressures. Humphrey et al. (2000) state that 95% of male and 86% of female student-athletes were stressed by academic pressures such as tests, exams, and writing papers. They also note that this stress was compounded by the time pressures of athletic travel. Wilson and Pritchard (2005) posit that freshman student-athletes experienced more stress than their non-athlete counterparts related to time management issues, increased number of responsibilities (athletic and academic), and not getting enough sleep, although they did not report more academic concerns specifically. Bedewy and Gabriel (2015) found that students perceived their sources of academic stress in four categories: pressures to perform, perceptions of workload, academic self-perceptions, and time restraints. In another attempt to understand the stress experienced by student-athletes, Lu and colleagues (2012) identified eight categories of stressors: sports injury, performance demand, coach relationship, training adaptation, interpersonal relationships, romantic relationships, family relationships, and academic requirements. It is clear that athletes face multiple sources of stress, academics being a major one of them.

Student-athletes are not alone in terms of experiencing stress while in college. Managing stress can be an important component of mental health and wellness. Students who have unmanaged stress are at risk for numerous unhealthy physical and psychological medical conditions, such as depression, gastrointestinal disorders, autoimmune disease, and chronic pain (Kottler & Chen, 2011; U.S. Department of Health and Human Services [USDHHS], 2021). In addition to the health implications, academic stress has repeatedly been shown to have a negative impact on grade point average and other measures of academic performance (Akgun & Ciarrochi, 2003; Felsten & Wilcox, 1992; Lloyd et al., 1980; Shields, 2001; Struthers et al., 2000). This was especially true for students who had low levels of resourcefulness (Akgun & Ciarrochi, 2003). While resourceful students experienced just as much stress, they were able to handle it, where low resourceful students were not and thus had poorer academic performance. Struthers and colleagues (2000) also identified a link between academic stress and academic performance. And while academic support resources have been shown to help improve academic performance outcomes, particularly when tailored to specific demographic groups, there does not appear to be any literature connecting those resources specifically to perceptions of academic stress (Dilley-Knoles, 2010; Williams et al., 2010). What has been established is that students who utilized problem-focused coping more effectively managed academic stress, which had a positive impact on course grades (Struthers et al., 2000). In addition to resourcefulness and problem-solving strategies, time management and improved thinking and learning techniques (all skills that are often included in academic support programs) are other skills that have been positively linked to academic stress management (Kausar, 2010; Misra & McKena, 2000). The

implications of this body of research are that students, and student-athletes specifically, are likely to experience high levels of academic stress, but that active management strategies can be enlisted to minimize the negative impact.

COVID-19 Pandemic's Impact on Mental Health, Athletic, and Academic Performance

In 2020, the Coronavirus (COVID-19) pandemic presented an entirely new variable to the stress experienced by college students. COVID-19 is a severe, acute respiratory illness that is spread from person to person in close contact (CDC, 2020). In response to the global spread of COVID-19 in March of 2020, most educational institutions were shut down, travel was restricted, and stay-at-home orders were instituted across the world (Kamenetz, 2020). Colleges and universities were forced to abruptly transition from in-person classes to a distance learning format, students moved home, and athletic seasons were canceled. The shift to online learning from home resulted in major disruptions to the structure of students' daily lives as they were separated from their peers, had to adjust to new technology and learning platforms, and often had limited access to support systems upon which they had previously relied (Tasso et al., 2021).

While mental health crises are always a concern on college campuses, these concerns increased significantly during the pandemic (Sutton, 2021). Lee et al. (2020) found most college students at one university experienced stress, anxiety, and depression associated with the pandemic, with 88% of respondents reporting moderate to severe stress. Studies conducted in myriad regions around the world revealed similar findings (Cao et al., 2020; Hicks et al., 2021; Kecojevic, 2020), as did a large-scale study representing over 18,000 students from 14 college campuses in the United States (Healthy Minds, 2020). This study revealed that rates of depression among college students increased by almost one third from the fall of 2019 to the spring of 2021. Specific sources of stress stemmed from a variety of factors related to the pandemic, though the authors did not specifically examine academic sources of stress.

Students reported that the transition to online learning was particularly difficult and negatively impacted their academic work (Garris & Fleck, 2020; Hicks et al., 2020; Kecojevic et al., 2020; Prowse et al., 2021). Research in the field of distance learning suggests students who are used to in-person learning and students in demographic groups that are underserved or economically disadvantaged may find the online learning environment particularly challenging (Xu & Jaggars, 2014). Moreover, students attending fully residential colleges presumably favor the in-person educational experience and thus, could be more likely to struggle when courses are suddenly moved online (Jaggars, 2014). While the transition to online learning did allow students to continue their education during the pandemic, the abrupt transition from in-person to online instruction was perceived negatively by students in terms of the quality of the learning experience (Garris & Fleck, 2020). Additionally, the pandemic led to higher rates of school related anxiety and a negative effect on the ability to attend to academic content (Hicks et al., 2021). Difficulties related to academics were also associated with depression, anxiety, somatization (i.e. experiencing physical symptoms), and stress (Kecojevic et al., 2020). Females were more likely to report higher levels of stress and negative outcomes but also more likely to access support resources (Kecojevic et al., 2020; Prowse et al., 2021).

