UNDERSTANDING THE ROLE OF GRIT
IN COMPETITIVE SPORT

A Dissertation Submitted to the
College of Graduate and Postdoctoral Studies
In Partial Fulfillment of the Requirements
For the Degree of Doctor of Philosophy
In the College of Kinesiology
University of Saskatchewan
Saskatoon

By

DANIELLE L. CORMIER

© Copyright Danielle Cormier, August, 2023. All rights reserved.
Unless otherwise noted, copyright of the material in this thesis belongs to the author
# Table of Contents

PERMISSION TO USE .................................................................................................................. 1

DISSERTATION ABSTRACT ........................................................................................................ 2

ACKNOWLEDGEMENTS ............................................................................................................. 4

DEDICATIONS ............................................................................................................................... 7

CHAPTER I DISSERTATION OVERVIEW – UNDERSTANDING GRIT IN SPORT ......................... 8

**Talent Identification and Expertise Development** ................................................................. 11
- Physiological Indicators of Expertise in Sport ........................................................................ 12
- Technical and Tactical Indicators of Expertise in Sport ......................................................... 12
- Psychological Indicators of Expertise in Sport ...................................................................... 13
  - Grit ..................................................................................................................................... 14
  - Grit in Sport ......................................................................................................................... 16
  - Gaps in the Grit in Sport Literature .................................................................................... 17

**Purpose of This Dissertation** ............................................................................................... 18
- Overview of the Individual Studies ......................................................................................... 19
- Organization of the Document ............................................................................................... 21

References .................................................................................................................................. 23

**Table 1.1 Description of the Research Questions, Hypotheses, and Methodologies for the Individual Studies** .................................................................................................................. 36

CHAPTER II STUDY 1 - GRIT IN SPORT: A SCOPING REVIEW .................................................. 37

Abstract ...................................................................................................................................... 38

**Introduction** .......................................................................................................................... 39
- Purpose of This Review ........................................................................................................... 42

**Methods** ................................................................................................................................ 43
- Protocol .................................................................................................................................. 43
- Identifying the Research Question ......................................................................................... 43
- Identifying Relevant Studies ................................................................................................. 44
  - Inclusion Criteria ............................................................................................................... 44
  - Sources ............................................................................................................................... 44

**Results and Discussion** ....................................................................................................... 45
- Consultation ............................................................................................................................ 46
CHAPTER III STUDY 2 - A QUANTITATIVE ASSESSMENT OF THE PREDICTIVE UTILITY OF GRIT IN SPORT

Bridging Study 1 and Study 2

Abstract

Methods
   Participants
   Measures
      Demographics
      Grit
      Self-Control
      Conscientiousness
      Mental Toughness
      Performance
      Well-Being
   Procedures
   Data Analysis

Results
   Predicting Performance
   Predicting Well-Being

Discussion
   Perseverance of Effort
   Consistency of Interests
   Adaptability to Situations
   The Predictive Utility of Other Determinants of Success
   Study Limitations
   Future Directions
   Conclusion

References

Table 3.1 Descriptive Statistics

Table 3.2 Performance and Well-Being Hierarchical Multiple Regressions

CHAPTER IV STUDY 3 – TOWARDS A GROUNDED THEORY OF GRIT IN SPORT

Bridging Study 2 and Study 3

Abstract
A Grounded Theory of Grit in Competitive Sport

CHAPTER V GENERAL DISCUSSION

Introduction

Integrated Interpretation of the Dissertation
The Relevance of Grit to Sport Participants
The Relationship Between Grit and Sport Performance
The Relationship Between Grit and Adaptive Constructs in Sport
Contributions to Theory
Contributions to Measurement

Implications for Practitioners
Interventions for Grit in Sport
Motivational Climate
Goal Setting
Self-Compassion
Awareness of the Dark Side of Grit

Methodological Reflections
Use of Mixed Methodologies
Knowledge Translation
Homogeneity of the Sample
Cross-Sectional Designs
Social Desirability Bias

Future Directions
Improving the Measurement of Grit in Sport
Team Level Grit in Sport
The Role of Grit for Athletes Outside of Competitive Sport
Talent Identification

Conclusion

References

Table 5.1 Summary of the Individual Studies’ Research Questions, Hypotheses, Methodologies, and Results

APPENDICES

Appendix A Study 1 - Communication with Athletics Department and Coaches
Communication with Athletics Department
Communication with Coaches

Appendix B Study 1 - Coach Consultation Participant Consent Form
| Appendix C Study 1 - Coach Consultation Interview Guide                      | 242 |
| Appendix D Study 1 - Scoping Review Summary for Coach Consultation           | 244 |
| Appendix E Study 2 - Communication with Athletics Department, Coaches, and Recruitment Poster | 247 |
| Communication with Athletics Department                                    | 247 |
| Communication with Coaches                                                   | 247 |
| Recruitment Poster                                                          | 249 |
| Appendix F Study 2 - Participant Consent Form                               | 250 |
| Appendix G Study 3 - Communication with Athletics Department, Coaches, and Recruitment Poster | 253 |
| Communication with Athletics Department                                     | 253 |
| General Team Recruitment Email                                              | 253 |
| Social Media Recruitment                                                    | 254 |
| Recruitment Poster                                                          | 255 |
| Appendix H Study 3 - Participant Consent Form                               | 256 |
| Appendix I Study 3 - Interview Guides                                        | 261 |
Permission to Use

In presenting this thesis/dissertation in partial fulfillment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying of this thesis/dissertation in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis/dissertation work or, in their absence, by the Dean of the College in which my thesis work was done. It is understood that any copying or publication or use of this thesis/dissertation or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be made of any material in my thesis/dissertation.

