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A Gamified Intervention to Enhance First Year Student-Athletes' Academic Self-Efficacy and Well-Being: A Mixed Methods Study

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Student-athletes hold lower academic efficacy beliefs than non-athletes (Jolly, 2008) and often report struggling with academics during their first year of college (Huml et al., 2019). Stress, burnout, and mental health concerns have increased since the pandemic, impacting academic performance and self-efficacy. Gamification can enhance motivation and self-efficacy and appeals to this generation (Kapp, 2012). The purpose of this intervention was to increase academic self-efficacy, reduce perceptions of academic stress, and shift stress mindsets in first year student-athletes. We utilized a mixed methods approach grounded in a pragmatic paradigm. Student-athletes (n = 24) and a comparable non-athlete control group (n = 35) completed measures of academic self-efficacy, perceived academic stress, and stress mindset at three points during the semester. Student-athletes attended workshops and completed tasks to practice and develop various mental tools and skills, and participated in semi-structured interviews to evaluate the program. Data analysis revealed significant differences between student-athletes and non-athletes in academic self-efficacy, one of four perceived academic stress subscales, and stress mindset ($p < .001$ for all) following the intervention. Student-athletes evaluated the overall program and workshops as beneficial. Qualitative data analysis produced seven themes and guided recommendations for practitioners and campus-level programming.

There is an abundance of research demonstrating the relationship between academic self-efficacy and academic performance (e.g., Chemers et al., 2001; Honicke & Broadbent, 2016; Lei et al., 2022). Students who have a higher perception of their academic abilities achieve greater academic success than those who have a lower perception of their abilities. However, student-athletes are considered a unique subpopulation of college students and have been found to hold lower academic efficacy beliefs than non-athletes (Jolly, 2008). Furthermore, they often report struggling with academics during their first year of college (Huml et al., 2019). This is especially true for Texas A&M University – Kingsville, a Division II athletic program with a university-wide first-year student retention rate of 67%, but only 40% for student-athletes. The athletic department reported that the retention rate was low largely due to student-athletes' academic performance. Many National Collegiate Athletic Association (NCAA) institutions offer student-athlete development programming, especially for first year student-athletes, in learning skills to assist them with their academic performance and therefore retention (e.g., Pierce et al., 2021). For example, mental skills programming has been offered to help first-year student-athletes make the transition from high school to college (Pierce et al., 2021). However, there is less empirical data on programs at Division II or III institutions (Nite, 2012), and scarce data on the impact of such student-athlete development programming on self-efficacy. NCAA institutions would benefit from a systematic mental skills program available and accessible to a large number of Division II and III institutions.

Gamification, or using game-based mechanics and aesthetics in a non-game environment, has been found to be an effective method of increasing learners' motivation and self-efficacy (Kapp, 2012). Moreover, gamification appeals to this iY generation of student-athletes, those born in the second half of generation Y along with generation Z, who are tied to their mobile devices and who often have a fleeting attention span (Elmore, 2010, Erisen & Bavli, 2024). Thus, the purpose of this study was to assess whether a gamified mental skills intervention could increase academic self-efficacy, reduce perception of academic stress, and shift stress mindsets in first year student-athletes. A secondary aim of this project was to explore first year student-athletes' experience of the gamified mental skills program.

Academic Self-Efficacy

Self-efficacy is an individual's judgement of their capability to perform specific behaviors that yield desired outcomes (Bandura, 1997). Academic self-efficacy is considered to be an individual's judgement of their capability to produce desired educational outcomes from their efforts (Elias & MacDonald, 2007). The existing research clearly links academic self-efficacy with academic performance outcomes, such as grade point average in both non-athlete and athlete populations (e.g., Certel & Kozak, 2017; Honicke & Broadbent, 2016; Lei et al., 2022). Students with higher academic self-efficacy are often more motivated, set higher academic goals, put forth more effort into academics, and persist in the face of setbacks or obstacles (Certel & Kozak, 2017; Chemers et al., 2001; Feldman & Kubota, 2015; Honicke & Broadbent, 2016). For students with high self-efficacy, experiencing a degree of failure early on may not influence their academic self-efficacy but rather serve to motivate the individual to put forth more effort (Feltz et al., 2008). However, for some students – particularly those with lower academic self-efficacy – early failure, or even the perception of failure, can result in decreased self-efficacy, and continued performance decrease (Gernigon & Delloye, 2003; Shipherd, 2019). Academic self-efficacy also plays an important role for students as they transition into college, where they are more in control of their own learning and must evaluate their capabilities and regulate their behavior accordingly (Gore, 2006).

Student-athletes tend to report lower academic self-efficacy than their non-athlete peers (Currie, 2023; Eiche et al., 1997; Hasanuuddin et al., 2024; Jolly, 2008). First-generation students (Khan, 2013), ethnic minorities (Currie, 2023; DeFreitas, 2012), immigrant students (Khan, 2013; Mahyuddin et al., 2006), and students from rural regions (Mahyuddin et al., 2006) also hold lower academic efficacy beliefs than their counterparts, likely due to decreased resources and academic support (Currie, 2023). Limited research on NCAA Division II and III institutions have found at-risk student-athletes, those who have learning disabilities, are academically underprepared, are first in their family to attend college, or from low social economic status, exhibit lower academic self-efficacy (e.g., Linville, 2022).

Student-athletes may report lower academic self-efficacy than non-athletes due to the overall number of stressors they face (Kuchar et al., 2023), and the contradictory messages they receive from advisors, coaches, and others implying that athletic performance was more important than academic performance for them (Hatteberg, 2020). Student-athletes also report a lack of sleep and fatigue, often stemming from athletic travel or scheduling, which may also impact their academic self-efficacy (Cosh & Tully, 2015; Hoffman, 2022). Further, Hoffman (2022) found academic identity, class year, and starter status predicted academic self-efficacy in a sample of student-athletes. That is, student-athletes who believed being a student was less important to their perception of self (lower academic identify), were in a lower class year (e.g., freshmen), and those who identified as starters exhibited lower academic self-efficacy than their peers. Student-athletes who are lowerclassmen may have not yet developed effective strategies to manage their time as compared to student-athletes who are upperclassmen (Hoffman, 2022). Student-athletes who hold starting positions on their teams may commit more time to their sport or miss more class or assignments due to athletic travel and schedules, which can increase stress and decrease academic performance (Cosh & Tully, 2015; Hoffman, 2022). Over one third of the student-athlete population at Texas A&M University – Kingsville are first-generation, immigrants, or from rural regions, thereby increasing the necessity for student-athlete development programming addressing academic self-efficacy among this first-year student-athlete population.

Stress

Stress, burnout, and mental health concerns in student-athletes have increased since the beginning of the COVID-19 pandemic (NCAA, 2021), impacting academic performance and self-efficacy.

Likewise, research on NCAA Division II and III institutions have found first-year student-athletes report experiencing high levels of stress or anxiety and also lack self-efficacy for engaging in coping behaviors to reduce their stress or anxiety (e.g., Hodges, 2022). While a variety of sources influence perceived stress in college students (e.g., change in environment, financial responsibilities, developing and maintaining relationships; Bulo & Sanchez, 2014), academic factors are often reported as the largest source of stress (Humphrey et al., 2000; Pohlmann et al., 2005). College student-athletes frequently report both sport-related and academics as their largest sources of stress (Lopes Dos Santos et al., 2020; Wilson & Pritchard, 2005). First year college students and Hispanic college students in particular report experiencing very high levels of academic stress (Watson & Watson, 2015). Studies have demonstrated that high academic stress is correlated with decreased self-efficacy in both student-athlete and non-athlete populations (Hasanuddin et al., 2024; van Raalte & Posteher, 2019; Zajacova et al., 2005). Thus, student-athlete development programming that targets or addresses stress, could also positively impact academic self-efficacy.

