

## Original Article

### Gender differences with anxiety, perceived competence, and grit in collegiate track and field throwers

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#### Abstract

Much research has been conducted on methods for enhancing sports performance. One area that has been examined is athletes Grit. Grit can be described as a combination of one's ability to overcome obstacles they encounter in their goal pursuit and continued persistence towards the goal over time. The intent of this study was to examine gender differences regarding self-perceived grit and meet performance in male and female collegiate track and field throwers. Subjects consisted of nine university track and field student-athlete throwers (5 males; 4 female). A mixed methods approach was applied. Quantitative measures included tracking athletes for 6 weeks. Grit and competition performance information was collected bi-weekly (3 times) to evaluate potential trends. Additionally, trait characteristics, perceived anxiety and competence were collected on each athlete. Qualitative measures involved gender group interviews at the end of the season to address potential variables associated with grit. Results indicated that there were differences between genders anxiety, competence, grit and their throwing performances. Grit scores indicated that motivational levels are impacted by overall performance and can shift from week to week. Female athletes were impacted by external factors such as stress, drama, and fear. Anxiety can impact overall grit, which should lead coaches to develop methods for helping athletes deal with anxiety. These results can be applied to help coaches and other caring individuals develop their athletes. Methods should be implemented to help avoid pitfalls associated with male/female athletes. By using the Grit scale, coaches can better prepare to meet the needs of each athlete and adjust their training throughout the season.

**Keywords:** Track and field, intensity, performance, external factors

#### Introduction

Duckworth(2018) defines grits “passion and sustained persistence applied toward long-term achievement, with no particular concern for rewards or recognition along the way” (p. 1087). Although, grit exemplifies aspects of a person's resilience, which allows an individual to bounce back from failure, it also reflects a person's tendency to maintain interest, or passion on long-term goals, regardless of the adversity encountered. Further, grit is a combination of one's ability to overcome obstacles they encounter in their goal pursuit and continued persistence towards the goal overtime. Grit is becoming a more highly researched topic in both education and sport performance as it has been found to be related to achievement, optimism, and individual growth(2018).

Grit is conceptualized as a higher-order personality trait consisting of two lower-order traits labelled, *consistency of interests*(CI) and *perseverance of effort*(PE)(Duckworth, Peterson, Mathews, & Kelly, 2007). CI reflects the individual's commitment to maintain focus and stay on track to accomplish the task over a long period of time. PE reflects the individual's ambition to pursue long-term goals, despite the obstacles and setbacks they might encounter(Duckworth & Gross, 2014). Additionally, grit has shown to be positively related to grade point average, military accomplishments, and performance in a national spelling bee (Duckworth, 2018). From these findings it was evident that the ability to persevere over a long-term made a difference between the low- and high-end achievers.

The concept of grit was first theoretically conceptualized in 2004 during research conducted at the United States Military Academy (Charlton, 2019). The individual who possesses more grit not only finishes the task at hand but pursues a given goal for a period of time. Grit is also distinct from dependability aspects of conscientiousness, including self-control in efforts for consistent goals and interest(Ravitch & Riggan, 2017). It is evident that those who possess higher perceived grit are likely to succeed and reach their potential in a variety of endeavours, this includes both education and sport performance. However, there has been limited research examining the relationships between factors such as competence, anxiety and grit in athletes, specifically track and field athletes. This may be particularly important to explore at the domain level as track is quite different from other traditional sports and the individual nature, preparations, and execution for the team is placed mainly on athletes individual performances.

One recent study explored the potential value of conceptualizing and measuring grit as a domain-specific construct (Cormier, Dunn, & Dunn, 2018). Researchers focused on collegiate athletes ( $N=251$ ), who completed 3 versions of the grit scale (Duckworth, Peterson, Matthews, & Kelly, 2007) specific to different contexts, including sport, school, and life. The study revealed differences in grit levels in the domains of sport and school. Specifically, participants reported higher grit in sport than in school and life in general. Results revealed that the school-specific measure of grit accounted for significant amounts of variance. However, more research is needed to explore the differences in other achievement contexts where grit may be experienced by individuals. Additionally, when evaluating one's perceived grit in a particular domain it is important to understand and identify other personal characteristics that may impact their grit in that setting. For example, a student might show high grit when playing sports, but low grit in school. Therefore, an explanation to why this variance might occur is needed.

