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Irrational Beliefs Among Competitive High School Student Athletes: Are they General or Context-Driven?

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Abstract

While student-athletes strive for high performance both athletically and academically, understanding the role of beliefs as it relates to objective measures of performance has not been readily studied (Turner and Barker in J Appl Sport Psychol 25:131–147, 2013) and even less so among youth. This research examined if irrational beliefs that are context specific to performance settings (academic vs. athletic) are more predictive of academic and athletic performance than those more general irrational beliefs among 30 high-school student athlete basketball players. While both general and context-specific irrational beliefs were predictive of athletic performance as measured by performance analysis from game video footage and academic performance as measured by Grade Point Average, there were no differences in terms of their predictive ability. Implications for researchers and practitioners are provided to guide the scholarly research and applied implications regarding the role of specific beliefs as it relates to performance with this population.

Keywords Irrational beliefs · REBT · Athlete · Performance

Introduction

Athletes are vulnerable to experiencing a mental illness due to contextual demands of their sport (i.e., large time commitments, level of high effort, heavy exertion of energy) and athlete burnout due to overtraining (Hughes & Leavey, 2012). Some athletes experience a loss of autonomy and disempowerment as symptoms of burnout, which has been found to be strongly correlated with affective disorders, such as depression (Cresswell & Eklund, 2007). Further, contextual factors of being an athlete such as, experiencing injuries, overtraining, excessive stress and competitive failure can also increase the risk of affective disorders (Frank et al.,

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2015). While the aforementioned research focuses on collegiate athletes, many secondary school student-athletes have also reported higher levels of negative affect than non-student-athlete adolescents (Neal et al., 2015).

Student-athletes face dual demands of academic and athletic responsibilities and face a multitude of stressors ranging from physical (i.e., injuries, physical conditioning), mental (i.e., meeting coaches' expectations, attention from fellow students, time commitment, game strategy, community-service requirements, less personal and family time) and academic (i.e., classes, study time, papers, exams, attaining and maintaining required grade point average to remain on the team, earning and maintaining a collegiate or academic scholarship) (Neal et al., 2015).

While many secondary-school student-athletes experience demanding athletic schedules as many of these athletes compete year-round, often with multiple teams (i.e., travel team, school team) and train and compete with each of their respective teams' multiple times per week (Neal et al., 2015), academic performance is still of high-importance at the secondary-school level. Many high schools have enforced academic eligibility standards to ensure academic achievement in their student-athletes (Lumpkin & Favor, 2012) and many states recommend academic eligibility requirements for high-school student-athletes ranging from enrollment requirements, assuring student-athletes pass each class, requiring a minimum grade-point average and enforcing an attendance policy (Bukowski, 2008). Student-athletes face a multitude of stressors including athletic and academic responsibilities and can be susceptible to experiencing a mental illness, which stresses the importance of understanding and evaluating such a niche population. Understanding what variables predict which student-athletes may experience stress and then provide preventative or supportive services may be very important to their overall well-being.

Theory and Practice of REBT

Given the mentioned mental health challenges experienced by many student-athletes, it is important to consider what student factors may contribute to the experience of stress and other affective conditions that may impact academic and athletic performance. While there are a number of external factors (i.e., athletic demands, academic demands etc.) to the student that can be considered to be contributors to experienced stress of student-athletes (Frank et al., 2015), it may be important to consider internal factors. One internal factor that may be important to consider are the types of thoughts or beliefs that a student-athlete engages in which may lead to stress. Consideration of theories of development of emotional states serve as the basis of a number of effective clinical interventions that will be described below.

Rational Emotive Behavior Therapy (REBT) is a psychotherapeutic technique that is considered to be one of the original forms of Cognitive Behavior Therapy (CBT) (DiGiuseppe & Doyle, 2019). REBT was developed by Dr. Albert Ellis, on the premise that individuals hold certain beliefs in life adversities (e.g., relation to failure, rejection, and poor treatment) that will then mediate his/her perception of events which in turn subsequently influences his/her emotional and behavioral

responses (Ellis & Dryden, 1997). That is, the way that one thinks about a situation may impact how they feel and how they respond/behave to the situation.

The theoretical model of REBT is based on the premise that individuals possess two types of beliefs: irrational beliefs and rational ones. The irrational beliefs are considered to be rigid and extreme thoughts which invoke dysfunctional, maladaptive emotions such as anxiety, depression, anger and/or guilt. Alternatively, rational beliefs are considered to be flexible, non-extreme beliefs that invoke healthy, functional, adaptive emotions such as concern, sadness, frustration, and regret (DiGiuseppe et al., 2014; Turner, 2016). The main idea of the theory, and as a result the clinical approach, is that these beliefs drive our emotions and behaviors.

The model of REBT may be best explained through an ABC framework as when one has to face an activating event, which may be a type of adversity (A), we have beliefs about the event (B) which then direct our emotional and behavioral responses, which are considered to be a consequence of our beliefs (C) (Davis & Turner, 2019). Clinically, the primary focus of change within REBT are the irrational beliefs that lead to unhealthy/maladaptive (emotional and/or behavioral) reactivity. The clinical model of REBT focuses on four main irrational beliefs to target for change: demandingness, awfulizing, frustration tolerance and global evaluations of human worth of self-and/or others (DiGiuseppe & Doyle, 2019). Each of the different beliefs are briefly discussed below and linked to athletic performance.