Requests for permission to copy or to make other uses of materials in this thesis/dissertation in whole or part should be addressed to:

Dean of the College of Kinesiology
Physical Activity Complex
University of Saskatchewan
87 Campus Drive
Saskatoon, Saskatchewan S7N 5B2 Canada

Dr. Debby Burshtyn
College of Graduate and Postdoctoral Studies
University of Saskatchewan
116 Thorvaldson Building, 110 Science Place
Saskatoon, Saskatchewan S7N 5C9 Canada
Dissertation Abstract

The ability to persist past challenges and sustain one’s pursuit of long-term goals is essential for athlete success. One motivational disposition that may enable athletes to overcome setbacks is grit. Grit, defined as perseverance and passion over the long term, has been linked to sport success. However, the role of grit in sport requires further exploration. This mixed-methods research program aimed to investigate the role of grit in competitive sport through three interrelated studies. Study 1 involved a scoping review of grit in sport, identifying 90 publications exploring relationships between grit and factors such as athlete characteristics, sport performance, motivation, mindfulness, self-compassion, and deliberate practice. Coaches' input helped identify future research considerations. Study 2 examined whether grit predicted important athlete outcomes beyond other determinants of success. Data from 214 collegiate student-athletes revealed that the grit subscales added unique explanatory power when predicting subjective sport performance perceptions and aspects of well-being. This study highlighted the complexity of predicting success in sport, but ultimately provided support for predictive utility of grit in sport. The purpose of Study 3 was to construct a grounded theory of competitive athletes' grit in sport. Interviews with 28 participants indicated that grit was a malleable dispositional tendency shaped by accumulated sport experiences. Support from others fostered adaptive cognitions, which lead to the pursuit of long-term goals in sport. Grit was associated with sport-specific goal achievement, thriving, and languishing. The study contributed to a greater understanding of the processes underlying competitive athletes' sport-specific grit, and provided implications for practice and recommendations for future research. Overall, this program of research found evidence to support the continued study of grit as a relevant and meaningful construct within the competitive sport domain and emphasizes the need for further exploration,
including improvements to the measurement of grit and the creation of interventions to enhance grit levels.
Acknowledgements

Embarking on the journey of a Ph.D. is much like setting out on a backcountry hike into the untamed wilderness. The path ahead is often unknown and sometimes it seems like the only certainty is that there will be challenges along the way, but the mission is always worth it no matter the stumbles and blisters you might experience. As I stand at the end of this expedition, I am overwhelmed with a profound sense of gratitude for the trailblazers, guides, and companions who have navigated these paths alongside me.

First and foremost, I owe an immeasurable debt of gratitude to my supervisor, Dr. Kent Kowalski. You have served as my trail guide throughout this academic expedition. Your gentle guidance and profound insights helped me to feel confident in my hiking boots, and trust that the path forward would get me where I am wanting to go. Your mentorship extends beyond the confines of a lab, shaping not only my scholarly endeavours but my growth as a person. Your ability to strike the perfect balance between challenge and encouragement were the driving force behind this document and all the other milestones outside of these pages. I strive to one day build an environment with as much authentic support as you and Leah have created with the KINpassion lab. I am so grateful to have had you as my supervisor.

To my esteemed committee members, Drs. Leah Ferguson, Nancy Gyuercsik, and Jennifer Briere, each of you have brought a unique perspective that enriched my work and pushed me to explore my interests with different lenses. Much like waypoints along the trail, your advice and thought-provoking questions have been the catalyst for refining my pathway forwards and chasing new peaks. Your dedication to excellence will forever be a source of inspiration as I move onwards.
I extend my heartfelt appreciation to my external examiner, Dr. Joe Baker, for dedicating his time and effort in both the preparation for and the duration of my defense. Your constructive perspective enriched my experience of my defense, and your involvement has left an indelible mark on the final day of my journey.

It would be foolish to embark into the unknown on your own, and my fellow expedition members—the KINpassion lab group—deserve a special mention. You have been more than colleagues; you have been my kindred spirits in this academic wilderness. Our lab meetings and casual chats were like gathering around a campfire, sharing stories of our discoveries, challenges, and triumphs (and eating a few snacks too!). I am so proud to call each of you my research sibling/cousin.

Numerous other supports ensured that this journey was a successful one. The nurturing environment of the College of Kinesiology has provided various resources, opportunities, and a sense of community that were instrumental in shaping the trajectory of my research journey. To the faculty, staff, and administration, I extend my heartfelt gratitude for creating the grounds where academic exploration could thrive and bloom. To my research participants who willingly gave their time and energy to contribute to my study, I extend my sincere thanks. Your willingness to be a part of this journey is a testament to the collaborative spirit that drives scientific inquiry. I have also benefited from funding from the College of Kinesiology, the College of Graduate and Postdoctoral Studies, the University of Saskatchewan, and the Social Science and Humanities Research Council of Canada. Thank you to these funding sources giving me the financial safety-nets needed to pursue my academic goals full-time.