Research revealing the negative impact of the pandemic on stress and anxiety in college students is conclusive, yet there is little research focusing on collegiate student-athletes specifically. Given the unique challenges that student-athletes face during a normal academic year, it is reasonable to assume that pressures during the pandemic could be amplified for

student-athletes. The NCAA Student-Athlete COVID-19 Well-Being Survey conducted in the spring of 2020 revealed that the pandemic had numerous impacts on student-athletes' mental health and identified specific factors that contributed to feelings of stress, anxiety, and depression (NCAA, 2020). A majority of student-athletes reported high rates of mental distress as a result of the pandemic and the effects were more pronounced for women, students of color, and economically disadvantaged students. Student-athlete respondents reported negative experiences related to their current living environment and barriers to training. Most students reported challenges related to the transition from in-person to online classes. Only half reported feeling positive about keeping up with their coursework, yet still 70% indicated that they felt positive about their ability to pass their classes for the semester.

Bullard (2020) reported similar findings in a study focusing on the well-being of Division III student-athletes, in which two thirds of respondents reported experiencing stress during the pandemic. The study included a qualitative component which asked students to comment on specific factors related to athletics, academics, coping strategies, and support resources. Lack of resources to train and practice their sport was the most common source of stress, along with difficulty staying connected and motivated. Lack of a consistent schedule and difficulty managing schoolwork while learning from home were also common themes, though overall, respondents were able to successfully manage their schoolwork. Females were more likely than males to feel that they could manage their schoolwork, yet at the same time, were more likely to rate the transition to online classes as extremely challenging. As a class, seniors found the transition to online learning most challenging. Qualitative data revealed three themes related to academic challenges during the spring of the shutdown: the transition to online learning, issues related to their professors, and struggles being off campus. Qualitative data also indicated a desire and need for universities to provide resources for stress management, time management and coping skills (Bullard, 2020).

Even as the majority of student-athletes returned to some form of in-person or hybrid learning models in the fall of 2020, most college athletic seasons were cancelled or postponed, leaving student-athletes with limited access to training facilities and practice time and a lack of structure to which they were accustomed (Bullard, 2020; Johnson, 2021). A follow-up survey conducted by the NCAA in the fall of 2020, which included 25,000 student-athletes, revealed that rates of mental health concerns, though slightly lower than in the spring of 2020, remained one and a half to two times higher than usual (NCAA student-athlete well-being survey, Fall 2020). Women, student-athletes in their senior year, and minority populations were again most likely to report mental health concerns. Interestingly, student-athlete confidence in their ability to keep up with their academic work and pass their classes decreased in the fall compared to the spring, with women feeling less positive than men and student-athletes attending classes virtually also less confident. "Academic worries" was the top factor contributing to negative mental health (Johnson, 2021, p.1).

Collectively, the limited data available indicates that the pandemic negatively affected collegiate student-athletes in numerous ways. Academic concerns clearly contributed to elevated levels of stress, however there is limited information available specifically examining academic related stress. The transition to online learning and limited access to support resources seem to be the strongest contributors and some groups (i.e. women, minorities, seniors) were more negatively affected than others. While a global pandemic is (hopefully) a rare occurrence, research examining perceptions of academic stress during the pandemic could help to identify resources to aid students in managing academic stress during challenging times of academic

disruptions that could potentially arise in the future. Given this need, the purpose of this study is to answer the following research questions:

- RQ 1: What was the extent of academic related stress in student-athletes prior-to and during the academic disruption caused by the pandemic?
- RQ 2: What factors (e.g. demographic, academic) impact perceptions of academic stress?

Method

Participants

All student-athletes at a small, private, Division III liberal arts institution were invited to participate in this study. The first survey (Fall 2019) was initially constructed as part of a different study, which was unable to continue due to the pandemic. Upon Ethics Board approval, researchers transitioned to a focus on the impact of the pandemic on perceptions of academic stress, with the initial research data collection serving as the first survey of this study. Rosters were provided to the researchers by coaches and all 479 student-athletes were contacted via email from the research team, with a follow-up email from coaches encouraging them to participate. Some coaches invited the researchers to attend a team meeting to invite students to participate. Three hundred seventy-eight (79%) student-athletes completed the initial survey, representing all 22 intercollegiate sports as well as cheerleaders.