#### *Anxiety*

Previous research has investigated several different psychological factors of collegiate athletes and their performance closely related to grit. Common constructs that have been found to influence athlete persistence and performance include anxiety, stress, and fear of failure (Gustafsson, Sagar, & Stenling, 2017). Anxiety is defined as a feeling of worry, nervousness, or unease typically about an imminent event or something with an uncertain outcome (Lexico, n.d.). Stress is defined as pressure or tension exerted on a material object (Lexico, n.d.). Fear of failure has been conceptualized as the motive to avoid failure associated with anticipatory shame in evaluative situations (Atkinson, 1957). Previous findings indicate that fear of failure is related to burnout and psychological stress in athletes and that this association is mainly associated with the individual-oriented dimensions of fear of failure (Gustafsson, Sagar, & Stenling, 2017).

Sporting events that are individually based, like track and field, may have a specialized need for understanding psychological preparation, coping, and grit as day-to-day performance is almost completely reliant on the individual athlete. One research study explored the characteristics of motivational factors and climate of elite hammer throwers (Benczeneiter, 2013). Athlete motivation was explored through intrinsic and extrinsic motivational levels along with the perceived motivational climate created by the coach. The results from the research identified that the male throwers had significantly higher intrinsic motivation and less amotivation compared to their female thrower counterparts. Intrinsic motivation refers to the behavior that is driven by internal rewards. Amotivation refers to the state of lacking motivation to engage in any activity. If male and female throwers showed significant differences in motivation, it is likely they share differences in perceived grit which may impact practice effort, performances, and open the door to greater feelings of stress, anxiety and fear. When evaluating motivation, it may be important to also consider characteristics like grit as one's consistency and perseverance are likely related to the daily grind of practice and meet performance.

Track and field throwers face several challenging moments in practice and performance as individuals are impacted by their limited number of attempts in their activity. Power (1982) provided seminal research on the onset of investigating anxiety levels in track and field in athletes of varying ages and abilities. These early results suggested that anxiety may be a problem for track athletes and that coaches and athletes may need special training to overcome its side effects. However, it was evident that if athletes would be identified at an earlier stage in their track and field career, they would be able to utilize some of the proven methods to control anxiety. Implications of this study have led to more nuanced approaches to understanding anxiety such as investigating individual differences in personality, coaching environments that reduce anxiety, as well as mental characteristics that could reduce anxiety and improve performance.

One way to evaluate these challenging individual moments and dealing with anxiety and stress is to explore one's perceived flow (Csikszentmihalyi, 1990). Flow is achieved at the optimal level of arousal where one can balance their anxiety and have the skills to overcome and persist towards quality performance. Csikszentmihalyi (1990) lays out the essential steps for producing flow and how mental periodization is important in maximizing a throwers flow. Mental periodization is a systematic mental conditioning program designed for peak performance for specific competitions (Csikszentmihalyi, 1990). According to previous research, there are potential relationships between grit and anxiety for athletes (Duckworth, 2018). Additionally, feeling competent in one's sport, which involves reducing fear of failure and achieving optimal flow, can be impacted by one's psychological perspective which is likely to include grit as grit has been shown to impact the day-to-day preparation as well as performance competition (Duckworth, 2018). However, there is limited research on these relationships. Overall, there appears to be differences in male and female motivation and perceived anxiety in shared track events like throwing events, suggesting that perceived grit may have potential gender differences as well (Duckworth, 2018). But there is currently limited information on what concepts might be connected to these differences. Therefore, the purpose of this study was to understand the differences between perceived grit and performance in male and female collegiate track throwers.

#### **Methods**

##### *Participants*

Approval for the research was obtained from the Institutional Review Board (IRB) at the university from which the study was conducted. The participants in this study were undergraduate students who were

enrolled at a university in the mid-south region of the United States and included nine track and field student-athletes (male=5; female=4), ranging from freshman to seniors (age range=18-25 years). The students volunteered for the study and signed a letter of informed consent prior to participation. All participants were over the age of 18 at the time of the study. Participants were all part of the throwing group on this university's Division I track and field team, competing in the shot put, discus, and hammer.