Demandingness is considered to be reflective of "unrealistic and absolute expectations of events or individuals" (DiGiuseppe et al., 2014). Alternative language used that reflects demandingness may involve rigidly held ideas like: have to, need, or should. An example of the irrational belief of demandingness would be when a student-athlete forms a rigidly held demand based on the belief: "I *have* to succeed/I *need* to do well." Clinically, in REBT the belief would be targeted for change as it is not the activating event (sporting event/competition) that *caused* the student-athlete to become anxious, but rather the irrational belief which may lead the student to experience anxiety which in turn would affect their behaviors (Turner & Barker, 2014).

Awfulizing, frustration intolerance and global evaluations of human worth also are proposed to have an impact affectively and behaviorally on student-athletes. The concept of awfulizing is when one believes that if something negative happened/will happen that "it would not just be bad, but *terrible* and *awful*" (DiGiuseppe et. al., 2014). For example, student-athletes might believe that if they lose a game or do not play to a high standard, it would be the *worst* thing possible.

An additional irrational belief within the REBT framework is that of frustration intolerance or low frustration tolerance. Here, the individual believes that the potential discomfort that they would experience would be unbearable and that they could not stand it/do not have the endurance to survive the discomfort (DiGiuseppe et. al., 2014). For example, during an activating event (i.e., running extra sprints after practice), one might think "I can't stand wind sprints" (Goldman, 2003). Another example that student-athletes may experience occurs after a loss, when student-athletes might think "I can't stand to lose."

The final of the core irrational beliefs in the REBT model is global ratings of worth which may be depreciation of self-and/or others. That is, here an individual doesn't rate their behavior or performance but rather rate themselves or others more globally in terms of their worth or value. For student-athletes the cognition may be "If/When I fail, it means I am a loser" or "If/When I fail, everyone will think I am bad" (Turner & Barker, 2013). This implicitly suggests one's self-worth is contingent upon his/her performance.

Efficacy of REBT

REBT is one of the most widely practiced forms of CBT (Matweychuk et al., 2019). Research has supported the efficacy of REBT in both clinical and non-clinical populations in both youth and adult populations (David, 2015; David et al., 2005). Studies have shown the use of REBT to be effective with school-aged children in improving psychological and behavioral problems (Banks, 2011). REBT has been utilized effectively within multiple settings including clinical, educational, and organizational settings (David et al., 2018). However, relatively speaking there has been a lack of research of the use of REBT in a sport setting (Turner, 2016; Turner & Barker, 2013). Most research with the use of REBT with athletes focuses on case studies and single-case designs (Turner, 2016). However, these studies have reported REBT as an effective intervention and treatment with athletes (e.g., Marlow, 2009; Turner & Baker, 2013).

Beliefs and Performance

The student-athlete population is vulnerable to multiple stressors and mental health challenges (Hughes & Leavey, 2012); however, this population also strives for high performance both athletically and academically. It may be possible that student-athletes' irrational beliefs not only have the capability of leading to stress and mental health challenges but can impact performance as well which may continue a cyclical pattern for student-athletes of stress.

Academic Performance

Academic performance is often synonymous with school readiness, academic achievement, and school performance (de Psicología & Lamas, 2015). Often times academic performance is defined by outcome measures such as school grades, and/or cumulative grade point average measured throughout the school-year (Jayanthi et al., 2014). As such, the current study will define academic performance as synonymous with academic achievement and through the use of outcome measures (i.e., grade-point-average).

In relation to beliefs to academic performance, research with student populations have shown that students who report a greater experience of irrational beliefs

typically experience more negative affect (Allen et al., 2017) and negative affect has been consistently linked to poor academic achievement (Callaghan & Papageorgiou, 2014). This is an important factor to consider when working with students; that negative affect is linked to poor academic achievement and therefore the focus should be on what leads to negative affect, in this case irrational beliefs.

While the previously mentioned research linked irrational beliefs to negative affect, it cannot automatically be assumed that the negative affect, caused by irrational beliefs, will lead to poor performance. However, a meta-analysis using adolescent samples and the use of REBT as a clinical intervention has demonstrated a moderate positive effect of REBT as an intervention on academic performance, as measured by grade point average (Gonzalez et al., 2004). This meta-analysis serves as an indicator that irrational beliefs may negatively affect academic performance.

Athletic Performance

Performance in the realm of athletics can be defined as an event where an individual or group/team is expected to execute specific skills, knowledge and abilities that are then compared, judged, or evaluated to a specific standard (Portenga et al., 2016). When it comes to athletic performance, Fullagar et al. (2015) define athletic performance as the context and magnitude in which an athlete completes a certain task within their sport. The most valid measure of athletic performance is through game statistics (Piedmont et al., 1999). The current study will define athletic performance in accordance with Portenga et al. (2016) and Fullagar et al., (2015) as execution of specific skills and abilities while participating in a sport and more specifically, in game performance.