Of the student-athletes who completed the first survey, 40 graduated and 20 did not re-enroll for the Fall 2020 semester. Only students who completed the first survey and returned to the college as either residential or on-line students were invited to participate in the second phase of data collection. Again, they were recruited by direct email from the researchers and a follow-up email from coaches. One hundred forty-eight student-athletes completed the second survey (47% of those who took the first survey and returned). Data analysis included only student-athletes who completed both surveys. Table 1 depicts demographic information describing the sample. The demographics represent the sample ($n = 148$) of student-athletes who completed both surveys.

Procedures

Student-athletes who were over age 18 and chose to participate signed an electronic informed consent document prior to responding to the surveys. As an incentive for participation, student-athletes who completed the surveys were entered into a drawing to win a small gift. Qualtrics was used to administer the electronic surveys. This project was approved by the college's Institutional Review Board. Initial survey data were collected during the first two weeks in November 2019, falling approximately halfway between midterm and final examinations. Second round data were collected during the exact same time period in November 2020. The second survey was identical to the first, minus demographic questions. During the time of the second survey the college was operating in a hybrid learning environment due to the pandemic, with students having the choice to live on- or off-campus and to attend classes in person or virtually. Approximately 70% of all students, and 85% of student-athletes, opted to

attend classes in person during this time frame. Athletic teams were practicing on a limited basis, but there was no competitive athletic season in the fall of 2020.

Table 1
Sample Demographics (n = 148)

Gender	Male	51.7% (77)
	Female	48.3% (72)
Race	Black	11% (16)
	Hispanic	5% (8)
	Hawaiian/Pacific Islander	<1% (1)
	Multiracial	5% (7)
	White	74% (109)
	Unknown	5% (7)
Sport type	Individual	15.2% (22)
	Team	84.8% (123)
Sport season	Fall	44.1% (64)
	Winter	9.0% (13)
	Spring	39.3% (57)
	Multiple	7.6% (11)
Anticipated Graduation	2020	4.8% (7)
	2021	27.2% (40)
	2022	29.3 (43)
	2023	38.8% (57)
Spring 2020 Course Modality	On campus	83.10%
	Virtual	16.90%
Average # of credits per semester	14.72	
Average GPA	3.19	

Measures

Two instruments were utilized to assess perceptions of academic stress. The research team evaluated many instruments that measure perceptions of stress and determined that there was not a single questionnaire that assessed the point in time affective self-assessment of academic induced stress intended for this study; thus, subscales from multiple instruments were utilized to establish a more complete picture of the range of perceptions surrounding academic stress that may be experienced by student-athletes.

The Medical Student Stressor Questionnaire [MSSQ] is a 40-item (6 factors) scale designed to assess stressors among medical students (Yusoff & Yaacob, 2010). The Academic Related Stressors (ARS) subscale, consisting of 13-items, was utilized for this study. Participants were asked to rate the intensity of stress caused by various academic factors on a Likert scale ranging from 1 (no stress at all) to 5 (causing severe stress) for each item. Responses were averaged to calculate overall perceptions of academic stress. One item was adapted to remove medical school specific terminology and make it applicable for general academic study.

The ARS subscale was selected to focus more broadly on perceived academic stress related to the desire and ability to succeed academically. The MSSQ's scale scores indicate high reliability (Chronbach's $\alpha=.952$) as does the academic related stressors subscale scores (Chronbach's $\alpha=.921$). This sub-scale has been used by several other scholars who confirmed strong validity and reliability (Kausar et al., 2018; Muhammad et al., 2019; Pokhrel et al., 2020).

Four items were selected from the Perceptions of Academic Stress Scale [PAS] (Bedewy & Gabriel, 2015). The PAS is an 18-item instrument with strong content validity (89 percent agreement among a 12-person expert panel) and reliability (Chronbach's $\alpha=0.7$) (Bedewy & Gabriel, 2015). Validity and reliability of the scale's scores were additionally confirmed by others who have used this instrument in the past (e.g., James, 2017; Sharma, 2018). The validated Perceptions of Workload and Examinations Subscale consists of four items (Chronbach's $\alpha=0.6$) and was selected for the current study based on relevance, specifically to assess point-in-time perceptions of academic stress related to workload (Bedewy & Gabriel, 2015). Participants were asked to rate their perceptions on a 5-point Likert scale (1= strongly disagree, 5= strongly agree). Responses were averaged to calculate overall perceptions of academic stress. For data analysis, PAS items were reverse coded for consistency among measures, with 1 representing low perceived stress and 5 representing high perceived stress.