To my family and friends, whose love and encouragement have never wavered, I am forever indebted. Your belief in my potential have been a constant reminder of why I embarked
on this journey. You have fueled my determination to keep stepping one foot in front of the other, especially when the path forward seemed rocky, steep, or was temporarily lost in the mist.

Last but certainly not least, my gratitude extends to my husband. Your boundless love and unending patience have never gone unnoticed. This journey could not have reached its end without your help and your sacrifices. You have always served as my compass, pointing me towards my North Star. Thank you for my best friend in life, second only to our pup, Scout.

Completing this dissertation feels like reaching the top of a mountain summit. Sure, the view is breathtaking, and the sense of accomplishment is profound, but one cannot help but to think that it would have all been for naught without the support of others along the way. My clumsy metaphors will never capture the gratitude I have for all who have accompanied me on this hike, but I hope this acknowledgment serves as a small token of the immense appreciation I feel. This journey has been a challenge and a privilege, and I am so thankful to all who have played a part in making the dream of 16-year-old Danielle a reality.
Dedications

For my family. You are my why.
CHAPTER I

Dissertation Overview – Understanding Grit in Sport
Excellence does not result from some special inner quality of the athlete. “Talent” is one common name for this quality; sometimes we talk of a “gift”, or “natural ability.” These terms are essentially used to mystify the essentially mundane processes of achievement in sports, keeping us away from a realistic analysis of the actual factors creating superlative performances, and protecting us from a sense of responsibility for our own outcomes. (Chambliss, 1989, p. 72)

Human beings have always seemed fascinated by the factors—whether overt or intangible—that cause some individuals to accomplish more than their peers (e.g., Cox, 1926; Galton, 1892; Howe; 1999). Ancient philosophers often distilled the attainment of success to simple virtues, including preparation (“Success depends upon previous preparation, and without such preparation, there is sure to be failure,” Confucius, ~500 BCE), consistency (“Obedience is the mother of success,” Aeschylus, ~500 BCE), effort (“Much effort, much prosperity,” Euripides, ~450 BCE), and the ability to withstand setbacks (“There is no success without hardship,” Sophocles, ~450 BCE). This fascination with individual achievement continues in the modern day and is often characterized by the assumption that long-term success follows ineluctably from talent (i.e., “the presence or absence of inborn attributes variously labeled as talents or gifts”; Howe et al., 1998, p. 399). Society’s collective obsession with talent is evidenced by the success of televised talent show competitions (e.g., America’s Got Talent, X-Factor, So You Think You Can Dance?), and our fixation on the narratives of wunderkind—outstanding individuals who arrive at their skills ‘naturally’ and early on in their careers—such as Magnus Carlsen, Blaise Pascal, and Wolfgang Amadeus Mozart. Accordingly, these types of individuals are often seen as special or unique, and their talent is viewed as something to emulate or aspire to. Naturally, the appeal of talent has also extended into the realm of sport. Viral videos
of toddlers making three-point shots in their basements or puck juggling in their cribs have captured the attention of millions on social media. News outlets have covered the stories of teen and pre-teen athletes who experience enormous amounts of success early in their playing careers and have subsequently been offered professional sport contracts. Athlete autobiographies are on various best-selling lists and are purchased by thousands of individuals who hope to have a behind-the-scenes glimpse into the mechanisms that have led to the success of these high-performing individuals.

Sport researchers—specifically those that operate within the fields of talent identification and expertise development—have also been interested in understanding why some athletes attain excellence over others of equal abilities (e.g., Baker & Farrow, 2015; Vaeyens et al., 2009), and have generally found that talent does not come quickly (e.g., Coutinho et al., 2016). That is, seldom (if ever) does an individual enter into a domain and rapidly achieve an exceptional level of performance without significant, unremitting practice (Ericsson et al., 2007). In the domain of sport, the possession of innate talent is an acknowledged prerequisite for success (Baker & Wattie, 2018). However, while natural ability inexorably contributes to elite sport achievement (Ericsson et al., 1993, Ericsson, 2006), the significant contributions of various adaptive psychological traits, states, and skills that enable the focused pursuit of goals have also been a fruitful area of study (e.g., Ford et al., 2015; Gould et al., 2002; Sheard & Golby, 2006). In an attempt to further elucidate these facilitative psychological characteristics, researchers and sport support persons have turned their attention towards the construct of grit, which is defined as passion and perseverance for very long-term goals (Duckworth et al., 2007).

Grit in sport appears to be an adaptive construct (e.g., Houston et al., 2021) and has been linked to several desirable correlates (e.g., self-restraint, impulse control, resilience, hardiness,
and sport engagement; Martin et al., 2015, Toering & Jordet, 2015) and outcomes (e.g., athlete performance and competitive level; Cazayoux & DeBeliso, 2019; Kitano et al., 2018; Shrivastava & Mishra, 2016). However, the role of grit in sport is still largely unclear and necessitates further exploration to fully understand if, and how it relates to athlete success. Thus, the overall purpose of my dissertation research programme was to explore the role of grit in competitive sport. The following sections provide more detail about the larger field of talent identification and expertise development, particularly the wide variety of indices that have been used to capture various human characteristics of sport expertise. Following my overview, grit will be re-introduced, and a broad summary of the extant body of sport-specific grit literature (and the gaps present within it) will be provided. Afterwards, I will re-establish the larger purpose of this dissertation and describe the content of the subsequent chapters.