In considering beliefs as they relate to athletic performance, there is a lack of research correlating irrational beliefs to athletic performance (Turner & Barker, 2013). Most studies investigating the effects of REBT on athletic performance use small sample sizes or rely on case studies, which can make it difficult to generalize findings across all sports and athletes. However, these studies have demonstrated positive effects of using REBT as a clinical intervention. For example, a study done with six gymnasts found enhanced performance in three gymnasts after applying REBT (Elko & Ostrow, 1991) and a case-study that applied REBT to an archery athlete found improved competitive performance (Wood et al., 2016). Two similar studies using golfers found that the use of rational self-talk led to more accurate performance in a putting task than when irrational self-talk was used (Turner et al., 2018) and the second study found golfers putting performance improved after a REBT intervention (Turner et al., 2018). While the research is building, again the work for beliefs and performance among high school students is lacking.

While there may be some gaps in the literature linking beliefs to performance, it is important to examine the relationship with sport settings as they are typically performance-driven settings (Turner, 2016). Irrational beliefs are unfavorable as they lead to maladaptive emotional and/or behavioral consequences (Turner, 2016), which has been consistently linked to mental health challenges (Turner, 2016). The severity of mental health challenges that student-athletes can face warrant further investigation.

The Present Study

The purpose of this study was to determine if irrational beliefs among competitive student athletes are predictive of their performance. More specifically, we wanted to determine if irrational beliefs are context specific to performance settings (academic vs. athletic) and if those beliefs predict performance differentially than irrational beliefs that are more general (i.e., power, fairness) in nature. This research will address a concern of David et al. (2010) who argued that there has been a lack of distinction between general and context-specific nature of irrational beliefs. Chadha et al. (2019) proposed that inherent in REBT is the idea that individuals often adopt irrational beliefs in situations that are important to them. As an example, one may think "If I do poorly during the game, that would be terrible/awful" but would not have the same type of catastrophic thinking as it relates to intolerance of rules or fairness.

With regards to academic performance, REBT as a clinical intervention has demonstrated a moderate positive effect on performance (Gonzalez et al., 2004) but historically there has been mixed findings in this area. Some studies have found irrational beliefs to be negatively related to academic achievement (Bridges & Roig, 1997), whereas, other studies did not find any associations between irrational beliefs and academic achievement (Medrano et al., 2010). Therefore, it may be important to consider the type of measure of irrational beliefs that are used in research. That is, if studies utilize more general irrational beliefs as opposed to content specific irrational beliefs, these general irrational beliefs may not always affect student's academic performance (Balkis, 2013). Based upon Ellis' theory that domain specific rational and irrational beliefs are better predictors of specific outcomes, such as performance, than general beliefs (1976), this research looked at context-specific irrational beliefs in performance settings in terms of their predictive ability of academic performance and athletic performance in comparison with a more general irrational belief measure among student-athletes.

Methods

Participants

Participants were recruited from regional high schools located near a large metropolitan area. Recruitment information was sent via email to 62 coaches of which approximately 15 coaches expressed interest and willingness to participate. Out of the 15 that expressed initial interest, only nine coaches and subsequently nine teams/schools participated. Multiple coaches reported difficulty participating due to not having access to Hudl Assist due to restrictive school budgets due to the COVID-19 pandemic. Out of the nine teams that participated, seven teams recorded winning overall records for the season and all nine teams placed within the top five in their respective leagues. From the nine schools, 30 student-athletes

participated in the study, however only 29 completed all measures required for this study with one participant not completing one of the measures. Data will be reported accordingly. The required criteria for participants included that they are a high school student, an active member of a competitive school-based team (i.e., being listed on the team roster on their high school Varsity girls' basketball team) and they average approximately eight minutes per game (the amount of time for one quarter in basketball). One participant in the study averaged seven-minutes per game, but was still included in the study as the time per game required was an estimate. Of the 30 participants, two reported to be in the 9th grade, seven reported to be in the 10th grade, six reported to be in the 11th grade and 15 reported to be in the 12th grade. The average reported GPA was within the higher range with minimal variation ($M = 3.85$, $SD = 0.22$).

Procedures

Ethical approval was received from the Institutional Review Board (IRB) of the first author prior to this study. A convenient recruitment method was utilized that included sending an email to high school girls Varsity basketball coaches. In order for high school student-athletes to be included in this study the student-athlete and their parent needed to consent to participate. All participants over the age of 18 completed an online consent form, while participants under the age of 18, participants' parents/guardian completed an online consent form to participate in this study and the student-athlete completed an assent form. The consent form requested the high-school student-athlete to actively participate in the study by completing multiple online questionnaires (iPBI and CASI) that was accessed via Qualtrics, an online data collection program. The consent also provided permission to view their in-game performance statistics, generated by Hudl, that was provided by their coach. After parents' consent and participants assent to participate in the study, the participants' respective coaches were asked to provide the researcher the VPS statistic, automatically generated by Hudl, for each player on their team that consented to participate in this study for at least four games during conference play. This was measured during conference play as this is a consistent point in the basketball season, without outlier influences that may occur during the playoff season (i.e., higher stress due to nature of playoffs such as the possibility of being eliminated and the season-ending).