Additional demographic and academic questions were included in the survey, including gender, sport, class year when they took the first survey, self-report GPA when they took the first survey, number of credits enrolled, hours spent preparing for exams, and academic support structures utilized. These demographic variables were examined because of their association with stress among college students in previous studies. For example, researchers found gender (Kecojevic et al., 2020; NCAA, 2020; Prowse et al., 2021), class year (Bullard, 2020; NCAA, 2020; Wilson & Pritchard, 2005), and GPA (Kecojevic et al., 2020; NCAA, 2020; Prowse et al., 2021; Struthers et al., 2000) were factors related to stress experienced by college students. Number of credits enrolled, and hours spent preparing for exams may be perceived by students as workload which has been positively correlated with stress in the literature (Bedewy & Gabriel, 2015; Kausar, 2010). Perceptions and effectiveness of academic support resources are often explored in the literature, though most focuses on academic performance outcomes (Dilley-Knoles, 2010; Williams et al., 2010). Since access to such resources was potentially limited by the pandemic, particularly for students who were learning remotely, it was important to identify whether this was a factor related to stress. Similarly, sport season has been previously connected to academic outcomes (Scott et al., 2008), and Whitsell & Naquin (2016) specifically suggested examining the connection between stress and sport season. The variable of race was only collected in aggregate form.

Data Analysis

Data were analyzed through a combination of quantitative measures. To answer research question one, measuring the extent of academic related stress in students, descriptive statistics (means, standard deviations) were run on the MSSQ and PAS scales. To assess how perceptions of academic stress were impacted by the pandemic, a repeated measures MANOVA was run utilizing the prior to- and during-pandemic MSSQ and PAS scores as the two dependent, within-subjects variables. The statistically significant predictor results from research question two were included in the model as covariates to control for potential demographic and academic factors that may confound academic stress caused by the pandemic. Sport season, modality of courses

during the pandemic, and gender were also included as between-subjects variables to assess potential differences across important groups and situations within intercollegiate athletics. The Bonferroni-adjusted estimated marginal mean results controlling for the covariates were interpreted to assess both the within- and between-subjects differences.

Two linear regressions were conducted to answer research question two, assessing what factors impact perceptions of stress. One regression was run for each measure of academic stress (MSSQ and PAS). In each case, the dependent variable for the model was measured prior to the pandemic-affected semesters. The independent variables included gender, GPA, class year, number of enrolled credits, season of competition (dummy variable), utilization of academic support (yes/no), and average number of hours of test preparation. Similar to the dependent variable, these variables were measured prior to the pandemic.

Results

Research question one asked, *What was the extent of academic related stress in student-athletes prior-to and during the academic disruption caused by the pandemic?* Results indicate that student-athletes report relatively high levels of academic stress, considering the mean stress levels on the MSSQ were 3.357 (pre-pandemic) and 3.610 (during pandemic) and on the PAS were 3.368 (pre-pandemic) and 3.60 (during pandemic). All academic stress scores are above 3.0, indicating higher than average levels of academic stress within the sample, even prior to the academic disruption caused by the pandemic.

Controlling for the statistically significant predictor variables of GPA and hours preparing for a test (see RQ2 results below), a repeated measures MANOVA indicated that there was a statistically significant increase in academic stress from pre-pandemic to during-pandemic on both the MSSQ ($F = 7.803$; $p = .006$) and the PAS ($F = 5.801$; $p = .025$). Figure 1 demonstrates the differences from pre- to during-pandemic differences on both scales.