**Talent Identification and Expertise Development**

Efforts to understand the predictors of exceptional sporting achievement are often made by talent identification and expertise development researchers (c.f. Baker & Farrow, 2015; Vaeyens et al., 2009). From this large body of research, two major themes can be surmised (though I do fully acknowledge the reductive nature of this statement). First, the identification of talent in sport can range from simple to complex (Ericsson & Towne, 2010). More specifically, while individual achievement in some sports can be ranked by objectively measuring the time to complete a race, the distance of a jump or thrown projectile, or the number of attempts to hit a target, other sports are adjudicated through subjective judge rankings or involve the effort of a cohesive team unit. These differences in measurement make it almost impossible to measure athlete talent across various sports; therefore, researchers often compare various scores and/or metrics between teams and athletes competing in the same sport (though this is difficult to do
even in certain team sports that have great variation in the roles and demands of different positions; Passos et al., 2017). Second, sport expertise is understood to be obtained through a constellation of domain-specific physiological and cognitive mechanisms developed through prolonged practice (Baker & Farrow, 2015). As a result, researchers have employed a wide variety of measures to capture various human characteristics of sport expertise, including physiological attributes, tactical and technical skills, and individual psychological factors to identify talent and assess expertise development.

**Physiological Indicators of Expertise in Sport**

Measures of physiological attributes are frequently used to select future star athletes (Arede et al., 2019; Cripps et al., 2019; Ziv & Lidor, 2014). Various genetic factors can influence the physical attributes that may contribute to an individual athlete’s sport performance (e.g., Baker & Horton, 2004). For example, certain genes have been identified to influence muscle growth and strength, endurance and cardiovascular function, and body size and composition (Brutsaert & Parra, 2009). By identifying the genetic markers that are linked to desirable physiological traits, researchers have been able to forecast the likelihood of an individual’s potential for success in a particular sport with increasing precision (Collins et al., 2016) due to the accuracy they have in predicting body shape, body size, body proportion, body composition, and physical maturation (see Nieuwenhuis et al., 2002; Spamer, 2009). As athletes mature, their speed, endurance, balance, strength, agility, and motor ability are often considered indicators of talent (Nieuwenhuis et al., 2002; Spamer, 2009; Woods et al., 2016).

**Technical and Tactical Indicators of Expertise in Sport**

Due to the specialized proficiencies required for superior performance in sport, technical and tactical characteristics are often considered in the talent identification of athletes (Koopmann
et al., 2020; McPherson, 2008). Athlete technical skill is usually assessed using tasks that are specific to a particular sport, such as accuracy in target spiking for volleyball or time needed to complete a dribbling task for soccer (Koopman et al., 2020). On the other hand, athlete tactical skill (i.e., the ability to realize a pattern within the behaviour of an opponent and subsequently act upon this knowledge) is often assessed using the Tactical Skills Inventory for Sports, developed by Elferink-Gemser and colleagues (2004). This measure was initially validated in populations of youth field hockey and soccer players but has since been used with athletes participating in other sports (e.g., Guimarães et al., 2020; Kolman et al., 2022). On the whole, both the technical and tactical indicators of sport performance are gained through prolonged exposure to the sport environment (McPherson, 2008) and appear to become better indicators of expertise as athletes progress in sport (Elferink-Gemser et al., 2004). These instruments have also been shown to discriminate between athletes who go on to play professional sport over those who do not (Huijgen et al., 2009; Kannekens et al., 2011).

**Psychological Indicators of Expertise in Sport**

While the anthropomorphic characteristics, physicality, technical ability, and tactical knowledge of athletes inexorably contributes to elite sport achievement (Baker & Wattie, 2018; Ericsson et al., 1993, Ericsson, 2006), various psychological factors have also received considerable attention as key elements of overall performance (Abbot & Collins, 2004; Allen et al., 2013). More specifically, some of the psychological states, traits, skills, and worldviews that have been examined alongside sport achievement include self-regulation (e.g., Cleary & Zimmerman, 2001; McCardle et al., 2019), mental toughness (e.g., Crust, 2007; Gucciardi, 2017), goal setting (e.g., Locke & Latham, 1985; Locke & Latham, 2002; Locke et al., 1981), deliberate practice (e.g., Baker et al., 2020; Ericsson et al., 1993), adaptive perfectionism (e.g.,
Dunn et al., 2002; Gotwals et al., 2012), and self-compassion (e.g., Cormier et al., 2023; Ferguson et al., 2014; Mosewich et al., 2013), amongst others (e.g., Gould et al., 2002; MacNamara et al., 2010; Orlick & Partington, 1988). Another psychological construct—and the primary focus of this dissertation—is grit (Duckworth et al., 2007).