Measures

Demographics After parental consent and student assent to participate in the study, participants were asked to complete a short demographic section requesting information such as ethnicity, grade-level, approximate time spent on academics and athletics during the season and grade-point average.

Irrational Performance Beliefs Inventory (iPBI) (Turner et al., 2018). The iPBI consists of 28-items measuring the four core irrational beliefs of REBT. This measure includes seven items of demandingness, seven items of awfulizing, seven items

of frustration tolerance and seven items of depreciation all of which are rated in a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A high score on this measure indicates stronger irrational beliefs (Turner et al., 2018). This scale has been used to measure context-specific irrational beliefs in performance environments, such as athletic performance and academic performance (Allen et al., 2017; Davis & Turner, 2019).

This measure has been used with multiple different populations from varying age ranges. For example, this measure has been used with triathletes (Davis & Turner, 2019) as well as amateur athletes and semi-professional athletes which included UK high-school aged participants with a mean age of 38.04 ± 13.80 years (Turner & Allen, 2017). This measure was also used with non-athlete populations of undergraduate students with a mean age of 20.32 ± 5.05 years.

Although this measure was created for context-specific irrational beliefs in performance environments and to be generalizable across performance settings, some of the language was adjusted for this study. For example, item four "I need my manager/coach to act respectfully towards me" was changed to "I need my teacher/coach to act respectfully towards me" to address the academic context. This item change has been used in a previous study (Allen, et al., 2017). The iPBI has demonstrated construct and concurrent validity with strong fit indices (CFI = 0.93, NNFI = 0.92, SRMR = 0.06, RMSEA = 0.07) (Turner & Allen, 2017). The iPBI has shown construct (α reliability between 0.90 and 0.96), concurrent (medium to large correlations) and predictive (small to medium correlations) validity (Turner & Allen, 2017).

Child and Adolescent Scale of Irrationality (CASI) (Bernard & Cronan, 1999; Terjesen et al., 2017). The CASI was originally created by Bernard and Laws in 1988, however the measure was updated in 1999 by Bernard and Cronan to be more consistent with REBT theory and more reflective of children and adolescents emotional functioning (Bernard & Cronan, 1999; Terjesen et al., 2017). The newest revised edition of the CASI (Terjesen et al., 2017) consists of 36-items which are rated in a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The 36-items create the Total Irrationality Scale however the measure also includes four core factors: self-downing ("I am not good enough"), intolerance of frustrating rules ("I can't stand following rules"), intolerance of work frustration ("School work is too difficult") and demands for fairness ("Others should treat me fairly"). Previous research reported the CASI to have good to moderate reliability of the subscales (Smidt et al., 2009). Previous research has found the CASI to have internal reliability of Cronbach's alpha of 0.92 (Terjesen et al., 2017).

Academic Performance Measures

Course grades are important indicators of academic performance for students (Allensworth & Clark, 2020). As such, grade-point average (GPA) was used to measure academic performance. Based off previous research of Hwang and Choi (2016) and Lumpkin and Favor (2012) that showed self-report of GPA to be reliable, GPA was collected through self-report. The participants were asked to provide

their most current GPA at the time of the study. In an effort to standardize GPA across multiple participants at varying schools, as GPA computations can vary across schools dependent on each schools' criteria, a standard metric of GPA was computed for raw GPA scores to create an average score and consistent metric. As College Board is a well-known not-for-profit of over 6,000 universities, colleges, schools and other educational institutions, the metric created by College Board to convert GPA to a 4.0 metric scale was utilized.

Athletic Performance Measures

Hudl, Value Point System (VPS) (Graff, 2007). Hudl is performance analysis company that is utilized by over 180,000 global sports teams at various levels, including high school. Hudl is a system used to store game film that also extracts performance analysis from the video footage. The Hudl technique mobile app has been utilized in previous research to measure middle-school students' knowledge of badminton and demonstrated increased understanding of rules, strategies and techniques as they relate to badminton (Yu et al., 2021).

Based off previous research of Newland et al. (2013) who utilized season averages of basketball performance including multiple facets of performance such as positive statistics (rebounds, assist, field goal percentages) and negative statistics (turnovers, personal fouls), a similar measure of performance was utilized in this research. Hudl has a value point system (VPS) that is a generated formula that factors multiple game statistics to produce a numerical indication of overall performance. The VPS calculates each individual player's 'positive statistics' such as in basketball, points, rebounds, assists, charges, steals and blocks and compares it by dividing it against each individual player's 'negative statistics' such as missed free throws, missed shots, fouls and turnovers. The VPS generates a single number of overall performance ranging from 0 (needs work) to 4 (great). provided to the primary researcher by the coaches' who consented to participate in this study. Athletic performance was measured during 'in-season' play and consisted of at least four games to accurately measure a player's performance while taking account for a 'bad game' or an 'off day.'