Studies have found students with high efficacy beliefs transitioning to college interpret academic pressures and high expectations as challenging rather than threatening and report lower levels of stress (Denovan & Macaskill, 2013). One's beliefs about the nature of stress (e.g., stress mindset) play a large role in the extent to which one experiences either beneficial or detrimental outcomes from stress (Crum et al., 2013). The idea that stress can produce positive outcomes was initially proposed by Seyle (1983). Selye (1950) considered stress to be an essential biological response, though one that could be harmful if experienced for an extended period of time. He then expanded on his ideas of stress, arguing that experiencing stress could lead to either negative (distress) or positive (eustress) outcomes, dependent upon how one appraises the experience of stress (Selye, 1983). Stress mindset is different from an appraisal in that it refers to one's core beliefs about stress and impacts one's valuation system of stress as either good or bad (Crum et al., 2020).

College students in the United States experience high levels of stress and have been found to view stress as more debilitating than enhancing (Avery et al., 2022; Jamieson et al., 2016). Fortunately, mindset interventions are effective at changing mindsets, and stress mindset interventions have found improving one's stress mindset can yield health, performance, and even academic improvements (Crum et al., 2011, 2017, 2020). Initially, stress mindset interventions focused on providing participants information about stress and the consequences of stress to facilitate either a stress-is-enhancing or stress-is-debilitating mindset (e.g., Crum et al., 2013). However, more recent research has found that presenting a more balanced view of the consequences of stress resulted in more significant positive outcomes than only focusing on the positive consequences of stress (Keech et al., 2021; Liu et al., 2017).

Gamification

Many students in this iY generation, those born in the second half of generation Y, along with those in generation Z, and especially academically at-risk or underprepared students, are tied to their mobile devices and view traditional teaching methods as boring (Elmore, 2010; Erisen & Bavli, 2024). The iY generation students differ from previous generations in that they have grown up with smartphones and consistent internet access, face pressures from work or family, have shorter attention spans, and are still encountering post-pandemic challenges (Marist, 2023; McMurtrie 2024). Gamification uses the concepts of conflict, competition, and cooperation in a controlled setting that encourages learners to problem-solve and try out ideas with a decreased risk of failure (Kapp, 2012); concepts that appeal to 21st century learners who are often tied to their mobile devices (Elmore, 2010).

Gamification is using game-based mechanics and aesthetics in a non-game environment to highlight problem solving, motivation, mechanics, and game thinking (Kapp, 2012; Lee & Hammer, 2011). Gamification is becoming a more popular strategy to use in the classroom (Shipherd, 2020), in physical activity interventions (Patel et al., 2019), and other domains to enhance motivation. Gamification increases motivation by increasing participants' autonomy, competence, and relatedness (i.e., self-determination; Ryan & Deci, 2000). Gamified classrooms impact motivation by actively involving students in the learning process, promoting collaboration, encouraging students to test out ideas in a low-risk environment, and offering them choices in assessments (Kapp, 2012). Gamification has also been successfully implemented in sport management classes (Duguay et al., 2023), as well as a college sport psychology class made up of a large number of student-athletes (Shipherd & Burt, 2018). Research on gamification in education has found that gamification improved student attitudes, engagement, and academic performance (Subhash & Cudney, 2018). Well-designed gamified programs or courses provide opportunities for learners to compete while simultaneously collaborating, which has been found to result in increased performance, enjoyment, effort, and reduced anxiety (Cooke et al., 2013). Therefore, adding elements of gamification into student-athlete development programming may increase its' effectiveness by enhancing student-athlete engagement with the programming and with other participants in the program.

Current Considerations

There is limited empirical data on student-athlete development programming to improve academic performance at Division II or III institutions (Nite, 2012), and scarce data on the impact of such programming on self-efficacy. However, there is evidence that mental skills programming at NCAA Division II or III institutions can improve psychological well-being in student-athletes (Bullard et al., 2020). Further, stress mindset interventions have improved both stress mindset and academic outcomes in college student populations (Crum et al., 2017). Mental skills training programs, which traditionally focused on reducing or managing stress, have now begun to incorporate aspects of stress mindset interventions to shift the idea away from stress is harmful to promoting adaptive outcomes and responses to stress (Hogue, 2019). Incorporating gamification into student-athlete development programming, such as mental skills training, may boost program effectiveness. Therefore, we aimed to implement a gamified mental skills intervention to increase academic self-efficacy, reduce perception of academic stress, and shift stress mindsets in first year student-athletes at a single NCAA Division II institution. A secondary aim was to explore first year student-athletes' experience of the program.

We sought to achieve these goals by providing student-athletes' opportunities to gain successful experiences with various academic behaviors (e.g., note-taking, reading comprehension) linked to academic performance (Easton & Ginsberg, 1983; Fink, 2013; Pintrich, 1995). Specifically, we gave student-athletes opportunities to perform the behaviors themselves (i.e., enactive mastery) and to observe their peers and others model the behaviors (i.e., vicarious learning; Feltz et al., 2008; Law & Hall, 2009). Secondly, we introduced mental skills training to student-athletes, which has also been found to enhance self-efficacy (e.g., Feltz et al., 2008; Wright et al., 2016) and academic self-efficacy (e.g., Shipherd, 2019; Usher, 2009).

Intervention

This program consisted of six in person workshops designed to introduce and provide student-athletes experience with mental skills training and with behaviors linked to successful academic performance. The workshop curriculum was designed using gamification principles and Fink's (2013) taxonomy of significant learning experiences, which aims to extend Bloom's widely used taxonomy, but with added dimensions to reflect the needs of today's student. Focus groups previously conducted in spring 2019 with Texas A&M University – Kingsville student-athletes and faculty also guided the curriculum design. The first author and the second author, a graduate assistant and former student-athlete, led and facilitated all of the workshops. The workshops lasted approximately 60 minutes in length and were conducted once a week in the evenings at 6pm (see Table 1 for workshop descriptions).

Table 1

Workshop descriptions

Workshop number/title	Description
1, Warming up: Creating a plan to cultivate success	This workshop provided student-athletes (n = 35) with an overview of the program, including the program personnel, workshop format, self-paced class, and program benefits. Student-athletes were introduced to effective goal setting and worked together to create effective academic and athletic goals for themselves for the semester, identify potential barriers to their goals, and develop contingency plans to prevent or minimize barriers. Student-athletes were also introduced to the challenge tasks.

2, Warming up: Acquiring tools for success	Student-athletes (*n* = 33) were introduced to the necessary study and learning skills to help them to be successful in the classroom, allow student-athletes to increase awareness of their skill usage, and provide student-athletes with an opportunity to gain experience practicing these skills and observing others use the skills. These study and learning skills were practiced in an environment designed to support self-efficacy, in which the skill was broken down into smaller and more manageable pieces to provide students with initial successful experiences, student-athletes observed peer models performing the skills, and student-athletes received immediate feedback (Feltz et al., 2008).
3, Putting in the practice: Creating your support team	This further developed student-athletes' (*n* = 32) awareness of resources and social support to guide them in becoming more self-efficacious and capable students, while also providing them with a sense of community. Social support has been identified as a key resource when facing stressful situations or when an individual experiences failure or setbacks that may impact their self-efficacy beliefs (Feltz et al., 2008). Student-athletes read passages from previous student-athletes sharing their initial worries that that they did not belong at college but came to feel at home. Student-athletes then worked together to create advice for future student-athletes to improve their transition to college (Yeager et al., 2016). Finally, they created their own support teams and identified the types of support they could receive from each team member.
4, Putting in the practice: Learning how to hurdle over obstacles	The goal was to aid the development of student-athletes' (*n* = 33) academic self-efficacy when faced with barriers or obstacles. Namely, we focused on introducing student-athletes to cognitive restructuring techniques, such as reframing (Williams & Leffingwell, 2002), especially after receiving critical feedback or encountering setbacks (Wilson & Linville, 1982). Lastly, student-athletes were given an opportunity to discuss and reflect on grade improvement strategies they could employ, as well as how they could help their teammates with their new knowledge.
5, Competing: Mental weight-lifting	This session helped develop student-athletes' (*n* = 31) academic self-efficacy by introducing them to the concept of the growth mindset (Dweck, 2006) and revisiting cognitive restructuring techniques, such as reframing, to re-interpret how obstacles or setbacks are viewed. They were provided information on how the brain can grow and discussed how they could use this information to advise a teammate who was struggling in classes and feeling discouraged (Paunesku et al., 2015). Student-athletes also brainstormed the signs of anxiety and excitement and learned the benefits of arousal on performance to help them reappraise and reinterpret their own arousal as excitement and beneficial (Jamieson et al., 2010). Lastly, they worked together to create strategies to use this information when taking tests or giving presentations.
6, Competing: Maximizing your game plan with mental tools	Student-athletes (*n* = 33) were introduced to self-talk and imagery, and provided a supportive environment to allow them to practice and develop these skills with a decreased fear of failure. Both self-talk and imagery have also been successfully used as tools to facilitate self-efficacy development (Jones et al., 2002; Weinberg & Jackson, 1990). Student-athletes self-assessed their self-talk and imagery usage and ability and practiced using both in a variety of scenarios. In this workshop, student-athletes also self-reflected on their academic progress and their use of the previously introduced skills and tools. Student-athletes were encouraged to share obstacles and discussed how the tools and skills they now possess could be used to address these challenges.