#### *Procedures*

Approval was obtained by the university's head track and field coach to conduct the research with the student-athletes. Surveys measuring grit, perceived competence, and anxiety were administered during the 6-week study (every second week). An email was sent to participants with directions and a link to the online survey which included all three measures at the first checkpoint, and just measured grit at the second and third checkpoint. Once survey responses were completed, performance data from competition at the end of the week was recorded.

During the first survey data collection, researchers also included questions regarding the athlete's perceived performance anxiety and competence. Data on the student's athletic performance were gathered the same weeks of grit data collection. Throw scores during these weeks included all throws accomplished during competition at the end of the week. At the competition 3-6 attempts were recorded for each of the participants.

#### *Quantitative Measures*

**Grit.** The 12-question Grit Scale (Duckworth, 2007) (See Fig. 1) was designed to measure the personality traits that would be in high-achieving individuals, by tracking trait level perseverance and long-term goals (Stellar, n.d.). The scale consists of a final total of two subscales: CI and PE. An example of a CI item is "I often set a goal but later choose to pursue a different one". An example of a PE item is "I am a hard worker". Participants were instructed to rate each statement on a scale as follows: Very much like me (5), Mostly like me (4), Somewhat like me (3), Not much like me (2), and Not like me at all (1). The six CI items are reverse scored, so that the higher composite scores on each subscale reflect higher levels of grit.

**Perceived competence.** The Self-perceptions of Competence tool (Amorose, 2002) (See Fig. 2) was used to measure each athlete's perceived competence towards their sport. The competence scale contains three items that measure the competencies it requires to be a successful athlete. The three items include, "How good do you think you are at sport", "When it comes to sport, how much ability do you think you have", "How skilled do you think you're at your sport". Each of the items were measured on an item customized 5-point Likert scale, ranging from "Not much ability at all" (1) to "A whole lot of ability" (5).

**Anxiety.** The Sport Competition Anxiety Test (SCAT) authored by Martens (1977) (See Fig. 3) was employed to analyze the athlete's responses and symptoms associated with anxiety when participating in their sport). An example item included, "Before I compete, I feel uneasy". The 10 items were measured on a 3-point scale including "Rarely" (1), "Sometimes" (2), and "Often" (3).

**Competition performance.** On a biweekly basis legal competition throws during meets were recorded that coincided with weeks that the athletes submitted their survey responses. This was performed bi-weekly for 6-weeks, which produced three sets of data at different, but subsequent time points.

#### *Qualitative Measures*

The semi-structured interviews were conducted at the end of the data collection. The interviews were conducted by gender, and each group were asked similar questions about their performances. There were only five questions asked, which included follow up questions if needed. The participants were given as much time as they needed to give a response. A protocol that was set prior to the commencement of the study was followed. This included asking the question, allowing responses, and then providing follow up questions if answers warranted more information.

#### *Data Analysis*

Quantitative analysis began by evaluating item responses for each of the measurement scale tools by identifying potential outliers. After no outliers were found, composite variables were created for the grit (weeks 1-3), perceived competence, and anxiety variables. To evaluate athlete performance, only successful and legal performance attempts were added together and divided by the number of successful attempts to provide mean scores for all throw attempts. Overall, simple means and standard deviations were calculated for each of the variables.

Qualitative analysis involved coding and constant comparison procedures. Coding was performed through a process of repeated readings of transcripts (Lincoln & Guba, 1985). During the initial coding process, observation and debriefing notes were taken by two of the researchers and were further reviewed for discussion. Identified themes and patterns based on the available data emerged and were ascertained by the researchers.

### **Results**

Overall participant mean scores were calculated (See Tables 1-3). Overall, mean scores of perceived grit were reported higher for males whereas anxiety and competence were reported higher, overall, by females.

However, trait perceptions of competence were slightly higher for female athletes. Additionally, when evaluating the trends of reported grit, male athletes reported group means started high at Time-1, went down at Time-2 and then came back up at Time-3 although it was still lower than the overall high at Time-1. Female

athletes also started with their highest perceived grit at Time-1 but showed a continual downward trend over Time-2 and Time-3.