Results

Psychometric Properties of Measures

Thirty participants completed the iPBI and reported a total average score of 13.6 ($M = 13.6$, $SD = 1.55$) with scores ranging from 10.57 to 16, which is relatively low overall. The total reliability ($\alpha = 0.85$) of the iPBI was slightly lower than previous reported reliability of the measure of $\alpha = 0.90 - 0.96$ (Turner & Allen, 2017), which may have been due the small sample size. Twenty-nine participants completed the CASI and reported a total average score of 2.81 ($M = 2.81$, $SD = 0.37$) with a range from 2.06 to 3.56 on a Likert scale ranging from one to five, with five being the

highest rating of irrationality (strongly agree). The total reliability ($\alpha = 0.83$) of the CASI was slightly lower but comparative to previous reported reliability of the measure $\alpha = 0.92$ (Terjesen et al., 2017), which may have been due to the small sample size. Table 1 displays the means and standard deviations of the iPBI subscales and total as well as the CASI subscales and total.

Correlations Within Measure and Correlations Among Measure Subscales

Both measures include the same core irrational beliefs, Demandingness, Awfulizing, Low-Frustration Tolerance and Global Ratings of Worth/Depreciation of Worth. Table 1 displays each subscale correlation to the corresponding subscale on the opposing measure, subscale correlations within the overall measure as well as the correlation of both measures (iPBI and CASI) total scores. When analyzing the strength of the relationship among the subscales that reflected similar constructs, the iPBI Depreciation subscale had the strongest statistically significant correlation to the CASI Depreciation of Self subscale. The iPBI measures overall depreciation whereas the CASI separates depreciation into depreciation of others and depreciation of self. However, the CASI Depreciation of Others subscale was not statistically significantly correlated to any iPBI subscales, including the total iPBI subscale. The measures total subscale overall was strongly correlated to each other, as to be expected as both measures are measuring the same irrational beliefs just in different setting (performance-based vs broad/general settings). When evaluating other subscale correlations some of the correlations were moderate and would most likely have been significant with a larger sample size.

Predicting Performance

To test the research questions under investigation, a hierarchical multiple regression analysis was computed to evaluate whether and to what degree do different types of irrational beliefs (general and context-specific) predict performance (academic and athletic). This process was completed twice, once to predict athletic performance and a second time to predict academic performance.

Predicting Athletic Performance

The first analysis was computed using the criterion variable, athletic performance, measured through the VPS from Hudl. The results of this regression are displayed in Table 2. For the first block analysis, the predictor variable of demographics such as, time spent on athletics versus academics and current year in high-school (freshman, sophomore, junior, senior) were entered and revealed a model not to be statistically significant $F\ (3,\ 25) = 0.613$, $p = 0.613$. Additionally, the R^2 value of [0.069] associated with this regression model suggests that demographics account for only 6.9% of the variance in performance. For the second block analysis, the predictor variable of the CASI subscale scores was added to the analysis and explained an additional 48.9% of the variance in athletic performance and this change in R^2

Table 1 Descriptive statistics and subscale and total correlations of the irrational performance beliefs inventory and the child and adolescent scale of irrationality

Scale/subscale	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. VPS	1.09	.42	–												
2. GPA	3.85	.22	−.375*	–											
3. iPBI LFT	4.13	.45	380*	−.297	–										
4. iPBI demand	3.68	.38	−.355	.430*	.305	–									
5. iPBI awful	3.48	.43	−.422*	.133	.390*	.643**	–								
6. iPBI depreciation	2.35	.83	−.333	−.021	.134	.387*	.490*	–							
7. CASI LFT	2.52	.58	−.440*	−.047	− .005	.213	.433*	.578**	–						
8. CASI demand	3.31	.36	−.543**	.420*	.056	.320	.374*	.163	.478**	–					
9. CASI awful	3.23	.37	.005	−.142	.341	.345	.519**	.459*	.495*	.147	–				
10. CASI deprec. others	2.60	.41	.038	−.174	.219	.141	.279	.190	.271	.325	.201	–			
11. CASI deprec. self	2.43	.70	−.308	−.004	.016	.297	.426*	.725**	.633**	.169	.345	.178	–		
12. iPBI total	13.6	1.55												–	
13. CASI total	2.81	.37												.717**	

Scores on the VPS can range from 0 (needs work) – 4 (great performance)

Scores in the CASI and iPBI range from a likert scale 1 (strongly disagree) − 5 (strongly agree), indicating that higher scores on these scales relate to greater irrational beliefs

GPA measures academic performance on a 0.0 to 4.0 scale with 4.0 being equivalent to an A/A+, 3.0 being equivalent to a B, 2.0 equivalent to a C and 1.0 equivalent to a D

*$p < .05$, **$p < .01$

was statistically significant contribution to the model ΔF (5, 20) = 4.43 $p = 0.007$. Additionally, the R^2 value of [0.558] associated with this regression model suggests that after the second block variable of CASI subscale scores was included in the model, the model as a whole explained 55.8% of the variance in athletic performance which was a statistically significant model F (5, 30) = 3.15, $p = 0.018$.

When further evaluating CASI subscales, two subscales revealed to be statistically significant predictors of performance. More specifically, CASI global ratings of worth/depreciation of others (i.e., "Classmates who always behave and follow the rules are "suck-ups.") ($\beta = 0.398$, $p = 0.034$) and CASI demandingness (i.e., "I have to do well in things that are important to me") ($\beta = -0.560$, $p = 0.006$) were significant predictors. The CASI demandingness subscale were strongly, negatively correlated with athletic performance $r(28) = -0.54$, $p = 0.001$ indicating that students who endorsed demandingness beliefs had poorer performance. Interestingly, the Depreciation of Others subscale was positively correlated with athletic performance r (28)_ = 0.04, $p = 0.052$ reflecting that when students reported rating the worth of others that this was related to high athletic performance, however, this was a small, non-statistically significant correlation.