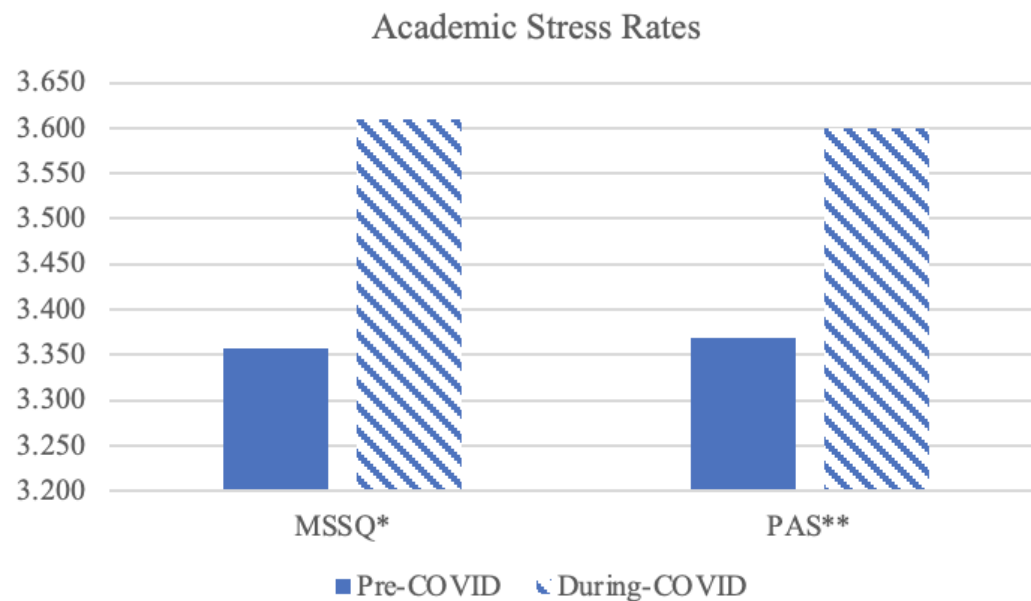


Figure 1

Mean Differences in Academic Stress Pre- and During-COVID

* $p = .006$

** $p = .025$

Research question two, *What factors impact perceptions of academic stress?*, attempted to determine whether other factors, including gender, GPA, anticipated graduation year, number of enrolled credits, season of competition, utilization of academic support, course modality during the pandemic (in person or on-line), and average number of hours of test preparation predicted academic stress levels. Two linear regressions, one for MSSQ and one for PAS, and each including all above-mentioned variables, identified only GPA and hours spent preparing for a test as predictive factors. GPA negatively impacted both factors of academic stress. In other words, those with higher GPAs prior to the pandemic were more likely to report low levels of academic stress. Those who studied more, however, felt the opposite. The average number of hours spent preparing for a test positively impacted academic stress levels. Thus, the more they studied, the more likely they were to experience academic stress. See Table 2 for all variable information in both regression models. No other factors in the regression equation were significant predictors of academic stress.

Table 2
Linear Regression Results of MSSQ and PAS

	B	Std. Error	Beta	t	Sig.
MSSQ*					
(Constant)	3.434	1.005		3.416	0.001
GPA	-0.440	0.162	-0.276	-2.710	0.008***
Hours Preparing	0.091	0.043	0.229	2.123	0.036***
Gender	.282	.171	.164	1.649	.103
Anticipated year of graduation	.063	.101	.063	.631	.530
# of enrolled credits	.053	.055	.095	.960	.339
Help from tutors or academic coach	-.199	.187	-.107	-1.065	.289
Fall sport	-.243	.477	-.141	-.511	.611
Winter sport	-.226	.530	-.080	-.426	.671
Spring sport	-.255	.482	-.140	-.529	.598
Fall / Spring sport	.262	.533	.085	.491	.624
PAS**					
(Constant)	4.635	0.872		5.317	0.000
GPA	-0.519	0.138	-0.367	-3.756	0.000***
Hours Preparing	0.091	0.037	0.255	2.489	0.015***
Gender	.209	.872	.135	1.401	.164
Anticipated year of graduation	.034	.086	.037	.396	.693
# of enrolled credits	.019	.048	.039	.410	.683
Help from tutors or academic coach	-.214	.163	-.127	-1.318	.191
Fall sport	-.323	.416	-.207	-.777	.439
Winter sport	-.023	.463	-.009	-.050	.960
Spring sport	-.180	.420	-.111	-.428	.670
Fall / Spring sport	.041	.465	.015	.089	.929

*MSSQ: $R^2 = .156$; $F = 2.961$; $p < .001$

**PAS: $R^2 = .284$; $F = 3.883$; $p < .001$

*** Significant at .05 level

Sport season, modality of courses in Fall 2020 (in-person or online), and gender were assessed as between-subjects variables to identify potential differences across important situations. Neither sport season ($F = 1.924$; $p = .132$) nor modality of courses ($F = .952$; $p = .332$) showed any significant differences. Gender, however, did result in significant differences between men and women on both scales. While women reported higher levels of academic stress both pre- and during-pandemic, men had a greater increase in academic stress during the pandemic, indicating a statistically significant difference from pre- to during-pandemic ($F = 3.441$; $p = .047$). Figure 2 depicts the differences for both men and women on both scales from pre- to during-pandemic.