**Grit**

Grit has been the subject of many recent academic journal articles, a New York Times bestselling book (Duckworth, 2016), various TED Talks (e.g., Duckworth, 2009; Duckworth, 2013), popular podcasts (e.g., Freakonomics, Hidden Brain, TED Radio Hour), and well-known newspapers (e.g., Forbes, The Guardian, National Geographic, The Washington Post). Of course, the important role of passion and perseverance in attaining success is not a particularly new notion. To illustrate, Charles Darwin once wrote a letter to his cousin Francis Galton (the esteemed psychometrist and inventor of the questionnaire) to share his belief in the relationship between an individual’s doggedness in reaching their goals and their overall level of achievement: “I have always maintained that, excepting fools, men did not differ much in intellect, only in zeal and hard work; and I still think this is an eminently important difference” (1869). While the word ‘grit’ has been in our shared vocabularies for hundreds of years, the modern empirical landscape of grit has been largely defined by two major studies—Duckworth et al.’s (2007) initial exploration of the original Grit Scale (Grit-O), and Duckworth and Quinn’s (2009) publication of the short Grit Scale (Grit-S). The former publication was comprised of six independent studies over 3 years and was the very first study to conceptually operationalize grit using two facets: consistency of interests (CI) and perseverance of effort (PE). CI refers to the tendency to work towards a single focused life-long goal, rather than following a series of different superordinate goals over a short period, while PE represents the great amount of
determination and effort needed over many years to attain that same life-long goal. In their initial
development and validation of the 12-item Grit-O, Duckworth and colleagues (2007) proposed a
hierarchical structure with two first-order factors representing passion and perseverance. Two
years after the publication of this series of studies, Duckworth and Quinn (2009) created an
abbreviated version (the Grit-S) of the original scale that contained only eight items (all of which
were contained in the Grit-O). Between these two studies, Duckworth and her colleagues (2007,
2009) found evidence to suggest that grit was associated with greater educational attainment,
fewer career changes, increased retention rates of freshman cadets at the United States Military
Academy at West Point, and advancement to further rounds in the Scripps National Spelling Bee.
As such, research indicates that grit is largely an adaptive construct (e.g., Houston et al., 2021),
and is positively related to desirable correlates and outcomes (for reviews, see: Christopolou et
al., 2018; Datu et al., 2017; Stoffel & Cain, 2018).

Beyond the work of Duckworth and colleagues, grit has been tied to many other indicators
of sustained engagement and success. For instance, grit scores have been positively associated
with various measures of retention (i.e., school motivation, attendance, satisfaction with
school/college, positive affect) and academic achievement (i.e., grade point average, American
College Testing scores, science and language scores) in various populations of students (e.g.,
Bowman et al., 2015; Dumfart & Neubauer, 2016; Farruggia et al., 2016; Hill et al., 2016;
Strayhorn, 2014; West et al., 2016). Vocationally, grittier (i.e., individuals who score above the
mean on the grit scale) teachers are less likely to quit before the end of the school year
(Robertson-Kraft & Duckworth, 2014), and grittier insurance employees were more likely to
receive higher work performance incentives than their peers (Zhong et al., 2018). Not only do
grittier individuals attain higher levels of work-related success, they also seem to find success in
their lives outside of their profession. Research focusing on personal relationships has shown that grittier married men tend to stay in their marriages for longer periods than their less gritty counterparts (Eskreis-Winkler et al., 2014), grittier students tend to be involved in greater amounts of cocurricular activities (Bowman et al., 2015), and high levels of grit were associated with less burnout within samples of doctors (Halliday et al., 2016). However, it is important to recognize that some exceptions to the adaptive nature of grit have been documented (e.g., Anestis & Selby, 2015; Houston et al., 2021; Lucas et al., 2015). For example, the relationship between grit and both general health and quality of life are moderated by study addiction in music academy students (Czerwiński et al., 2022), suggesting that when grit is paired with study addiction it can lead to persistent overinvolvement in unhealthy behaviors. Furthermore, researchers have found an inverted U-shaped relationship between grit and the work goal progress of American university professors (Khan et al., 2021).

Recently, some researchers have found significant merit in measuring grit as a domain-specific personality characteristic rather than domain-general (Miele et al., 2022; Schmidt et al., 2019; Teimouri et al., 2022). That is, domain-specific versions of the grit scales have been shown to be superior predictors of domain-specific performance over and above the domain-general grit scale (Cormier et al., 2019). Researchers are therefore encouraged to explore grit within the specific contexts that their populations of interest are setting and striving for long-term goals, including sport.

**Grit in Sport**

Grit offers a desirable character strength that would likely facilitate the magnitude of determination needed to attain achievement in sport (Duckworth et al., 2007; Duckworth & Gross, 2014), and the extant literature lends some support to this claim. To briefly summarize
(because you will be getting the full picture in Study 1!), the grit levels of competitive athletes have been shown to be significantly higher than those competing at lower levels and/or non-athletes (Cazayoux & DeBeliso, 2019; Kitano et al., 2018; Shrivastava & Mishra, 2016). From interviews with American Olympic athletes, grit was understood to have facilitated successful career transitions in and outside of sport (Poczwardowski et al., 2014). Furthermore, grit is positively correlated with self-restraint and impulse control in elite Norwegian soccer players (Toering & Jordet, 2015), and resilience, hardiness, and sport engagement in competitive wheelchair basketball athletes (see Martin et al., 2015). As such, gritty individuals are more likely to maintain sustained engagement in their long-term goals over long periods despite setbacks and switch less between achievement pursuits (Duckworth et al., 2007), which are both important behaviours for aspiring competitive athletes. From this, it seems reasonable to speculate that coaches and other sport support persons would be interested in learning how to increase and maintain the grit levels of athletes, as would athletes themselves. Thus, efforts made by researchers to understand how grit might contribute to competitive athletes’ success appears to be a worthwhile endeavour.