**Table 1.** Overall means and standard deviations for survey and performance scores for group, men, and women.

	Anxiety	Competence	Grit Score Average	SPM	WTM
Overall	1.74 (0.17)	3.89 (0.40)	3.91 (0.34)	15.28 (0.16)	18.38 (0.19)
Men	1.66 (0.15)	3.80 (0.41)	3.85 (0.35)	16.36 (0.15)	18.20 (0.16)
Women	1.85 (0.19)	4.00 (0.33)	3.69 (0.34)	13.49 (0.19)	18.51 (0.23)

Note. Grit 1-3= reported mean grit scores during weeks 1, 2, and 3 of data collection.

SPM= Shot Put Meet; WTM= Weight Throw Meet

To provide context and support to the quantitative results, quotes were used to identify and explain existing themes. Segments of the conversations were included to comprehend dialogue between the participants. For the purpose of the paper, we identified participants by male and female pseudonyms. Our analysis of the data resulted in three initial themes: *Intensity*, *Anxiety*, and *External Factors*. For this paper we will discuss findings related to the discussed and reinforced themes.

#### *Intensity*

One interesting finding from this study was the level of intensity that was created in both practice and competitive settings. Male throwers suggested that intensity was an influencing factor in regard to performance. Blake discussed how he performs better on technique and intensity in practice than competition.

"I feel like I usually perform better in practice than in meets. Both my throwing technique and the intensity of the weight room tends to be higher when the lifting is heavier and when it's lighter the intensity tends to be lower".

However, from the data collected it was evident that Blake had a greater average in the weight throw during competition than practice (Weight Throw Practice 18.13m, Weight Throw Meet 18.64m). This shows that Blake is doing well in the day to day and is not as concerned with competition scores, leading to better competition results. The female showed the same results, performing better in practice than in meets.

The throwers participated in a strenuous training regime, lifting weights three days a week, and throwing 3-4 days with a competition at the end of each week. They also completed a couple of days of plyometric training, sprinting and throwing drills. This type of training can have an effect on how the athletes are feeling, and how they respond to the next training session. Anna stated, "I would say that I practice with almost the same intensity, it just depends on how I'm feeling for the day". This statement supports the idea that intensity can vary, depending on how the athlete is feeling from previous training sessions, or how seriously they take practice sessions versus competitions. From these findings, the environment created by the athletes is the greatest factor influencing the level of intensity and how it changes from practice to competition. In practice the throwers are more driven to work on technical cues, gaining higher competence, thus increasing their day-to-day grit. Whereas, in competition the goal is to throw as far as they can, supported by the added competitive environment and adrenaline rush that comes with it. James added,

"I feed off adrenaline a lot, especially in meets and so in practice it's super hard to recreate that, we try to compete as best as we can, and sometimes it helps, but you can't recreate a meet atmosphere in practice, it's just not possible".

This connects to the grit theme CI, by the knowledge and feelings that are experienced in competition and cannot be recreated in practice. Even though the intensity should be high in both practice and competition, a competitive environment is hard to mimic in a practice setting.

#### *Anxiety*

Another interesting finding from the study were the differences between how male and female throwers dealt with anxiety. Male participants showed a lower anxiety score than the women (M= 1.66, W= 1.85). However, in response to the question, "Would any of you say you're anxious during throw practice?" Liam stated,

"Yes, I was anxious all indoor just because I never threw indoors, and I had to build confidence throughout the whole season. That's kind of like why I was calm during training, just so I could get comfortable with it, but yeah, I was really anxious, and I still am, because I've only thrown in one meet".

Blake added, "I think I perform better in practice because I'm calmer, which allows my body to perform better". These statements show that the high stakes of competition are associated with higher anxiety.

The female athletes expressed that external factors were influencing their anxiety levels. In response to the question, "Do you think anxiety would play more of a role in competition than it would in practice?" Anna stated,

"I'm not going to lie I also feed off a lot of the energy that's around me, it's really hard to see a teammate have a really bad day, and then try and go out there and throw as far as you can. It's like you want them to do well, but you also want to do well yourself".

Dorothy added, "You want everyone to have the same type of energy, so they can feed off each other and if one person has a negative energy it can spread to other people". These statements exemplify that the female athlete's anxiety can be created from the group's energy. Simply, if the group's energy is high, the intensity is high. If the energy is low, the intensity levels are affected and some of the female athletes see this more as an anxiety creator, making them feel anxious. In addition, the relationship between anxiety and grit varies between athletes. Some athletes that had higher anxiety had lower grit, and some that had lower anxiety had higher grit.