In addition to the workshops, student-athletes were also provided 36 total challenge tasks (see Table 2) in which they further practiced and worked to master the skills learned in the workshops both individually and also in collaboration with others. A key element of gamification is competition alongside cooperation, so to further motivate and engage student-athletes in the program, athletic teams competed against one another to earn points through attendance and engagement at workshops, and also practice and mastery of the skills through the challenge tasks. Another gamification concept incorporated in the program was immediate feedback on progress both in the workshops and through the challenge tasks. Furthermore, the challenge tasks also added the following gamified mechanics and components: badges for practicing and mastering concepts and varying levels of difficulty in the activities to practice and master concepts.

Table 2

Challenge tasks

Level	Academic Category	Wellness Category
1 - 10 pts each	Enter exam dates/assignment due dates and class schedule into calendar or planner for one class (may be completed up to 5 times)	Drink at least 8 glasses of water one day (may be completed up to 10 times)
	Have a virtual study session with at least 2 other students	Get at least 8 hours of sleep one day
	Take a career aptitude test to help identify your major	Cook a healthy meal at home
	Make an appointment with a tutor in the PAC	Engage in 30 minutes of recovery (ice bath, foam rolling, etc.) at least 2 days
	Be on time or early to all classes for one week	Eat at least 1 serving of vegetables 3 days in a row
	Take notes in at least 2 classes during the week	Meal prep snacks for before and after practices for 1 day
	Check all midterm grades	
	Watch a Ted Talk on a topic of your choosing and write up a short summary of what you learned and how you can apply what you learned to sport or life (may be completed up to 10 times)	
2 - 15 pts each	Visit one professor during their office hours (may be completed up to 5 times)	Get 8 hours of sleep for 3 days in a row
	Attend an appointment at the writing center	Cook a healthy meal at home for at least 3 days in a week

	Take notes on a class reading before class (may be completed up to 5 times)	Engage in 30 minutes of recovery (ice bath, foam rolling, etc.) at least 4 days
	Explain a chapter or section to a classmate (may be completed up to 5 times)	Make a healthy grocery shopping list ahead of time
	Enter exam dates/assignment due dates and class schedule into calendar or planner for all classes	Meal prep snacks for before and after practices for 3 days
	Attend at least 2 tutoring sessions	Eat at least 3 servings of vegetables 3 days in a row
	Be on time or early to all classes for 3 weeks (may be completed up to 2 times)	Attend at least one workshop or event being put on by the health and wellness center
	Take notes in all classes for at least one week	
	Have a friend, family member, or classmate read over an assignment before you submit it (may be completed up to 3 times)	
	Create a review for an upcoming test at least one week in advance (may be completed up to 5 times)	
	Make a weekly to-do list that includes time to work on specific class assignments and time devoted to studying to exams (may be completed up to 5 times)	
	Take the plagiarism tutorial test and submit your completed certificate	
	Watch one of Thomas Frank's videos on studying, reading, or test-taking. Try out one of the strategies and write-up a short summary of how you used it and how it worked for you (may be completed up to 15 times)	
	Watch one of the Crash Course on Psychology videos on a topic related to studying/learning and write a short summary of what you learned from the video and how you can apply what you learned to class or life (may be completed up to 5 times)	
3 - 25 pts each	Visit one or more professors in their office hours at least 3 times	Average 8 hours of sleep for 3 weeks (may be completed up to 2 times)

Attend at least 4 tutoring sessions	Cook a healthy meal at home or at least 3 weeks straight (may be completed up to 2 times)
Be on time or early to all classes for 5 weeks	Engage in 30 minutes or recovery (ice bath, foam rolling, etc.) at least 5 days a week for 3 weeks straight (may be completed up to 2 times)
Take notes in all classes for 3 or more weeks	Meal prep snacks for before and after practices for 3 weeks straight (may be completed up to 2 times)
Review the notes you took in class after at least 3 classes and fill in any gaps you missed or generate questions you still have over the material (may be completed up to 5 times)	Eat at least 3 servings of vegetables every day for 3 weeks (may be completed up to 2 times)
Spend at least 30 minutes each day for 2 weeks straight completing coursework (reading, assignments, reviewing, etc.; may be completed up to 3 times)	Attend at least 3 workshops or events being put on by the health and wellness center
Test yourself on each reading for at least 2 classes for 2 weeks straight (may be completed up to 3 times)	
Submit two class assignments at least one day prior to the due date (may be completed up to 2 times)	
Improve a grade in a class from one exam to another	

Challenge Tasks. These challenge tasks provided student-athletes with the opportunity to practice and develop essential skills outside of the workshops, while simultaneously working with and competing against other student-athletes. Challenge tasks that student-athletes completed varied in level of difficulty (e.g., attend one tutoring session, visit with one professor during their office hours to get feedback on an assignment at least three days before the assignment is due), and included both academic tasks and also non-academic tasks (e.g., improving nutrition or sleep). Nineteen student-athletes completed at least one challenge task. Of those, twelve completed three tasks, and three completed more (9, 10, and 12, respectively).

Research Questions

1a. Does a gamified intervention improve academic self-efficacy of college student-athletes compared to a non-athlete control group?

1b. Does a gamified intervention improve stress mindset of college student-athletes compared to a non-athlete control group?

1c. Does a gamified intervention reduce perceived academic stress of college student-athletes compared to a non-athlete control group?

2. How did participants perceive the gamified intervention?

3. In what ways do the qualitative data help explain the quantitative results?

Methods

Design

We utilized a mixed methods approach grounded in a pragmatic paradigm to examine the research questions, analyze, and interpret the data. This lens is commonly used with mixed methods research and was appropriate here, given the goal of using the findings to address real world issues (Tashakkori & Teddlie, 2003). An explanatory sequential design was selected for this study to use the qualitative data to explain and understand the quantitative results (Creswell & Plano Clark, 2018). This began with the initial quantitative phase, where the data was collected and analyzed. The qualitative phase occurred next, where the qualitative interviews were conducted and data analyzed to help explain and expand on the results from the initial quantitative phase. This allowed the quantitative results to inform us if the intervention could impact academic self-efficacy and perceived academic stress, while the qualitative results allowed us to better understand how and what aspects of the intervention were or were not effective to improve the program quality moving forward. The data from both phases were then integrated following the analysis of the qualitative data. The qualitative phase of the study was guided by interpretative phenomenological analysis (IPA; Smith & Shinebourne, 2012) as our aim was to understand the participants' perceptions of and experiences with the intervention.