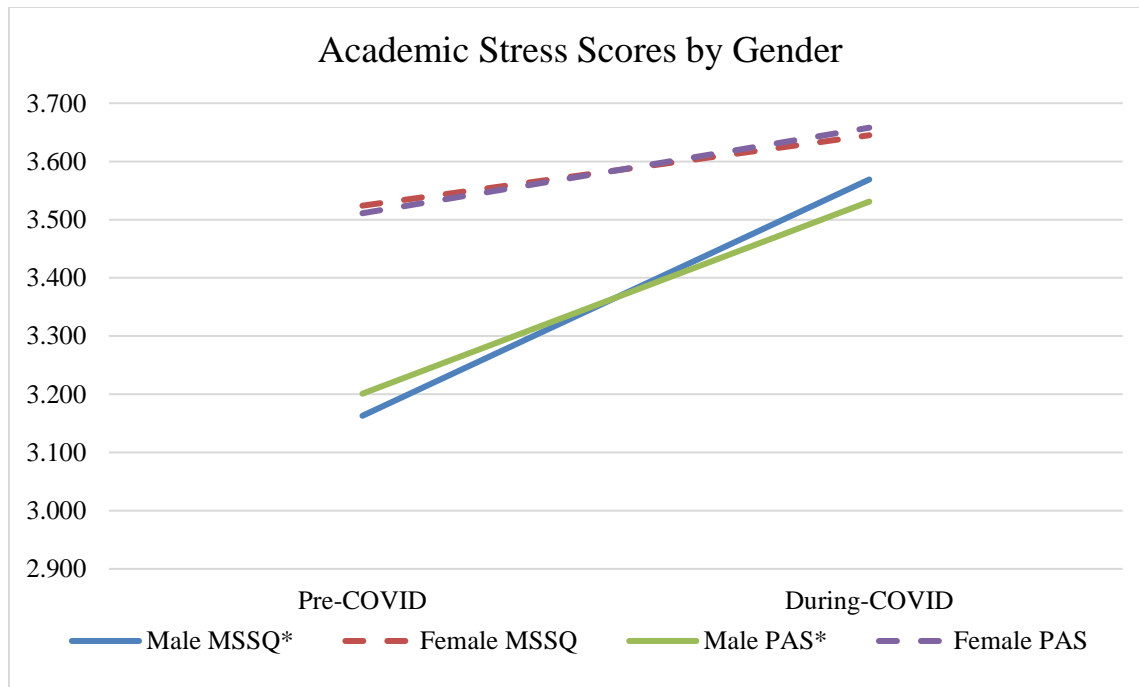


Figure 2.
Academic Stress Scores by Gender
* $p = .047$

Discussion

Student-athletes experience high levels of perceived stress related to academics, consistently rating themselves on the moderate to high stress continuum on the MSSQ scale, and equivalently on the PAS scale. When the COVID-19 pandemic disrupted the academic environment, already high stress levels increased significantly. In fact, when asked specifically how COVID had impacted their stress related to academics, the majority (68%) reported that it had increased. This phenomenon happened despite the fact that student-athletes did not experience a significant change in credits or access to academic support, and most (83.1%) had returned to an in-person learning environment. In fact, many colleges and universities, including the one represented in this study, adjusted grading policies and other course requirements (e.g., attendance requirements, presentations, group projects, due dates) during the pandemic. So, while there were efforts made by faculty and administrators to address the disruption and ease

academic burdens, student-athletes still experienced increases in perceptions of academic stress. These results are consistent with other research which found that stress and anxiety increased among all student groups during the pandemic (Healthy Minds, 2020; Kecojevic et al., 2020; NCAA, 2020).

Also consistent with other studies, female student-athletes experienced more academic stress than their male counterparts (Bullard, 2020; Kecojevic et al., 2020; NCAA, 2020), both before and during the pandemic. This was not surprising since females generally report higher levels of stress than males (Brougham et al, 2009; Olfert et al, 2019). Interestingly, while women's stress was higher both prior to and during the pandemic, men's stress significantly increased from before the pandemic to during the pandemic, while women's did not. As depicted in Table 2, this significant increase in academic stress for men from pre- to during-pandemic brought their stress levels much closer to those of the women in the during-pandemic time frame. There is no clear explanation for this increase in stress for men, either in the current study or in previous literature. One possible explanation is that females' stress levels were already high and there was simply less room for increase. Additional speculation points to the nuanced experience of stress during the pandemic discussed in the literature, including confidence to manage the workload and how students experience the transition to and from online learning (Bullard, 2020; NCAA, 2020). Furthermore, gender differences in perceptions of academic support highlighted in previous literature could have played role. Research has shown that male student athletes have more negative perceptions of formal academic support structures like tutoring and study halls than female student athletes and that females rely more on their coaches for academic support than males (Williams et al., 2010). Similarly, Dilley-Knoles (2010) found that academic support programs provided for student athletes were less successful for males than females in terms of academic performance measured by GPA, and concluded that academic support programs may need to be structured differently for males and females. During the pandemic, student athletes did access support structures including tutoring and study halls but may have had limited access to other types of academic support like teammates and peers. While we did not examine these interactions, it is possible that the type of academic support that men tend to use and benefit from was not available during the pandemic, resulting in a greater increase in academic stress for men. Therefore, the larger jump in stress for men is worth further investigation in order to determine why their increase was more pronounced and statistically significantly higher.