For the third block analysis, the predictor variable of the iPBI subscale scores was added to the analysis. The results of the third block hierarchical linear regression analysis revealed the model as a whole to be statistically significant F (4, 16) = 6.08, $p \leq 0.001$. Including the iPBI subscales into the model accounted for an additional 26.2% of the variance in athletic performance ($\Delta R^2 = 0.262$) which was a statistically significant contribution to the model ΔF (4, 16) = 5.83, $p = 0.004$. Additionally, the R^2 value of [0.820] associated with this regression model suggests that after the third block variable of iPBI subscale scores was included in the model, the model as whole explained 82% of the variance of performance which was a statistically significant model F (4, 16) = 6.08, $p \leq 0.001$.

When further evaluating the third block analysis, the CASI subscales of demandingness and depreciation of others remained statistically significant (Demandingness, $\beta = -0.430$ $p = 0.008$, Depreciation of Others, $\beta = 0.320$, $p = 0.023$). However, with the addition of the iPBI, the CASI subscale of Awfulizing now was statistically significant ($\beta = 0.335$, $p = 0.038$) when it was not significant during the second block analysis ($p = 0.125$). Inconsistent with results of the types of the beliefs shown in the CASI, the iPBI subscales of Demandingness ($p = 0.361$) and Depreciation ($p = 0.188$) were not significant. The subscales of Awfulizing ($\beta = -0.392$, $p = 0.032$) and Low-Frustration Tolerance ($\beta = 0.448$, $p = 0.003$) were significant predictors in this model. The iPBI Awfulizing subscale was moderately, negatively correlated to athletic performance $r(28) = -0.46$, $p = 0.006$ indicating that students who endorsed awfulizing beliefs had poorer performance. Interestingly, the Low Frustration Tolerance subscale was moderately, positively correlation to athletic performance $r(28) = 0.40$, $p = 0.018$ indicating that students who endorsed low frustration tolerance beliefs correlated to high athletic performance.

Table 2 displays results from this hierarchical regression. However, block 1, Demographics (time spent on athletics, time spent on academics and grade-level) did not contribute to the model at any step and therefore, was not included in the table.

Table 2 Regression with VPS as criterion

Variable	Model 1	Model 2			Model 3		
		β	*t*	Sig (*p*)	β	*t*	Sig (*p*)
Regression 2 *Demographics, CASI Subscales*				.018*			
CASI demand		−.560	−3.07	.006**	−.430	−3.00	.008**
CASI awful		.284	1.60	.125	.335	2.27	.038*
CASI LFT		−.115	−.457	.653	−.066	−.343	.736
CASI deprec. self		−.307	−1.48	.156	.004	.021	.983
CASI deprec. others		.398	2.28	.034*	.320	2.52	.023*
Regression 3 *Demographics, CASI Subscales, iPBI Subscales*							<.001**
iPBI demands					−.136	−.940	.361
iPBI awful					−.392	−2.36	.032*
iPBI LFT					.448	3.51	.003**
iPBI deprec					−.233	−1.38	.188
R^2	.069		.558			.820	
ΔR^2	–		.489			.262	
F		.613	3.15			6.08	
ΔF		–	5.83			5.83	
Sig. ΔF		–	.007**			.004**	

*$p < .05$, **$p < .01$

To test if the analyses demonstrated results to be true a block switch analysis was computed switching the order of the predictor variables of the CASI and the iPBI. Switching the order of the CASI and iPBI in the regression model helped to determine if performance-specific irrational beliefs (iPBI) or general irrational beliefs (CASI) better explain the association in athletic performance. The results of this regression switching the order of blocks/steps is displayed in Table 3. In this analysis, the same demographics (grade, time spent on athletics, time spent on

Table 3 Block switch regression with VPS as criterion

	R^2	ΔR^2	*F*	ΔF	Sig (*p*)	Sig. ΔF
Regression 1 *Demographics*	.069	–	.613	–	.613	–
Regression 2 *Demographics, iPBI Subscales*	.576	.508	4.08	6.28	.006**	.002**
Regression 3 *Demographics, iPBI Subscales, CASI Subscales*	.820	.244	6.08	4.34	<.001**	.011*

*$p < .05$, **$p < .01$

academics) were still utilized as the first predictor variable. Then the iPBI subscales were utilized as the second predictor variable and the CASI subscales were added to the analysis as the third block. In the block switch analysis, utilizing the iPBI as the second predictor in the model demonstrated a model to be more statistically significant ($p = 0.006$) than when utilizing the CASI subscales as the second predictor in the model ($p = 0.018$).