#### *External Factors*

While conducting the interview it was evident that there were many differences and similarities between the men and women, regarding external factors. However, only the women discussed external factors and its importance in their training regime. For example, in response to the question, "How consistent are you when it comes to your training?" Anna responded "I would say it depends on the event and some of the external stuff that's going on at that time. Like, if school's really stressful that will definitely affect how I'm throwing". These external factors can be related to CI which can easily be derailed by other factors like school for collegiate athletes, ultimately impacting their grit for their sport. Other external factors also lead to issues that might affect the athlete's performance, such as developing higher stress levels, less focus, or lack of motivation. In response to day-to-day perseverance, Dorothy responded, "We've been having some drama at practice with the girls and it can be a distraction. Also, there is a lot happening in regard to school, like tests, assignments, and other external distractions". The external factors the women were dealing with could potentially be the reason why they had higher anxiety scores ( $M = 1.66$ ,  $W = 1.85$ ) and lower grit scores ( $M = 3.85$ ,  $W = 3.69$ ). Therefore, external distractions may reduce individual grit and performance.

#### **Discussion**

The purpose of this study was to determine if there were differences, and to better understand these differences, between perceived grit and performance in male and female collegiate track throwers. One of the key findings in the study was the grit scores for participants, resulting in the men have a higher average grit score than the female athletes. Results showed athletes perceived grit over the season can shift in different directions and there may be a relation with this trend and their performance. Conroy (2001) stated that "fear of failure is related to sport specific anxiety and rumination" (p. 12). When grit showed a regression along with performance, it could potentially connect with previous findings about stress, anxiety, and burnout impacting performance. However, some athletes showed improvement in their throwing performances throughout the indoor season. Progression indicated that the participants CI and PE levels are becoming more consistent and more motivated to perform at their best. Males had higher grit, but both genders' grit went down overtime, however, there were some outlying males who trended up. For males, this pattern of relationships was less evident, in other words, although grit shifted over time the performance scores did not always shift in a similar direction. In opposition, the females' pattern showed a more distinct relationship. Thus, for Claire, Rebecca, and Anna, as grit went up or down from week to week, so did their performances, relatively speaking. This could represent an early indication that grit may have a larger impact on female athletes as opposed to males and that perceived competence and optimal levels of anxiety impact males to a larger extent.

Another significant finding was the apparent gender differences with anxiety and grit. Based on higher anxiety scores, the females discussed external factors. These higher scores could have been contributed to the external factors in which they discussed. Both genders stated different trends that caused them to become anxious, however this does not only affect their anxiety levels. As found in the qualitative results, anxiety levels appear to affect key components of grit, which ultimately affects performance. The males showed a lower anxiety average than the females, and a higher grit score average. Whereas the female athletes showed higher anxiety levels and lower grit scores, which is from the several external distractions. The external factors that contributed to these high scores were stress, emotional conflict, anxiety and fear.

Stress and anxiety were collective as both genders associated stressful situations with higher levels of anxiety. Another external factor was emotional conflict, which was stated in the female interviews. Since emotional conflict was present in the female throwing group at the time of the study, this could have been a contributing factor to their grit and performance. Emotional conflict is related to CI because it is preventing the female athletes from developing consistency in their throwing. This is demonstrated in the female practice session, where Dorothy and Anna both stated concern regarding the emotional conflict in the throwing group. Therefore, emotional conflict has an impact on the grit and performance of the all athletes. Fear is also noted as an external factor, as both genders exemplified fear of failure during the study. Since there is a strong relationship between fear of failure and stress (Gustafsson, Sagar, & Stenling, 2017), it ultimately impacts grit and performance. It is also connecting to PE, as the athletes try to persevere, fear ultimately gets in the way. For example, in the female interviews Clare stated, "Sometimes if I don't do well in throwing, I go into the weight room and try to smash the workout since I didn't do so well beforehand". According to research by Gustafsson, Kentta, and Hassmen (2011) elite athletes cope with fear of failure by increasing the workout intensity to avoid failing. Therefore, since Clare showed signs of a bad throwing session, she would increase her intensity in the next session to avoid failing, which is related to PE. The more external factors are present, female throwers could increase their anxiety levels, therefore affecting their grit and performance.