The Researcher

Data analysis using IPA requires researchers to interpret participants' descriptions of their experiences, thus it is important for us to disclose our own backgrounds and assumptions. The first author, who both delivered the intervention and conducted the qualitative interviews, used bracketing to aside her personal beliefs and perceptions in order to maintain an open and unbiased perspective toward the phenomenon (Creswell & Poth, 2018). The first author is a faculty member at Texas A&M University – Kingsville and regularly teaches courses with large numbers of student-athletes enrolled. She has often seen student-athletes, especially those new to the university or to college overall, lack confidence in the classroom and struggle academically. These observations, alongside her work as a mental performance consultant with university athletic teams, led her to conduct focus groups which informed the intervention design. Throughout the remainder of the study, the first author reflected on her personal experiences with student-athletes on the athletic field and in the classroom. Her experiences fostered empathy toward the student-athletes and fueled her motivation to share their stories. While these reflections offered valuable context for understanding their experiences, she remained careful to view the experiences as belonging to the participants themselves.

Participants

After obtaining Institutional Review Board approval, incoming student-athletes (N = 130) and non-athletes (N = 150) were sent a recruitment email up to three times to solicit participation in this study. Participants were randomly selected from two different email lists (incoming student-athletes and incoming non-athletes at Texas A&M University –

Kingsville) and emailed the recruitment email in two different phases given the initially low response rate. All coaches were provided a flier with information at an athletics meeting prior to the start of the semester and the primary investigator (PI) and graduate assistant also followed up via email and in person with the coaches during the first week of the semester to further encourage their incoming student-athletes to participate. Two hundred participants (100 student-athletes, 100 non-athletes) were first contacted three weeks before the start of the semester. The first week of the semester, the remaining incoming 30 student-athletes and an additional 50 non-athletes were contacted. Of those, 36 student-athletes and 42 non-athletes gave consent and completed initial questionnaires at the beginning of the fall 2022 semester. A total of 24 incoming student-athletes and 35 non-athletes completed the entirety of the study, yielding an attrition rate of 24%. While we were hoping for a larger sample, this size is consistent with previous mental skills training programs for student-athletes and research on student-athlete academic self-efficacy (e.g., Linville, 2022; Vidic & Cherup, 2022; Vidic et al., 2017).

Participants ranged in age from 18 to 35 (M = 18.98, SD = 2.47), identified as male (n = 26) or female (n = 33), and identified as Hispanic (n = 29), Caucasian (n = 15), Black (n = 10), or multiracial (n = 5). Most participants were in their first year of college (n = 49), but some identified as sophomores (n = 2) and juniors (n = 7), and one participant did not indicate their year in school. It should be noted that those participants who indicated they were not in their first year of college were new to the university and were in their first year of college at a four-year institution, having transferred from a junior college. Participants reported pursuing a variety of majors that represented all five colleges within the university and participated in track and field (n = 20) and tennis (n = 4). See Table 3 for further breakdown of demographic information across the experimental and control groups.

Instruments

The College Academic Self-Efficacy Survey (CASES; Owen & Froman, 1988) is a valid and reliable measure of academic self-efficacy. This 33-item measure is completed using a 5-point Likert-type scale from one to five, with anchors at one (very little) and five (quite a lot). Participants are asked to indicate their degree of confidence for completing a variety of academic behaviors, such as "taking well-organized notes during a lecture." The CASES is scored by calculating a mean of all 33 items. The CASES has been found to be a valid instrument (Owen & Froman, 1988). The Cronbach's alphas for this study were 0.93, 0.96, and 0.96 for the pre- and post-tests, respectively.

The Perceived Academic Stress Scale (PASS; Bedewy & Gabriel, 2015) measures participants' perceptions of various potential academic stressors. This 23-item measure is assessed on a 5-point Likert-type scale from one (strongly disagree) to five (strongly agree). The PASS has four subscales: pressures to perform, perceptions of workload, academic self-perceptions, and time restraints. Pressures to perform encompasses pressure from peers, parents' expectations, and educators' critical comments. Perceptions of workload and examinations refers to stress caused

Table 3

Participant demographic data frequencies by group

Variable		Student-athletes	Non-athletes
Gender	Male	9	17
	Female	15	18
Ethnicity	Black	6	4
	Hispanic	9	20
	Caucasian	7	8
	Bi/multiracial	2	3
College major	Accounting	1	4
	Agriculture	0	3
	Biology	2	1
	Business	4	3
	Communication	1	3
	Criminology	1	0
	Education	3	2
	Engineering	3	5
	History	0	3
	Kinesiology	6	4
	Mathematics	0	2
	Psychology	3	5

from workload or worries about failing. Academic self-perceptions focus on confidence in one's future career and confidence in making the right academic decisions. Finally, time restraints refers to stress from insufficient time to complete coursework and the struggle of catching up if one falls behind. A sample item is "I believe that the amount of work assigned is too much." The PASS has been found to be a valid measure (França & Dias, 2021). The Cronbach's alphas for each subscale in this study were all acceptable (α coefficients between 0.71 and 0.85).

The Stress Mindset Measure (SMM; Crum et al., 2013) is an 8-item assessment of an individual's beliefs about the nature of stress. The SMM is completed using a five-point Likert-type scale from zero (strongly disagree) to four (strongly agree). A sample item from the SMM is, "Experiencing stress inhibits my learning and growth." The odd-numbered items are negatively worded and reverse scored, while the even-numbered items are positively worded. Thus, higher scores represent a positive, or stress-is-enhancing mindset, whereas lower scores represent a negative, or stress-is-debilitating mindset. The SMM has previously been found to be a valid measure (Crum et al., 2013). The Cronbach's alpha values for the current study were acceptable (α coefficients of 0.74, 0.78, and 0.80).

The 35-item program evaluation survey was created to determine how well the program overall and each individual component (all workshops and the self-paced class) met the program goals. More specifically, student-athletes were asked to rate how beneficial each program component and the overall program was at improving their confidence in their ability to perform behaviors that would result in successful academic performance and reducing stress from their classes. These items were rated using a Likert-type scale from one (not at all beneficial) to five (very beneficial). They were also asked to rate the likelihood they would recommend future student-athletes participate in the overall program from one (definitely not recommend) to five (definitely recommend). Finally, student-athletes were asked to assess the frequency of tools and resources they had begun using as a result of the overall program from one (never) to five (very often). The specific tools and resources were: goal setting, effective study skills (elaboration, organization, creating real-life examples, creating practice tests), social support, reframing (negative feedback/failure), reappraising arousal as helpful, self-talk, and imagery. The evaluation survey was created based on similar program evaluation tools and was not rigorously tested as the purpose was to use the information to gauge the participants' perception of the intervention and use the information to improve upon the intervention itself (Pierce et al., 2021).

Procedures

Incoming student-athletes completed basic demographic information (age, gender, ethnicity, year in school, major), the CASES, PASS, and SMM prior to beginning the program, at the completion of the program (just past midway through the semester; week 8), and finally at the end of the fall 2022 semester. Given the timing of the administration of the measure could have an impact (i.e., following final exams), a group of incoming non-student-athletes served as a control group and completed the same measure at the same time points, a strategy used in previous similar studies (e.g., Pierce et al., 2021). All participants who completed all surveys were offered $10 worth of merchandise or supplies from the university bookstore. The 24 student-athletes who completed the program were asked to evaluate the program effectiveness via a brief survey and were also invited to participate in a semi-structured interview after the semester to gain a better understanding of overall program effectiveness and quality. These participants were offered an additional $20 worth of merchandise from the university bookstore to complete the interview. Twenty-one student-athletes completed the program effectiveness survey, and five student-athletes agreed to participate in an interview. These semi-structured interviews assessed the whole program effectiveness, effectiveness of each program component (i.e., each workshop and the self-paced class), program enjoyment, perceived academic self-efficacy, and awareness of opportunities to support academic excellence. While we ideally would have liked to interview more than five student-athletes, sample sizes of fewer than five participants are common for qualitative studies, especially those using IPA (e.g., Caron et al., 2013;

Howells & Fletcher, 2016). Further, after completion of the fifth interview, no new themes or insights emerged, indicating that further data collection would not yield new information. The interviews ranged from 23 to 41 minutes (M = 32.2, SD = 6.98) and took place either in person or over video conferencing to allow for in-depth responses and accounts of their experiences and were recorded to ensure accuracy. These recordings were then transcribed verbatim. The PI conducted all interviews.