Predicting Academic Performance

The first analysis was computed using the criterion variable, academic performance, measured through self-reported GPA scores. The results of this regression are displayed in Table 4. For the first block analysis, the predictor variable of demographics such as, time spent on athletics versus academics and current year in high-school (freshman, sophomore, junior, senior) was analyzed. The results of the first block hierarchical linear regression analysis revealed a model not to be statistically significant (F (3, 25) = 1.19, $p = 0.333$). Additionally, the R^2 value of [0.125] associated with this regression model suggests that demographics account for only 12.5% of the variance in academic performance. For the second block analysis, the predictor variable of the CASI subscale scores was added to the

Table 4 Regression with GPA as criterion

Variable	Model 1	Model 2			Model 3		
		β	*t*	Sig (*p*)	β	*t*	Sig (*p*)
Regression 2 *Demographics, CASI Subscales*				.147			
CASI demand		.638	3.03	.007**	.451	2.31	.035*
CASI awful		− .023	− .115	.910	− .055	− .273	.788
CASI LFT		− .271	− .931	.363	− .200	− .765	.456
CASI deprec. self		.110	.459	.651	− .080	− .322	.752
CASI deprec. others		− .251	− 1.25	.228	− .154	− .892	.385
Regression 3 *Demographics CASI Subscales, iPBI Subscales*							.035*
iPBI demands					.478	2.42	.028*
iPBI awful					.098	.433	.671
iPBI LFT					.448	− 2.13	.049*
iPBI deprec					− .371	− .040	.969
R^2	.125		.412			.666	
ΔR^2	–		.287			.255	
F	1.19		1.75			2.67	
ΔF	–		1.95			3.05	
Sig. ΔF	.333		.131			.048*	

*$p < .05$, **$p < .01$

analysis and explained an additional 28.7% of the variance in academic performance and this change in R^2 was not a statistically significant contribution to the model ΔF (5, 20) = 1.75, $p = 0.147$. However, when evaluating specific CASI subscales, the subscale of Demandingness was a strong, statistically significant predictor ($\beta = 0.638$, $p = 0.007$) and was moderately, positively corelated to academic performance r (27) = 0.42, $p = 0.012$, indicating that high levels of the irrational belief of demandingness were predictive of high academic performance.

For the third block analysis, the predictor variable of the iPBI subscale scores was added to the analysis. The results of the third block hierarchical linear regression analysis revealed the model as a whole to be statistically significant F (4, 16) = 2.67, $p = 0.035$. Including the iPBI subscales into the model accounted for an additional 25.5% of the variance in academic performance $\Delta R^2 = 0.255$) which was a statistically significant contribution to the model ΔF (4, 16) = 3.05, $p = 0.048$. Additionally, the R^2 value of [0.666] associated with this regression model suggests that after the third block variable of iPBI subscale scores was included in the model, the model as whole explained 66.6% of the variance of performance which was a statistically significant model F (4,16) = 2.67, $p = 0.035$.

When further evaluating the third block analysis, the CASI subscale of demandingness remained statistically significant ($\beta = 0.451$, $p = 0.035$). Similarly, to the CASI, the iPBI subscale of Demandingness demonstrated to be statistically significant ($\beta = 0.478$, $p = 0.028$). However, the iPBI subscale of Low-Frustration Tolerance also demonstrated to be statistically significant ($\beta = -0.371$, $p = 0.049$). The subscale of Demandingness was moderately, positively correlated with athletic performance r (27) = 0.47, $p = 0.005$ indicating that students who reported demandingness beliefs correlated with higher academic performance.

Table 4 displays results from this hierarchical regression. However, block 1, Demographics (time spent on athletics, time spent on academics and grade-level) did not contribute to the model at any step and therefore, was not included in the table.

To test if the analyses demonstrated results to be true, a block switch analysis was computed switching the order of the predictor variables of the CASI and the iPBI. Switching the order of the CASI and iPBI in the regression model helped to determine if performance-specific irrational beliefs (iPBI) or general irrational beliefs (CASI) better explain the association in academic performance. The results of this regression switching the order of blocks/steps is displayed in Table 5. In this analysis, the same demographics (grade, time spent of athletics, time spent on academics) were utilized as the first predictor variable. Then the iPBI subscales were utilized as the second predictor variable and the CASI subscales were added as the third. In the block switch analysis, utilizing the iPBI as the second predictor demonstrated a model to be statistically significant ($p = 0.015$). This is dissimilar to when using the CASI subscales as the second predictor in the model which did not demonstrate a model to be statistically significant ($p = 0.147$), demonstrating that the iPBI is a better predictor for academic performance than the CASI.

Table 5 Block switch regression with GPA as criterion

	R^2	ΔR^2	F	ΔF	Sig (p)	Sig ΔF
Model 1 *Demographics*	.125	–	1.19	–	.333	–
Model 2 *Demographics, iPBI Subscales*	.527	.402	3.34	4.46	.015*	.009**
Model 3 *Demographics, iPBI Subscales, CASI Subscales*	.666	.139	2.67	1.34	.035*	.299

*$p < .05$, **$p < .01$

Discussion

Student-athletes may be at risk of experiencing mental health challenges due to the combination of academic and athletic pressures in conjunction with individual factors such as how they think about or evaluate these pressures. In essence, their thoughts or beliefs. This study aimed to determine among competitive student-athletes if there is a link between irrational beliefs and performance. More specifically, based on REBT theory (Ellis & Dryden, 1997) and the competitive nature of this population to emphasis performance (Turner, 2016) this study aimed to determine if irrational beliefs that are specific to performance settings predict performance differently than irrational beliefs that are more general and/or broad in nature.