The women had higher competence scores which could indicate that their CI was high, contributing to their grit scores. For example, Clare had a high competence score of 4.00 and a high grit score of 3.82. However, Clare also showed a high anxiety score which could have been impacting her performance, although previous research would suggest those who reported high competence and grit would most likely have less anxiety, one female participant reported high in all three factors. The male athletes had greater levels of grit, which includes CI and PE. This could be from a number of factors. For example, in the interviews Blake stated, "I know I have a job to get done". According to Hough(1992), the achievement-orientated individual is one who works hard, tries to do a good job, and completes the task at hand. Knowing that you have to get a job done and pursuing that goal for a long time is one potential reason why the males showed higher grit scores. The male athletes also showed more coping strategies than the female athletes. For example, Rick used deep breathing, James liked to pray, and Will liked to drink an energy drink. In related research, Cosh and Tully(2015) explored stress and coping strategies used on student athletes. The research identified stressors including performance expectations, poor preparation, and rivalry. Research found that student athletes would benefit from training that incorporated appropriate coping strategies, especially problem-focused to overcome stressors and manage pressure(Cosh & Tully, 2015). These techniques may also help athletes cope with other psychological factors that might impact their athletic performance. The relationship between grit and coping may overlap to predict those who can continually perform at a high level, which may exist between stronger grit traits and those who can reduce stress and anxiety with coping strategies. Therefore, by incorporating these coping strategies the male athletes are able to perform better, resulting in higher grit.

A higher grit score does not necessarily mean greater performances, however data indicates that the performances for some throwers improved throughout the season, regardless of their grit levels. For example, in Table 2, it is evident that Anna, Clare, Rebecca, Rick, and Blake all showed progress in the weight throw. Whereas, Blake, Will and Liam showed progress in the shot put. This could be because the athletes were more prepared to throw the weight far, or they just weren't able to mimic their shot-put throws in practice.

**Table 2.** Overall means and standard deviations for survey and performance scores for group, men, and women.

Athlete	Anxiety	Competence	Grit Score Average	SPM	WTM
Dorothy	1.30 (0.48)	5.00 (0.00)	3.45 (0.66)	N/A	17.96 (0.31)
Anna	1.60 (0.48)	4.33 (0.58)	3.49 (1.22)	13.66 (0.27)	18.89 (0.60)
Clare	2.60 (0.52)	4.00 (0.00)	3.82 (0.85)	14.04 (0.53)	20.98 (0.83)
Rebecca	1.90 (0.88)	2.67 (0.58)	4.27 (1.11)	12.78 (0.16)	16.21 (0.41)
Rick	2.00 (0.67)	3.00 (0.00)	3.79 (0.79)	15.52 (0.29)	17.77 (0.66)
James	2.50 (0.53)	4.00 (1.00)	3.51 (0.84)	18.12 (0.28)	18.18 (0.44)
Blake	1.60 (0.52)	4.33 (0.58)	4.00 (0.68)	15.98 (0.42)	18.64 (0.76)
Will	1.10 (0.32)	3.67 (0.58)	4.24 (0.50)	17.55 (0.38)	N/A
Liam	1.10 (0.32)	4.00 (1.00)	3.70 (1.40)	14.61 (0.66)	N/A

*Note.* Grit 1-3= reported mean grit scores during weeks 1, 2, and 3 of data collection.

SPM= Shot Put Meet; WTM= Weight Throw Meet

Based on these findings future research should consider testing the athletes on more than just their throwing performance. It would be interesting to see how practice time, throwing attempts, attitude at practice and use of different strategies affected the athlete's performances. It would also be interesting to study the male and female differences, and how they respond differently to various stimuli. For example, a study could look at how male and female athletes respond to different types of training and individual messaging in practice and/or competition. The results would then be compared, and the differences would be discussed.