Data Analysis

The quantitative data were screened using SPSS v.26. While 78 participants began the study and completed the pre-test, 19 participants failed to complete post-test 1 or beyond (12 student-athletes, 7 non-athletes), leaving a total sample size of 59 participants. Independent sample *t*-tests were conducted to explore differences in demographic data (gender, year in school, ethnicity, major) and outcome variables between those who did and did not complete post-tests. There were no significant differences between individuals who did and did not complete testing on any variable. Of the remaining 59 participants, there was 0.1% missing data on questionnaire items. The a priori cut-off criteria for removing a participant due to missing data was either missing 20% of total items on a measure or two or more items on a given sub-scale (Walton et al., 2020). None of the 59 remaining participants were removed. Given the limited missing item data, missing values were resolved by substituting the within-item mean (Parent, 2013; Walton et al., 2020). Data were analyzed for normality by analyzing skewness and kurtosis values; all were within ±2.58, indicating normality. Reliability analyses were performed on the CASES, PASS, and SMM. Descriptive data and frequencies were calculated for all variables. Next, repeated measure ANOVAs were conducted to explore time (pre-test, post-test 1, post-test 2) by group (athlete, non-athlete) interactions on CASES, PASS subscales, and SMM. Post-hoc pairwise comparisons were computed using the Bonferroni correction where main effects were observed. Effect sizes are reported as η_p^2 and categorized as small, medium, or large effects using values of 0.01, 0.06, and 0.14.

The qualitative data were analyzed and coded across cases by the first author using Smith and colleagues' (2009) six-step IPA process. Each interview transcript was read by the first author multiple times to get a sense of the participants' experiences. Next, notes were made in the margins and then the researcher developed initial themes based off of the notes. After these initial themes were developed, the researcher worked to identify connections between themes to merge similar themes together. Finally, this process was repeated for each case and then similarities and differences were identified for the cases. Steps taken to establish validity included the most experienced qualitative researcher conducting the data analysis, and using a critical friend (Smith et al., 2009). The second author acted as a critical friend to the first author by reviewing, discussing, and challenging themes until a consensus was reached.

Results

Quantitative Results for Academic Self-Efficacy, Academic Stress, and Stress Mindset

Research Question 1A

Mauchly's test indicated that the assumption of sphericity had been violated $\chi^2(2) = 132.04, p < .001$, therefore Greenhouse-Geiser corrected tests are reported for the CASES score ($\varepsilon = 0.53$). The results show a significant main effect for time on CASES score $F(1.05, 59.83) = 16.08, p < .001, \eta_p^2 = 0.22$. Pairwise comparisons revealed academic self-efficacy significantly increased ($p < .001$) from pre-test ($M = 3.27$, $SE = 0.08$) to post-test 1 ($M = 3.47$, $SE = 0.08$), significantly increased ($p = .001$) from pre-test to post-test 2 ($M = 3.44$, $SE = 0.08$), then significantly decreased ($p = .003$) from post-test 1 to post-test 2. The results also show a significant time by group interaction on CASES score $F(1.05,59.83) = 36.03, p < .001, \eta_p^2 = 0.39$, indicating that academic self-efficacy differed between athletes and non-athletes across time. Pairwise comparisons revealed academic self-efficacy was not significantly different at the pre-test ($p = .174$) between athletes ($M = 3.37$, $SE = 0.12$) and non-athletes ($M = 3.16$, $SE = 0.10$). However, academic self-efficacy was significantly different at post-test 1 ($p < .001$) between athletes ($M = 3.86$, $SE = 0.12$) and non-athletes ($M = 3.08$, $SE = 0.10$). Academic self-efficacy was also significantly different at post-test 2 ($p < .001$) between athletes ($M = 3.84$, $SE = 0.12$) and non-athletes ($M = 3.04$, SE $= 0.10$).

Research Question 1B

Mauchly's test indicated that the assumption of sphericity had been violated $\chi^2(2) = 27.83, p < .001$, therefore Greenhouse-Geiser corrected tests are reported for stress mindset score ($\varepsilon = 0.72$). The results show a significant main effect for time on stress mindset score $F(1.44, 81.92) = 11.52, p < .001, \eta_p^2 = 0.17$. Pairwise comparisons revealed stress mindset significantly increased ($p = .005$) from pre-test ($M = 2.50$, $SE = 0.06$) to post-test 1 ($M = 2.66$, $SE = 0.06$), significantly increased ($p < .001$) from pre-test to post-test 2 ($M = 2.67$, $SE = 0.06$), but did not significantly differ ($p = 1.00$) from post-test 1 to post-test 2. The results also show a significant time by group interaction on stress mindset score $F(1.44, 81.92) = 21.10, p < .001, \eta_p^2 = 0.27$, indicating that stress mindset differed between athletes and non-athletes across time. Pairwise comparisons revealed stress mindset was significantly different at the pre-test ($p < .001$) between athletes ($M = 2.73$, $SE = 0.10$) and non-athletes ($M = 2.26$, $SE = 0.08$). Stress mindset was also significantly different at post-test 1 ($p < .001$) between athletes ($M = 3.12$, $SE = 0.09$) and non-athletes ($M = 2.20$, $SE = 0.08$). Stress mindset was also significantly different at post-test 2 ($p < .001$) between athletes ($M = 3.13$, $SE = 0.09$) and non-athletes ($M = 2.21$, $SE = 0.08$).

Given stress mindset scores differed between athletes and non-athletes during the pre-test, ANCOVAs were conducted with the stress mindset pre-test score entered as the covariate. There was also a significant difference between athletes and non-athletes on post-test 1 even when controlling for pre-test scores, $F(1, 56) = 51.60, p < .001, \eta_p^2 = 0.48$, and also a significant difference between athletes and non-athletes on post-test 2 even when controlling for pre-test scores, $F(1, 56) = 76.57, p < .001, \eta_p^2 = 0.58$.

Research Question 1C

Mauchly's test indicated that the assumption of sphericity had been violated χ^2 (2) = 39.23, $p < .001$, therefore Greenhouse-Geiser corrected tests are reported on the PASS pressure to perform subscale ($\varepsilon = 0.67$). The results show a significant main effect for time on PASS pressure to perform score $F(1.33, 75.81) = 3.79$, $p = .044$, $\eta_p^2 = 0.06$. However, pairwise comparisons revealed no significant different in pressure to perform ($p = .152$) from pre-test ($M = 3.06$, $SE = 0.12$) to post-test 1 ($M = 3.18$, $SE = 0.11$), no significant difference ($p = .122$) from pre-test to post-test 2 ($M = 3.18$, $SE = 0.10$), and no significant difference ($p = 1.00$) from post-test 1 to post-test 2. The results show no significant time by group interaction on pressure to perform score F(1.33, 75.81) = 2.94, $p = .057$, $\eta_p^2 = 0.05$, indicating that pressure to perform did not differ between athletes and non-athletes across time.

Mauchly's test indicated that the assumption of sphericity had been violated χ^2 (2) = 56.21, $p < .001$, therefore Greenhouse-Geiser corrected tests are reported for the PASS perception of workload subscale ($\varepsilon = 0.61$). The results showed no significant main effect for time on PASS perception of workload score $F(1.22, 69.79) = 1.52$, $p = .226$, $\eta_p^2 = 0.03$. The results also show no significant time by group interaction on perception of workload score $F(1.22, 69.79) = 1.31$, $p = .264$, $\eta_p^2 = 0.02$, indicating that perception of workload did not differ between athletes and non-athletes across time.