None of the other demographic differences examined were related to significantly higher levels of academic stress during the pandemic, including number of credits enrolled in, class year, use of academic support services, or class attendance in-person versus virtually. The lack of differences based on class year are contrary to the findings of Kecojevic and colleagues (2020) who found that freshmen experienced lower levels of anxiety compared to students who were not freshmen, and to Johnson (2021) who found that seniors experienced more stress during the pandemic than students in other class years. Previous research has shown that transitioning to on-line learning and lack of support resources have a negative impact on academic performance (Garris & Fleck, 2020; Hicks et al., 2020; Kecojevic et al, 2020; Prowse et al, 2021; Williams et al., 2010). However, academic stress has not been previously examined as a dependent variable. The lack of relationship found in this study indicates that there may be distinct performance factors associated with these moderating variables independent of perceived academic stress. So, while the connection between stress response and performance is established (Akgun & Ciarrochi, 2003; Felsten & Wilcox, 1992; Lloyd et al.,1980; Shields, 2001; Struthers et al.,

2000), utilizing support resources and maintaining in-person learning do not appear to moderate perceptions of academic stress alone.

When examining perceptions of academic stress, only two variables were predictors of change in stress levels: GPA and hours spent preparing for exams. Generally speaking, GPA and stress have an inverse relationship; stress levels decrease as GPA increases. Conversely, the more time spent preparing for an exam, the higher levels of academic stress among student-athletes. These two variables were then controlled for when assessing the impact of the pandemic on academic stress. One possible explanation for the impact of these variables is that students study more when they become stressed. Alternatively, those who tend to spend more time studying were adversely affected by not having some of the study strategies they are accustomed to during the pandemic, thus they spent even more time studying to compensate for inaccessible strategies such as professor office hours and study groups. The latter is supported by the literature which shows that a lack of social support and limited connection to campus resources during the pandemic was associated with higher levels of stress (Bullard, 2020). Regardless of the reason, the association between hours studying and perceived stress should be considered when teaching students coping strategies and study skills. Resourcefulness, problem-focused coping, and time management have all been linked to academic stress management (Akgun & Ciarrochi, 2003; Kausar, 2010; Struthers, et al., 2000). These skills may be particularly beneficial for students with a lower GPA or those who spend excessive amounts of time studying yet still experience significantly higher levels of academic stress.

While the particular disruptive event experienced during the timeline of this study was COVID-19, there are transferable take-aways from examining student-athletes' perceptions and stress levels that can be applied in various situations. Disruptions to the college experience can happen at any time to an individual, a team, a college, or a nation. For example, natural disasters have abruptly forced entire college campuses to close for a significant period of time. On a team level, the sudden death of a teammate has caused intense emotional distress. Individual athletes may experience a catastrophic injury or death in the family that requires them to be absent from campus for weeks at a time. So, while the pandemic was a unique event, disruption to the academic environment is not unique and is something worth examining and preparing for. When these disruptions happen, they impact every area of life, so even if the event is not academic specific (such as COVID-19 which was primarily a health crisis), the trickle-down effect on academics is real in the minds of student-athletes. This is consistent with findings among college students in general and thus, being prepared to provide robust academic and mental health support for all areas of life is important (Healthy Minds, 2020).

Many people have attributed the challenges associated with the pandemic disruption to the fact that students had to quickly shift learning modalities from face-to-face, in person classes to on-line or virtual class environments. These changes resulted in less access to campus-based resources and social support. It also restricted the learning modalities that faculty could employ and students could use to study. However, the current study found that there was no significant relationship between perception of academic stress and the way that students attended classes in the Fall 2020 semester (during the pandemic). This is supported by an NCAA (2020) study, which found that during the pandemic student-athletes reported challenges with online classes, yet most (70%) indicated that they felt positive about their ability to pass their classes. These apparently contradictory experiences of disliking and attributing stress to on-line academic learning, while also finding it manageable, may be related to measures taken by colleges and universities to alleviate academic burdens during the pandemic such as easing some academic

policies and allowing for pass/fail grading options. Therefore, the lack of relationship between on-line learning and academic stress in this study does not minimize the academic challenges associated with balancing virtual and in-person learning, but does suggest that it is not a primary factor in the way that student-athletes perceive academic related stressors. The outcome measures in this study specifically examined stress related to the perceived desire and ability to succeed academically (MSSQ) and perceived workload (PAS), so student-athletes may have disliked on-line classes or struggled with them in other ways, but they did not associate them with higher levels of stress as operationalized by this study.

Interestingly, the use of academic supports was also not associated with lower perceived academic stress in this study. Support resources were defined as tutoring, academic coaches, and departmental help sessions. It is possible that academic supports are effective at helping student-athletes to pass classes and maintain eligibility, but not raising them to the level of high academic achievement that would help to mediate their perceptions of stress. Other researchers have found that general support services are beneficial during times of academic disruption (Lee et al., 2021), however this study found that academic specific support services such as tutoring and academic coaching were not effective at helping to manage academic stress.