**Table 3.** Mean scores of practice and competition performance per week with grit scores each week.

	Dorothy	Anna	Claire	Rebecca	Rick	James	Blake	Will	Liam
Grit T1	3.36	3.55	4.00	4.55	3.91	3.45	3.91	4.64	3.82
SPMT1	-	13.79	13.79	12.89	15.45	N/A	15.48	17.21	-
WTM T1	17.42	19.11	21.05	16.08	16.80	N/A	17.74	-	-
Grit T2	3.64	3.55	3.64	4.00	3.64	3.64	4.00	4.09	3.55
SPMT2	-	13.96	13.96	N/A	15.31	18.32	16.51	18.12	-
WTM T2	18.04	18.44	20.71	15.82	17.96	18.49	19.16	-	-
Grit T3	3.36	3.36	3.82	N/A	3.82	3.45	4.09	4.00	3.73
SPMT3	-	13.76	13.76	12.67	15.21	N/A	15.91	17.78	-
WTM T3	18.07	19.72	22.35	16.90	18.45	N/A	19.25	-	-

*Note.* Grit= reported mean grit scores. SPM= Shot Put Meet; WTM= Weight Throw Meet. T1, T2, T3= bi-weekly data collection time points for each variable. "--" means the data was unable to be recorded.

Some of the limitations of this study included; the limited number of participants which limited the impact and interpretation of the quantitative data. Additionally, due to the nature of track and field events, not all participants competed at each meet. This prevented us from collecting a full set of data. Future studies would score the best throws from training and competition instead of the average. This would also allow the researcher to look more into specific factors that might affect an athlete on a day-to-day basis. One final limitation was the inability to report scores during some competitions if an athlete did not compete or record any legal attempts. From this, a lack of scores would make it difficult to interpret their performance in that event.

### Conclusion/Practical Application

For coaches to avoid pitfalls with the male/female athletes there needs to be a better way to prepare and support the athletes for these moments. By taking the grit scale at the start of the season, coaches will have a better understanding of each athlete's personality and how they reach maximum performance efficiency. In addition, coaches can make adjustments in order to increase practice efficiency for each athlete. By incorporating cost efficient measurement tools, coaches are utilizing available resources to enhance the overall experience for the athlete.

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### APPENDIX

#### Figure 1. Grit Survey.

Q1. UID Number:

Q2. Age:

Q3. Race/ Ethnicity:

Black/African American - Asian - White/Caucasian - Hispanic - Other

**The following answers will be used for the next 11 Questions.**

- Very much like me
- Most like me

- Somewhat like me
- Not much like me at all
- Not like me at all

Q4. I have overcome setbacks to conquer an important challenge.

Q5. New ideas and projects sometimes distract me from previous ones.

Q6. My interests change from year to year.

Q7. Setbacks do not discourage me.

Q8. I have been obsessed with a certain idea or project for a short time but later lost interest.

Q9. I am a hard worker.

Q10. I often set a goal but later choose to pursue a different one.

Q11. I have difficulty maintaining my focus on my projects that take more than a few months to complete.

Q12. I finish what I begin.

Q13. I have achieved a goal that took years of work.

Q14. I become interested in new pursuits every few months.

Q15. I am diligent.

**Figure 2.** The Self-perceptions of Competence test.

Q1. How good do you think you are at your sport?

1-Not good at all

2

3

4

5-Very good

Q2. When it comes to your sport, how much ability do you think you have?

1- Not much ability at all

2

3

4

5- A whole lot of ability

Q3. How skilled do you think you're at your sport?

1-Not skilled at all

2

3

4

5- Very skilled

**Figure 3.** The Sport Competition Anxiety Test (S).

*The following answers will be used for all Questions.*

Q1. Before I compete, I feel uneasy.

- Rarely
- Sometimes
- Often

Q2. Before I compete, I worry about not performing well.

- Rarely
- Sometimes
- Often

Q3. When I compete, I worry about making mistakes.

- Rarely
- Sometimes
- Often

Q4. Before I compete, I am calm.

- Rarely
- Sometimes
- Often

Q5. Before I compete, I get a queasy feeling in my stomach.

- Rarely
- Sometimes
- Often

Q6. Just before competing, I notice my heart beats faster than usual.

- Rarely
- Sometimes



- Often

Q7. Before I compete, I feel relaxed.

- Rarely
- Sometimes
- Often

Q8. Before I compete, I am nervous.

- Rarely
- Sometimes
- Often

Q9. I get nervous wanting to start my event.

- Rarely
- Sometimes
- Often

Q10. Before I compete, I usually get uptight.

- Rarely
- Sometimes
- Often