Mauchly's test indicated that the assumption of sphericity had been violated χ^2 (2) = 55.99, $p < .001$, therefore Greenhouse-Geiser corrected tests are reported for the PASS academic self-perceptions subscale ($\varepsilon = 0.61$). The results show a significant main effect for time on PASS academic self-perceptions score $F(1.23, 69.85) = 13.17$, $p < .001$, $\eta_p^2 = 0.19$. Pairwise comparisons revealed academic self-perceptions significantly decreased ($p = .006$) from pre-test ($M = 4.00$, $SE = 0.07$) to post-test 1 ($M = 3.86$, $SE = 0.07$), significantly decreased ($p < .001$) from pre-test to post-test 2 ($M = 3.82$, $SE = 0.07$), but did not significantly differ ($p = .090$) from post-test 1 to post-test 2.The results also show a significant time by group interaction on academic self-perceptions score $F(1.23, 69.85) = 7.25$, $p = .006$, $\eta_p^2 = 0.11$, indicating that academic self-perceptions differed between athletes and non-athletes across time. Pairwise comparisons revealed academic self-perceptions were not significantly different at the pre-test ($p = .118$) between athletes ($M = 4.10$, $SE = 0.10$) and non-athletes ($M = 3.89$, $SE = 0.09$). However, academic self-perceptions were significantly different at post-test 1 ($p = .007$) between athletes ($M = 4.05$, $SE = 0.11$) and non-athletes ($M = 3.66$, $SE = 0.09$). Academic self-perceptions were also significantly different at post-test 2 ($p < .001$) between athletes ($M = 4.06$, $SE = 0.10$) and non-athletes ($M = 3.57$, $SE = 0.09$).

Given PASS academic self-perception scores differed between athletes and non-athletes during the pre-test, ANCOVAs were conducted with the PASS academic perception pre-test score entered as the covariate. There was also a significant difference between athletes and non-athletes on post-test 1 even when controlling for pre-test scores, $F(1, 56) = 93.45$, $p <$

.001, $\eta_p^2 = 0.63$, and also a significant difference between athletes and non-athletes on post-test 2 even when controlling for pre-test scores, $F(1, 56) = 87.92$, $p < .001$, $\eta_p^2 = 0.61$.

Mauchly's test indicated that the assumption of sphericity had been violated $\chi^2 (2) = 61.18$, $p < .001$, therefore Greenhouse-Geiser corrected tests are reported for the PASS time restraints subscale ($\varepsilon = 0.60$). The results show a significant main effect for time on PASS time restraints score $F(1.20, 68.48) = 4.08$, $p = .040$, $\eta_p^2 = 0.07$. However, pairwise comparisons revealed no significant different in time restraints ($p = .083$) from pre-test ($M = 3.05$, $SE = 0.06$) to post-test 1 ($M = 3.17$, $SE = 0.06$), no significant difference ($p = .282$) from pre-test to post-test 2 ($M = 3.13$, $SE = 0.06$), and no significant difference ($p = .173$) from post-test 1 to post-test 2. The results also show a significant time by group interaction on time restraints score $F(1.20, 68.48) = 7.85$, $p = .004$, $\eta_p^2 = 0.12$, indicating that time restraints differed between athletes and non-athletes across time. However, pairwise comparisons revealed time restraints was not significantly different at the pre-test ($p = .254$) between athletes ($M = 2.98$, $SE = 0.09$) and non-athletes ($M = 3.11$, $SE = 0.07$). Time restraints was also not significantly different at post-test 1 ($p = .139$) between athletes ($M = 3.26$, $SE = 0.09$) and non-athletes ($M = 3.07$, $SE = 0.08$). Finally, time restraints was not significantly different at post-test 2 ($p = .303$) between athletes ($M = 3.19$, $SE = 0.09$) and non-athletes ($M = 3.07$, $SE = 0.08$).

Taken together, student-athletes experienced an increase in academic self-efficacy and stress mindset while non-athletes decreased in academic self-efficacy and stress mindset. Both groups experienced a decrease in the PASS academic self-perceptions subscale, while no significant differences were observed in the remaining PASS subscales. See Table 4 for means.

Program Evaluation Results

Research Question 2

The student-athletes evaluated the overall program and five out of the six workshops as beneficial ($M > 3$ out of 5) for their academic self-efficacy, academic stress, and stress mindset (see Table 5). Student-athletes evaluated only one workshop (workshop #2) low for im-

Table 4

Means for student-athletes and non-athletes across time

Variable	Scale Range	Pre-test		Post-test 1		Post-test 2	
		SA	NA	SA	NA	SA	NA
Academic Self-Efficacy	1-5	3.37	3.16	3.86*	3.08*	3.84*	3.04*
PASS Pressure to Perform	1-5	3.00	3.12	3.21	3.15	3.24	3.13
PASS Perception of Workload	1-5	3.11	3.14	3.26	3.15	3.21	3.10
PASS Academic Self-Perceptions	1-5	4.10	3.89	4.05*	3.66*	4.06*	3.57*
PASS Time Restraints	1-5	2.98	3.11	3.26	3.07	3.19	3.07
Stress Mindset	0-4	2.73	2.26	3.12*	2.20*	3.13*	2.21*

Note. SA = student-athletes, NA = non-athletes.

*Indicates significant differences between groups.

Table 5

Means and standard deviations for program evaluation

	Academic Self-Efficacy		Academic Stress		Stress Mindset	
	Mean	SD	Mean	SD	Mean	SD
Workshop 1	3.67	0.97	3.90	0.89	3.71	0.78
Workshop 2	2.62	1.17	2.86	1.15	2.81	0.93
Workshop 3	3.62	0.97	3.71	0.90	3.81	0.75
Workshop 4	3.62	0.80	3.86	0.85	3.86	0.85
Workshop 5	3.67	0.80	3.81	0.75	3.81	0.81
Workshop 6	3.67	0.91	3.95	0.86	3.76	0.83
Challenge Tasks	2.52	1.33	2.62	1.02	2.33	0.80
Whole Program	3.95	0.86	4.24	0.83	4.20	0.75

Table 6

Means and standard deviations for program recommendation and tool usage

Variable	Mean	SD
Program Recommendation	4.10	0.70
Goal Setting	3.90	0.83
Elaboration	2.86	0.85
Organization	2.76	0.94
Creating Real-Life Examples	3.05	0.86
Creating Practice Tests	2.67	1.02
Social Support	3.48	0.68
Reframing	4.10	0.83
Reappraising Arousal	4.00	0.89
Self-Talk	3.43	0.81
Imagery	3.19	0.68

pacting their academic self-efficacy (M = 2.62), academic stress (M = 2.86) and stress mindset (M = 2.81), however this particular workshop was more heavily focused on study and learning strategies as opposed to mental skills and tools that could apply to their sport as well. The student-athletes also rated the challenge tasks lower with respect to contributing to their academic self-efficacy (M = 2.52), academic stress (M = 2.62), and stress mindset (M = 2.33). However, it should be noted that only 29% (f = 7) of the program participants completed more than one challenge task. Further, several participants who were interviewed reported low motivation for completing challenge tasks in the first place (see qualitative results below). Despite this, the student-athletes all indicated they would recommend the program to future student-athletes. Furthermore, they reported frequently utilizing seven of the ten specific tools and resources as a result of the program, with goal setting, reframing, and reappraising arousal being reported as the most frequently used tools (see Table 6).

Qualitative Results

Research Question 2

Data analysis produced seven themes regarding participants' contextual description of the gamified intervention. Participants described how they were able to apply the ideas and information to various domains, they felt the workshops contained a high amount of engagement and hands-on experiences, they described the workshops as fostering social connections and social support, and they described how the concepts of reframing and reappraisal were particularly helpful for them. On the other hand, they described feeling overloaded with the challenge tasks, lacked motivation to do the challenge tasks outside of the workshops, and believed the workshops would have been more helpful if the focus was more on how the mental skills could be applied to their sport rather than academics.

Transferability of Concepts

All five participants reported that they were able to apply the ideas and concepts learned in the program to a variety of domains, including school, sport, and life. For example, athlete 4 described, "It was cool that a lot of the stuff you had us do were things that helped me on the court and just like, in general." Similarly, athlete 2 stated, "Using some of the topics to improve my running, like, made me feel like I could use them to get better at school too." Athlete 3 said, "I caught myself thinking negative things like 'I'm no good at this' before a test but also at practice on the track and was like, 'wait, I need to change this.'"