**Gaps in the Grit in Sport Literature**

While the evidence supporting grit as a useful and relevant construct within the achievement-striving process is convincing, it is important to recognize that there are several gaps in the sport literature that must be addressed to move the field forward. First, while grit

---

1 It is important to recognize that there is ongoing dialogue about the nomenclature used to refer to the various tiers of competition in sport, and that the taxonomy used for sport skill levels can vary based upon the framework chosen by the researcher to define the sample of athletes they are working with. For instance, McKay and colleagues (2022) have identified six tiers of performance ranging from sedentary to world class, while Baker and colleagues (2015) offer seven skill levels ranging from naiveté to eminence. As this dissertation as a whole includes athletes participating in a wide variety of skills levels ranging from local to international, I have chosen to use the term ‘competitive’ to describe my overall sample, and will describe the skill levels of the included athletes more specifically within each standalone study.
tends to be positively related to adaptive constructs and inversely related to maladaptive constructs within the extant literature, the observed effect sizes are generally rather small (e.g., Christopolou et al., 2018; Credé et al., 2017; Hodge et al., 2018). Small effect sizes might limit the practical significance of the findings of a study, especially if the effect is too small to be useful in applied settings (Andersen et al., 2007), such as talent identification and expertise development in athletes. Second, critics have often argued that grit offers limited predictive utility (i.e., the effectiveness of a measure in predicting an outcome of interest) over other existing psychological constructs (e.g., Credé et al., 2017; Ponnock et al., 2020; Schmidt et al., 2019). Determining whether grit contributes unique empirical value to the sport literature is a critical next step for researchers, as the use of redundant psychological constructs and measures conflates the field and fundamentally hinders scientific communication (Gonzalez et al., 2020). Third, while it has been established that there is value in conceptualizing and measuring grit as a domain-specific construct (Cormier et al., 2019; Miele et al., 2022; Schmidt et al., 2019; Teimouri et al., 2022), the theoretical framework of grit has yet to be contextualized or explored within any specific domain. This stymies future research in the area, as it limits our ability to fully understand the role of grit in sport and makes it challenging to compare findings across different studies. While these gaps raise doubts about the growing body of grit in sport literature, it also highlights the need for further research to explore the role of grit in the achievement-striving processes of athletes.

**Purpose of This Dissertation**

The overall purpose of my dissertation research programme was to *explore the role of grit in competitive sport*. The guiding research question that all three studies attempted to answer was: *Does grit contribute to desirable outcomes in sport for competitive athletes, and if so,*
This guiding research question was addressed through several sub-questions posed within the studies that were conducted, and will be discussed in further detail below.

**Overview of the Individual Studies**

Three studies were conducted to address the guiding research purpose and question. First, while researchers have been investigating grit in sport with increasing frequency, it is important to note that nothing had been done to collate extant sport-specific literature to examine the extent or the trends in these findings. Thus, establishing the scope of the extant literature and suggesting key gaps that should be considered moving forward would be valuable for sport researchers. More specifically, it was important to collate what was already known about the construct to have a clearer understanding of important next steps. A summary of the literature could also inform various sport support persons of the value of assessing and/or fostering grit in athletic contexts, particularly when previous research has suggested that the relationship between grit and other adaptive constructs is small in size. Therefore, the first purpose of this dissertation was to broadly examine what was known in the sport literature about grit in athletes. This was accomplished using established scoping review methodologies (c.f., Arksey & O’Malley, 2005).

Second—as has been mentioned previously—there has been a marked lack of consensus among researchers concerning the utility of grit in the study of personality and individual differences. While several researchers have found that grit significantly contributed to performance and well-being in various performance domains, others have accused grit of contributing limited discriminant validity over and above pre-existing psychological constructs (see Credé et al., 2017; Meyer et al., 2017; Ponnock et al., 2020). Researchers can fall into a jangle fallacy (Kelley, 1927) when they erroneously put forward a novel concept or measurement that captures an already existing construct. The jangle fallacy of grit has been the
subject of several reports, and these criticisms have extended into the domain of sport research (Meyer et al., 2017). More specifically, pre-existing constructs that have been posited to conceptually relate to passion, perseverance, and long-term goal attainment include mental toughness, self-control, and conscientiousness (e.g., Credé et al., 2017; Duckworth & Gross, 2014; Ponnock et al., 2020; Schmidt et al., 2019). To determine whether grit should be cast aside as a redundant psychological construct already captured by pre-existing measures of known psychological constructs, more work needed to be done to assess whether it contributes distinctive empirical value to the sport literature. Thus, the second purpose of this dissertation was to evaluate the predictive utility of grit in competitive sport. This was accomplished using a series of hierarchical multiple regressions that predicted various measures of athlete performance and well-being, in which measures of mental toughness, self-control, and conscientiousness were also entered into the regression models.

Third, few studies have focused on the processes by which grit is developed in sport and its outcomes. Only two theories that explore the factors that precede and the outcomes that result from grit have been identified in the literature (i.e., Datu, 2021; Hudson et al., 2020). However, neither of these theories were generated using an athlete sample, nor were they meant to understand the processes specific to the sport domain. If sport psychology researchers are to understand the means by which athletes successfully move into and through elite performance pathways, theories concerning the development and outcomes of long-term goal achievement in sport are required. Creating a theory of grit in sport may enable researchers to better pinpoint novel mediators and moderators that affect the relationships between athlete grit and important outcomes. Furthermore, such a theory may help identify other social and psychological factors that catalyze grit and lead to the creation of specific interventions or policies guiding the
development of grit in sport settings. Thus, *the third purpose of this dissertation was to understand the processes by which grit in sport is developed in athletes, as well as the anticipated outcomes of grit in competitive sport.* This was accomplished using established constructivist grounded theory methodology (c.f., Charmaz, 2006).