Despite this finding, colleges and universities can and should offer targeted support for student-athletes all the time, and especially during particularly stressful times, perhaps with a greater emphasis on stress management (Cao et al., 2020). The Association for Applied Sport Psychology offers specific recommendations for student-athletes but does not address recommendations specific to academic stress, indicating an area worth further research and attention (AASP, 2020). While students may have little control over stressful events in their lives, they can control how they approach their academics, and support services can provide specific strategies and resources in that regard (Akgun & Ciarrochi, 2003). Special efforts should be made to connect with groups of students who tend to experience the most academic stress including females, and student-athletes who have a low GPA. Female student-athletes are consistently more stressed than male athletes, thus may require additional attention to learning academic stress management techniques preventatively. During academic disruptions, students with poorer general academic performance should also receive special attention. By providing targeted support to these higher risk groups, the interventions can be more customized and intentionally reach those in greatest need of stress relief.

A recent trend among NCAA Division I institutions has been to add a role generally referred to as learning specialist. Learning specialists are hired within athletics academic advising departments with a focus on providing “individualized skill development and learning strategy instruction to student-athletes who are identified as academically underprepared” (Steinberg et al., 2018, p. 92). These positions grew by 70% from 2012 to 2015 (Wolverton, 2016), and this trend has no doubt continued. While learning specialists supplement the work of academic advisors, working predominantly with student-athletes identified at-risk academically, the tools they share in helping their student-athletes achieve success could very likely help all student-athletes in a time of academic disruption, such as that caused by the pandemic.

Additionally, academic support resources provide an opportunity to address broader stressors and coping strategies during times of academic disruption. Student-athletes in this study continued to access academic support resources, such as tutoring and academic coaches, throughout the pandemic. However, those support services did not have a significant impact on perceptions of academic stress. This indicates that these types of services, which are already being accessed, provide an untapped opportunity to reach student-athletes who need stress

related support, particularly those who are lower academic achieving and had a greater increase in stress levels during the pandemic. This is particularly important because stress can be a barrier to achievement in the classroom and on the field, and have other negative health implications (Akgun & Ciarrochi, 2003; Felsten & Wilcox, 1992; Kottler & Chen, 2011; Lloyd et al., 1980; Shields, 2001; Struthers et al., 2000; USDHHS, 2021). In fact, according to Johnson (2021), academic worries were the number one contributor to negative mental health amongst college students, highlighting the importance of addressing academic related stress at every possible opportunity. Future research should specifically examine the role of academic specific support for both academic performance and related stress. This should include the use of active stress management and learning strategies for the benefit of both (Kausar, 2010; Misra & McKena, 2000; Struthers et al., 2000).

The results of this study should be interpreted with some caution as generalizability is limited by the sample size that was drawn exclusively from one small Division III liberal arts institution. Additionally, there are few instruments available that measure point-in-time perceptions of academic stress responses, as opposed to measuring the quantity of academic related stressors. Sub-scales from the PAS and MSSQ were used as acceptable measures of perceptions of academic stress, however they are only one possible way to quantify the hypothetical construct of academic stress. Similarly, all variables were self-reported by the participating student-athletes, including GPA and hours spent studying. While self-reported data can introduce bias, research has shown strong response validity and reliability for GPA reporting among college students (Kuncel et al., 2005). It should also be noted that many colleges and universities, including the one in this study, modified their spring semester grading scales during the pandemic to account for the severity of the abrupt academic disruption caused by the pandemic. To account for this potential confounding impact on academic records, only pre-pandemic GPA was used to operationalize academic performance. Additionally, only a limited number of demographic variables were included in this analysis. Future research should examine additional variables that could impact academic stress, such as race or ethnicity. Race was not included in the regression analysis in this study due to a data collection error, however is an important variable to examine. Finally, there is a need to examine how student-athletes have been impacted due to the pandemic, as we attempted here, but it is difficult to tease out only the academic stressors when there are accumulating effects that could impact the stress student-athletes experience.

Conclusion

This research indicates that academic stress is moderate to high among student-athletes in a typical academic year, and increases significantly during times of academic disruption. One notable implication is that academic performance and academic stress are independent factors that need to be addressed in different ways. While there were some relationships between factors that are commonly associated with high academic achievement and stress (e.g. GPA, hours spent studying), in other areas they diverged (e.g. in-person versus virtual learner, in-season time commitments, use of academic supports, number of credits enrolled). This indicates that support for students during academic disruption must have a dual focus on both maintaining academic excellence and managing the mental and physical health and performance implications associated with increased perceptions of academic stress. Furthermore, academic stress relief should always be targeted at high-risk students such as women and academically underprepared

students, but especially toward men during times of academic disruption. Because student-athletes continue to access academic support resources during the time of academic disruption, even through virtual modalities, this can be an opportunity to address both academic and stress related mental health concerns.

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