Engagement/Hands-on

All five participants also described how they perceived the engagement and hands-on nature of the workshops as beneficial. Athlete 1 noted, "You didn't just talk to us the whole time. I liked that you did a lot of activities with us." Athlete 5 also described how the hands-on practice of the concepts in the workshops also helped to improve his self-efficacy for using the concepts: "When you had us practice the stuff in the meetings…that made me feel like it wasn't that hard." He continued on saying, "Using some of the stuff in the meetings made me feel a lot better about, like, trying it out for class or on the track and to study too."

Opportunities for Social Connections/Social Support

Four participants reported the program also provided opportunities to connect with or learn from other student-athletes. For example, athlete 2 said, "The groups you put us in...during the meeting…it was kind of cool to talk to some other athletes I didn't know." She also described how observing other athletes in the program use or practice the concepts helped her self-efficacy for using the concepts as well: "Seeing someone else in the meeting do something helped me feel like I could do it too." Three participants also described how hearing other athletes describe their own challenges faced when it came to school or sport made them feel validated and less alone, knowing they were others facing the same challenges as themselves. Athlete 3 stated, "Hearing [teammate] say he found the textbooks hard to read too made me feel less dumb."

Reframing and Reappraisal were Most Useful

Four participants spoke of how they found the concepts of reframing and reappraisal to be particularly helpful. This mirrors the high ratings provided on these two tools from the program evaluation survey. For example, athlete 4 stated, "There was one bad week where I didn't do good on a paper…but the teacher gave me comments, and I tried to remember this was good…it means she thinks I can get better." Similarly, athlete 5 described reframing as something that helped him improve his overall confidence, saying, "It helped me to realize that negative things can help you get better if you look at them differently…and that made me feel like I could do better, ya know?" Furthermore, athlete 1 went on to describe how reappraisal helped her when she experienced high arousal before a competition, "I was thinking how I was nervous, but then I stopped myself and said, 'you're not nervous, you're just ready to get after this match.' And I think it helped me to calm down."

Feeling Overloaded

Three participants noted that while they found the program very helpful, the addition of the challenge tasks that need to be completed outside of the workshops felt like too much work. [Note: one of these three student-athletes did not complete any challenge tasks.] Athlete 3 stated, "I think it was a good idea, but it was hard to remember to do them when I had a lot of homework already from my classes." Even athlete 1, who did the most challenge tasks of all participants (n = 12), shared that she only chose to complete the challenge tasks because she was already doing most of them. She added, "if I wasn't already doing those things I probably wouldn't have done any of the them. They were all things to help you do better in your classes, but most of us are pretty busy and those things take time if you're not already doing them."

Motivation for Challenge Tasks

Four participants also compared the challenge tasks to homework they had for their classes, noting that because they viewed the challenge tasks as homework they felt a lack of motivation to complete them. For example, athlete 5 said, "I probably would have done more of those, but I liked that the meetings with you didn't feel like class…but when you gave us that extra stuff to do it felt like homework, and then I didn't really want to do it." Athlete 4 also stated, "The meetings were really helpful, but having stuff to do after the meetings, even if it was going to help me in my classes, just didn't get me excited to do them."

Focus on Sport

Four participants also described how they felt the workshops could be improved if more of the focus was placed on how to use the tools and skills for sport rather than academics. For example, athlete 3 said, "it was cool learning about everything, but I think I would have been more interested if you gave us more time to practice stuff on the track." The second participant noted "I had a sport psychologist I worked with before." She continued on, saying, "I already knew about the things like imagery and self-talk and stuff." She described how she appreciated learning how to apply the tools and skills she already knew and used in her sport with her academics as well.

Research Question 3

The qualitative data provided insights into the quantitative results in two ways. First, participants' overall positive assessment of the program helped to explain how the intervention improved academic self-efficacy and stress mindset. Participants shared that they were able to apply the ideas and information across various domains, found the workshops to be highly engaging and hands-on, noted that the sessions fostered social connections and support, and highlighted the concepts of reframing and reappraisal as particularly helpful. This suggests that the intervention content was appropriate for enhancing academic self-efficacy and stress mindset, and that the design of the intervention followed existing research on how to enhance academic self-efficacy and stress mindset (e.g., Crum et al., 2013, 2017, 2020; Elias & MacDonald, 2007; Feltz et al., 2008; Keech et al., 2021). Secondly, participants' suggestions for improvement helped to explain why significant differences were not found on the pressures to perform, perceptions of workload, or time restraints PASS subscales. Specifically, much of the challenge tasks included strategies for participants to practice that could have assisted them in reducing their perception of academic stress, such as getting assignments completed ahead of time. Participants' specific feedback regarding the challenges tasks – namely, describing how the challenge tasks felt like extra work and their low motivation to complete the challenges tasks – could explain why we did not find significant differences on three of the PASS subscales.

Discussion

The purpose of this study was to explore the impact of a gamified mental skills intervention on academic self-efficacy, perception of academic stress, and stress mindsets in first year student-athletes. A secondary aim of this project was to explore first year student-athletes' experience of the intervention. Results from this study suggest that a gamified mental skills intervention such as this may improve student-athletes' academic self-efficacy, stress mindset, and academic self-perceptions. Significant differences were found between student-athletes and the non-athletes who served as the control group in academic self-efficacy, stress mindset, and the academic self-perceptions subscale of the PASS. Namely, student-athletes experienced an increase in academic self-efficacy and stress mindset while non-athletes decreased in both academic self-efficacy and stress mindset. This supports existing research that has found interventions such as this can benefit academic self-efficacy and stress mindset (Bartimote-Aufflick et al., 2016; Crum et al., 2011, 2013; Hitches et al., 2022; Jamieson et al., 2018; Paunesku et al., 2015). Participants' positive feedback regarding the intervention suggests that the intervention content was appropriate for enhancing academic self-efficacy and stress mindset, and that the design of the intervention followed existing research on how to enhance academic self-efficacy and stress mindset (e.g., Crum et al., 2013, 2017, 2020; Elias & MacDonald, 2007; Feltz et al., 2008; Keech et al., 2021).

Specifically, participants reported successfully applying the ideas and information to different areas of their lives, which research has found to be an outcome of effective mental skills training programming (Bullard et al., 2020). Participants also described the workshops as highly engaging with ample hands-on activities and reported that the workshops emphasized the development of social connections and support, both key outcomes from research on gamification (Cooke et al. 2013; Duguay et al., 2023; Kapp, 2012; Subhash & Cudney, 2018). Finally, participants identified reframing and reappraisal as especially valuable concepts, which research on stress mindset and arousal often focus on to produce beneficial outcomes in the classroom or workplace (Crum et al., 2017; Jamieson et al., 2010; 2018).

However, no significant differences were found between those in the experimental group (student-athletes) and participants in the control group (non-athletes) on the pressures to perform, perceptions of workload, or time restraints PASS subscales. This is in contrast to research that has found teaching athletes mental skills and educating coaches and teammates about social support has decreased stress and anxiety (Fogaca, 2021). However, many of the challenges tasks included strategies – like completing assignments early – that may have helped participants reduce their perceived academic stress. This suggests that more emphasis may need to be placed on strategies to reduce perceptions of academic stress within the content of the workshop itself. For example, recent research has found a strong correlation between perceived academic stress and the construct of mindfulness (Koppenborg et al., 2024). Studies employing mental skills training interventions has found mindfulness training to be impactful in reducing perceived stress (Miller et al., 2021; Vidic & Cherup, 2021; Vidic et al., 2017). Further, previous interventions that involved teaching mental skills to college student-athletes as a means of improving their mental health and well-being included mindfulness in their programming (Fogaca, 2021; Vidic & Cherup, 2021; Vidic et al., 2017). This suggests that adding mindfulness to mental skills training programming may be key for reducing perceptions of stress.