**Organization of the Document**

In the following chapters, the manuscripts reporting the findings of the three phases of my dissertation research are presented using the formatting style of the journals in which they were published (Study 1), submitted (Study 2), or prepared for publication (Study 3). Chapter II (i.e., Study 1) represents a scoping review of grit in sport that was published in the *International Review of Sport and Exercise Psychology* (Cormier et al., 2021). This chapter presents a summary of existing grit research in sport (both peer-reviewed and grey literature) and generally determined the current trends and gaps in the literature at the time of publication. Chapter III (i.e., Study 2) presents the quantitative utility of grit in a sport setting through cross-sectional measurement. Study 2 helped to determine whether sport-specific grit predicts a unique amount of variance in performance and well-being above other determinants of success in sport and is currently under review at a scholarly journal at the time of writing. Chapter IV (i.e., Study 3) explored grit from a qualitative perspective, with the goal of building a grounded theory of grit in competitive athletes and was written with the intent to submit to a scholarly journal.

In the general discussion (Chapter V), I revisit the purposes of my research program and integrate the findings across the three studies. In this final chapter, the implications, strengths, and limitations of the research are further deliberated, future research directions are recommended, the case for and against grit in the domain of sport with respect to this program of
research will be discussed. For a detailed list of the research questions, hypotheses, and methods of analyses included in this dissertation, please see Table 1.1.


Cox, C. M. (1926). *Genetic studies of genius. II. The early mental traits of three hundred geniuses.* Stanford University Press.


Table 1.1

Description of the Research Questions, Hypotheses, and Methodologies for the Individual Studies

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Hypothesis</th>
<th>Methodologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1 What literature exists that examines the construct of grit in sport?</td>
<td>N/A</td>
<td>• Arksey &amp; O’Malley’s (2005) scoping review protocol</td>
</tr>
<tr>
<td>Study 2 Are the sport-specific grit subscales (i.e., consistency of interests and perseverance of effort) empirically distinct from existing measures of mental toughness, self-control, and conscientiousness when predicting performance and well-being in varsity athletes?</td>
<td>Sport-specific perseverance of effort scores will explain a significant amount of variance beyond other determinants of success when predicting performance and well-being, while sport-specific consistency of interests will not.</td>
<td>• Descriptive statistics • Hierarchical regression ○ SPSS</td>
</tr>
<tr>
<td>Study 3 Will sport-specific adaptability to situations explain unique variance in existing measures of mental toughness, self-control, and conscientiousness when predicting performance and well-being in varsity athletes?</td>
<td>Sport-specific adaptability to situations scores will explain a significant amount of variance beyond other determinants of success when predicting performance and well-being,</td>
<td>• Descriptive statistics • Hierarchical regression ○ SPSS</td>
</tr>
<tr>
<td>Study 3 What are the processes by which competitive athletes suggest they have acquired grit in the sport domain, the behaviors and cognitions they experienced while striving towards their long-term goals, and the by-products of being gritty in sport?</td>
<td>N/A</td>
<td>• Charmaz’s (2006) constructivist grounded theory</td>
</tr>
</tbody>
</table>
CHAPTER II†

Study 1 - Grit in Sport: A Scoping Review


† This chapter is presented exactly as it was published in the International Review of Sport and Exercise Psychology (with the only exception being the formatting of the document, the renumbering of tables/figures, updating of out-of-date citations, the sequential numbering of pages to match the remainder of the dissertation, and the insertion of appendices). I originally conducted a review of the grit in sport literature, loosely using a scoping review framework, on my own during my doctoral comprehensive exam (completed October, 2019). However, due to limitations imposed by the competency exam process, I was unable to complete the version of a scoping review that I would have liked and would make the strongest contribution to the literature. Therefore, afterwards, I completed what I feel is a high quality scoping review that included consultation with relevant knowledge users (i.e., varsity coaches), collaboration with colleagues, and an updated literature search to include the articles (29 in total) that had been published since the original search for relevant sources. While this manuscript is largely my own work, Drs. Leah Ferguson and Nancy Gyurcsik each contributed to the manuscript by verifying that the included articles adhered to the search inclusion/exclusion criteria, while Drs. Jennifer Briere, John Dunn, and Kent Kowalski each provided feedback to written document.
Grit in Sport: A Scoping Review

Abstract

Understanding the personality characteristics that help and/or hinder competitive success in sport is of great interest to many sport psychology researchers. Grit (i.e., passion and perseverance towards long-term goals) is one such construct that has recently gained popularity in the sport domain. This scoping review explored the associations between grit and the cognitive, affective, and behavioural variables that reside within athletes and sport settings. Ninety publications were identified through various search strategies. The majority of studies explored relationships between grit and athlete sex, athlete skill/competitive level, sport performance, motivation, mindfulness, self-compassion, and deliberate practice. Constructs that have been previously critiqued as sharing significant variance with grit were also collated from the existing research. Six collegiate-level coaches were consulted as knowledgeable stakeholders and provided input to the results of the scoping review. These results allowed for the identification of future research considerations, including ameliorating current issues regarding grit measurement in sport contexts, and the designing and testing of interventions aimed at increasing athlete grit levels. Additional research with stronger methodological design and rigour is needed, and recommendations to enhance the quality of future studies with athletes are discussed.