When evaluating athletic performance, results supported the hypothesis that context-specific irrational beliefs in performance settings was a slightly better predictor of athletic performance, than general irrational beliefs. The model containing the context-specific irrational beliefs scale (iPBI) and demographics demonstrated to be slightly more statistically significant ($p = 0.006$) than the model containing the general irrational beliefs scale (CASI) and demographics ($p = 0.018$). The difference in the variance between the models was also small as the model with demographics and the iPBI accounted for approximately 57% of the variance while the model with demographics and the CASI accounted for approximately 56% of the variance. Indicating that the context-specific irrational beliefs scale with this sample are really not a better predictor of athletic performance than a general irrational beliefs scale.

However, in looking at the more general irrational beliefs, endorsement of demandingness items was negatively correlated with athletic performance. This finding is consistent with previous REBT literature, that demandingness is the primary irrational belief (Turner, 2016) and therefore expected to be significant and negatively correlated to performance as irrational beliefs typically lead to negative emotions which can impact behavioral responses such as performance. The difference here is that this measure of demandingness was of more of a general type and as such may be important for clinicians to consider in their clinical work to improve performance.

An interesting finding was that the subscale of global ratings of worth/depreciation of others on a broad measure of irrationality (CASI) was positively correlated to performance. This finding is not consistent with the extant literature as

depreciation beliefs are negatively correlated with performance of elite athletes Turner et al., (2019). However, the current study analyzed high-school student-athletes and therefore, the level of play may have an effect on levels of depreciation and performance. An interesting factor to consider as it relates to ratings of worth is that on the CASI scale depreciation is differentiated by depreciation of self and depreciation of others, whereas the iPBI does not differentiate. It may be important to determine how each specific depreciation irrational belief(s) impact performance. This finding is important for clinicians and sport psychologists to note as irrational beliefs of global ratings of others place emphasis on external factors (i.e., other's opinions) in contributing to one's actions and self-worth.

The addition of the performance beliefs from the iPBI to the predictive models led to some of the more general irrational beliefs subscales of the CASI becoming significant predictors, when these subscales were not statistically significant on their own. This indicates that some student-athletes may have more specific irrational beliefs than general irrational beliefs, and some student-athletes may experience both general and specific irrational beliefs and the additional pressure of being a student-athlete/performance pressures may accentuate their irrational beliefs.

In looking at academic performance context-specific irrational beliefs in performance settings was a better predictor of academic performance than general irrational beliefs as general irrational beliefs was not a significant predictor. Linking a specific irrational belief scale to academic performance may be important in applied settings. That is, if clinicians and school psychologists only utilized general irrational belief measures to indicate a student's level of irrationality, they may miss a student who may have irrational beliefs as it relates to their performance but not as it relates to general life rules (fairness, power etc.). However, it is important to note that in this study GPA was utilized as a measure of academic performance and while the study included participants from varying schools, the average reported GPA was within the higher range with minimal variation. This may have misleading predictive conclusions, as with less variability in the academic measure, it cannot be as easily concluded the results would be the same for those with lower self-report GPA.

However, in looking at the more general irrational beliefs as it relates to performance, endorsement of demandingness items was the only statistically predictor, which is consistent with REBT literature (Turner, 2016), however the general irrational belief of demandingness was positively correlated to academic performance. This finding is inconsistent with the theory of REBT that irrationality is predictive of functional impairment, in this case academic performance Similarly, when looking at the context-specific irrational beliefs (iPBI), endorsement of demandingness was also statistically significant and positively correlated to academic performance. One possible explanation for the positive correlation of demandingness (general and context-specific) to academic performance may be explained through the Yerkes–Dodson law (1908). Yerkes–Dodson law explains that there is an optimal level of stress that correlates to performance, indicating that moderate arousal (i.e., stress) correlates to an optimal level of performance (Nickerson, 2015). Therefore, it may be possible that some stress, which may be derived from irrational beliefs, particularly demandingness as demandingness is the primary irrational belief, may benefit

a student-athlete to perform well academically. That is, these beliefs may be adaptive and drive them to do well and not be truly irrational and dysfunctional in nature.

This is important for clinicians and school psychologists to consider that not 'all stress' is inherently bad and may be beneficial for student-athletes. However, future research should distinguish 'how much stress' is too much, meaning determining the point where stress no longer becomes beneficial and instead can negatively impact performance. When considering context-specific irrational beliefs to performance settings, the subscale of Low Frustration Tolerance was statistically significant and negatively correlated to academic performance which is consistent with previous REBT literature that low levels of tolerating frustration can impact academic performance as low frustration tolerance can lead to more procrastination and negative affect (Balkis, 2013).

Overall, it is evident that irrational beliefs can impact performance. While context-specific irrational beliefs to performance better predict performance, both academically and athletically, this concept should be tested throughout other performance-specific domains (i.e., work settings). Future research should also consider testing context-specific irrational beliefs to other domains that are not performance based.

Data Availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors did not receive support from any organization for the submitted work. The authors declare they have no financial interests.

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