While qualitative data demonstrated that the student-athletes evaluated the intervention favorably, they did note some suggestions for improvement, including the addition of the challenge tasks felt like too much work, they lacked motivation to complete challenge tasks, and described how they felt the workshops could be improved if more of the focus was placed on how to use the tools and skills for sport rather than academics. Practitioners looking to deliver similar programming should work more closely with coaching staff to reinforce and practice ideas and concepts from the workshops as one method of addressing some of these issues. Highlighting and focusing on how the skills and concepts can transfer to their athletics or other aspects of their lives may help the student-athletes see the ideas as beneficial and increase the likelihood the information will be used and retained (Forester et al., 2020). While many athletic departments do employ sport psychology professionals to address student-athletes' mental health concerns, most institutions have not fully integrated sport psychology professionals into athletic teams (Zakrajsek et al., 2013). Thus, athletic departments should work to incorporate sport psychology professionals into their athletic teams as a means of helping coaches reinforce mental skills concepts learned in programming such as ours, but also to provide additional experts to assist student-athletes in learning and applying the mental skills concepts (Wrisberg et al., 2012; Zakrajsek et al., 2013).

All five student-athletes who completed post-program interviews discussed how they were able to apply the ideas and information to various domains and reported they felt the workshops contained a high amount of engagement and hands-on experiences. Active learning, such as incorporating hands-on activities to allow students to purposefully interact with the material and other students, has often been found to promote greater learning and retention in the classroom than passive learning strategies (Prince, 2004; Wakefield & Tashman, 2020). Further, while it is unclear the extent to which gamification impacted participants, active learning, like gamification, has often been cited as an effective strategy to keep students engaged in learning (Wakefield & Tashman, 2020).

Thus, we recommend that practitioners include active and collaborative learning strategies during similar programming workshops or meetings to increase engagement and give student-athletes hands-on experience using the concepts taught in the intervention. This can be as simple as asking participants to take a minute to set a goal for themselves to practice effective goal-setting techniques, having one participant role-play negative self-talk statements they may say in various situations and asking another participant to reframe each statement, or providing student-athletes opportunities to practice using various study skills. Incorporating opportunities for the student-athletes to perform the behaviors and practice the concepts taught in the intervention themselves first-hand also provides them with successful performance experiences, a key source in promoting self-efficacy (Bandura, 1997). Furthermore, this can help the student-athletes understand the relevance of the concepts being covered, something student-athletes reported as a critique of life skills programming (Forester et al., 2020).

The student-athletes also described the workshops as fostering social connections and social support. van Raalte and Posteher (2019) found esteem (e.g., expressions of confidence or encouragement) and informational (e.g., advice or guidance) support significantly and positively impacted athletic and academic self-efficacy. We recommend that practitioners incorporate many opportunities for student-athletes to interact with both teammates and athletes from different teams in their programming to broaden their social support networks. Further, practitioners should work to create a safe climate where student-athletes feel comfortable being vulnerable in front of each other as a means to foster belonging, which can also improve academic self-efficacy and performance (Yeager et al., 2016).

The student-athletes evaluated the overall program and five out of the six workshops as beneficial ($M > 3$ out of 5) for their academic self-efficacy, academic stress, and stress mindset. Further, qualitative feedback from the student-athletes interviewed suggested they perceived the intervention positively. The lower ratings for workshop #2 (see Table 5) suggests that such programming may be more beneficial if student-athletes not only understand the relevance of the concepts taught (Forester et al., 2020), but may value these concepts more if they are applicable to both academics and sport (Fogaca, 2021). The participants echoed this as well, describing how they felt the workshops could be improved if more of the focus was placed on how to use the tools and skills for sport rather than academics. The student-athletes all indicated they would recommend the program to future student-athletes and reported frequently utilizing seven of the ten specific tools and resources as a result of the program. This provides further support for the potential longer-term benefits of a gamified mental skills intervention (Vidic, 2021). Practitioners looking to improve academic self-efficacy and stress mindset in student-athletes on their own campuses may consider utilizing all or part of our programming to do so. Detailed program materials are available from the first author.

Limitations and Suggestions for Future Research

While strengths of this study include the innovative intervention and use of a control group, this study was not without limitations. One major limitation of this study was the limited number of teams and participants represented in the sample and the high attrition rates for both the student-athlete and non-athlete participants. Practitioners should work with their athletic department staff to gain program support from all coaches. Doing so would increase workshop and intervention attendance and potentially student-athlete academic and athletic success. Having participants from more than two athletic teams may have further motivated student-athletes to compete against one another. While we did not explicitly measure student-athlete retention or athletic performance, research has consistently found the variables targeted in our programming improve academic and athletic performance (Chemers et al., 2001; Crum et al., 2011, 2017, 2020; Feldman & Kubota, 2015; Honicke & Broadbent, 2016). Therefore, future research on programming such as this should incorporate measures of academic and athletic performance, as it is possible that programming such as this may have a larger impact than what we assessed.

Research has identified an increase in all students' overall workload since the onset of the pandemic in 2020 (Hews et al., 2022; Wang et al., 2020). Furthermore, college student-athletes, and especially first year student-athletes often report feeling surprised at how tight their schedule is and how little free time they have (Huml et al., 2019). Moving the workshops to before the semester started may have alleviated student-athletes' workload and reduced the attrition rate.

While we did not include mindfulness training in our programming, recent research employing mental skills training interventions has found mindfulness training to be impactful in reducing perceived stress (Miller et al., 2021; Vidic & Cherup, 2021; Vidic et al., 2017). Therefore, future studies should investigate the impact of including mindfulness training into an intervention such as this to better reduce perceived stress. Further, given the limited variety of sports represented in this study, a follow-up study with additional sports could provide a more complete picture of how such an intervention could impact academic stress.

Another limitation is the gamified aspects of this program were predominantly integrated into the team competition and the challenge tasks, which were only completed by 79% (19 of 24) of the program participants. Of those participants who did complete challenge tasks, the majority (*f* = 12; 63%) only completed one challenge task. Only three participants completed more than three challenge tasks. One participant, athlete 2, noted the team competition increased her motivation to complete challenge tasks; however, with such a low percentage of participants completing challenge tasks, it's difficult to determine how much impact the gamified elements of the program had on participants. It is recommended that practitioners and researchers further continue to examine the effectiveness of gamifying such programming.

With respect to the interviews, these were conducted by the PI as she had already built rapport with the participants. However, as she was involved with the intervention delivery it is possible that social desirability response bias may have impacted participant responses. Future studies should consider using an interviewer who is not already associated with the programming.

Finally, this study was conducted at a single Division II athletic program. While this study provides valuable research on programs to improve academic self-efficacy and stress mindset in student-athletes, the results of the present study may not be generalizable or applicable to Division I or III student-athletes, or even other Division II student-athletes outside of this particular university. Furthermore, Texas A&M University – Kingsville is a Hispanic Serving Institution (HSI) and nearly half of the total participants (*n* = 29) identified as Hispanic. Research has consistently reported that across the United States, the graduation rate for Hispanic students is far lower than the national average (Murphy & Murphy, 2018; Watson & Watson, 2015). Therefore, practitioners are recommended to interpret these results carefully.

Conclusion

In summary, we sought to identify if this gamified mental skills intervention could increase student-athletes' academic self-efficacy, stress mindset, and reduce perceptions of academic stress. Results from this study suggest that a gamified mental skills intervention such as this may improve student-athletes' academic self-efficacy, stress mindset, and academic self-perceptions. However, no significant differences were found on the pressures to perform, perceptions of workload, or time restraints PASS subscales. The student-athletes evaluated the overall program and five out of the six workshops as beneficial for their academic self-efficacy, academic stress, and stress mindset. Further, qualitative feedback from the student-athletes interviewed suggested they perceived the intervention positively. Future research is needed to explore the role, if any, gamification had on the intervention and outcomes, as well as implement interventions such as this in other universities. It is our hope that our significant findings with respect to academic self-efficacy and stress mindset, and the promising feedback by the student-athletes may prompt other researchers and practitioners to consider examining the effectiveness of utilizing gamification in their own programming.

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