Keywords: grit; sport; athletes; sport psychology; scoping review
Introduction

“Our potential is one thing. What we do with it is quite another,” (Duckworth, 2016, p. 14).

Several organizations worldwide prioritize the measurement and prediction of talent in athletes competing at all skill levels (e.g., Australian Institute of Sport, ASPIRE in Qatar, UK High Performance Talent Programme). For instance, an annual report from the Canadian organization Own the Podium announced their intention to bolster “areas such as talent identification” in their Paralympic podium pathway (Own the Podium, 2019, p. 13). Yet the prediction of potential paragons of athletic achievement remains problematic, since the identification of athletes who will go on to compete at elite levels is often flawed (Vaeyens et al., 2009). For example, a recent meta-analysis revealed a clear overrepresentation of research (60%) that focuses exclusively on physical ability when attempting to determine young athletes’ potential for success in elite sport (Johnston et al., 2018). However, if talent alone is not enough to predict future levels of accomplishment, what is it that leads to the success of one individual over that of another?

Grit is one such personality characteristic thought to positively impact goal-attainment and long-term success and is defined as a person’s dispositional tendency towards passion and perseverance for long-term goals (Duckworth et al., 2007). As such, gritty people are characterized by their capacity to strive for and achieve goals over long periods of time despite setbacks, failures, boredom, or plateaus in goal progress (Duckworth et al., 2007). Grit is most commonly measured by one of two scales—the original Grit Scale (Grit-O; 12 items) and the short Grit Scale (Grit-S; 8 items)—both developed by Duckworth and her colleagues (Duckworth et al., 2007; Duckworth & Quinn, 2009). Both scales contain two subscales:
consistency of interests (CI) and perseverance of effort (PE). CI refers to the tendency to work towards a single focused life-long goal, rather than following a series of different superordinate goals over a short period of time. PE represents the great amount of determination and effort needed over the course of many years to attain that same life-long goal. In other words, CI represents the direction of one’s passion, while PE represents the duration of effort an individual spends working towards it (Tedesqui & Young, 2017).

With a few exceptions (e.g., Anestis & Selby, 2015; Khan et al., 2021; Lucas et al., 2015), research indicates that grit is positively related to many quality-of-life indicators (Jin & Kim, 2017) including positive affect (Hill et al., 2016; Singh & Jha, 2008), psychological well-being, satisfaction with life, and harmony (Vainio & Daukantaitė, 2016). Furthermore, research indicates that grit is predominantly associated with adaptive characteristics/outcomes in a variety of contexts. In scholarly settings, individuals with higher levels of grit were more likely to experience greater amounts of academic success (Duckworth et al., 2007; Muenks et al., 2018; Strayhorn, 2014; Wolters & Hussain, 2015), achieve higher levels of education (Duckworth & Quinn, 2009), and be more satisfied with their college experience (Bowman et al., 2015). Moreover, students who were one standard deviation above the average grit score of their class were 21% more likely to graduate from high school on time (Eskreis-Winkler et al., 2014). These outcomes might be influenced by the tendency for people with higher levels of grit to engage in higher amounts of deliberate practice (Duckworth et al., 2011). In vocational settings, grittier novice teachers were more likely to produce content mastery in their students and were less likely to quit their job during the school year (Robertson-Kraft & Duckworth, 2014). Grit has also been associated with success among army officer cadets, where grit was shown to be negatively correlated with attrition from an arduous 24-day military selection at the highly
competitive West Point US Military Academy (Eskreis-Winkler et al., 2014). For doctors and medical residents, high levels of grit have been associated with lower levels of burnout (Halliday et al., 2017; Salles et al., 2014).

Although grit has been studied extensively in a variety of achievement domains and has been consistently linked to an array of adaptive/healthy correlates/outcomes, questions surrounding the conceptualization and measurement of grit have been raised within the literature. For example, on a conceptual level, some researchers have suggested that grit is largely indistinguishable from conscientiousness and may therefore simply represent a repackaging or rebranding of an existing construct (e.g., Credé et al., 2017; Schmidt et al., 2018, 2020). Researchers have also challenged Duckworth et al.’s (2007) original suggestion that grit can be treated as a higher-order construct whereby the PE and CI subscales of the Grit Scale can be combined to form a single composite grit score. This practice has been criticized because it can often “result in a significant loss in the ability to predict performance” (Credé et al., 2017, p. 502), and researchers have found that the CI and PE subscales often have different relationships (and predictive power) with the same criterion variables—a finding that undermines the appropriateness of combining scores from the two subscales into a higher-order construct (e.g., Datu et al., 2017; Muenks et al., 2018; Wolters & Hussain, 2015). It is also worth noting that on the basis of similar conceptual and measurement concerns, some researchers in sport psychology have gone so far as to propose that “practitioners should refrain from using grit measures in their applied work with athletes” (Meyer et al., 2017, p. 363). Given such a position, it would appear that a comprehensive review of grit research in sport is warranted.
**Purpose of This Review**

High-level competitive sport is rife with moments where athletes can experience personal failure, slumps in performance, and stressors (e.g., poor weather conditions, excessive travel, risk of injury; Sarkar & Fletcher, 2014) in both practice and competition. It therefore seems reasonable to suggest that grit has received research attention in sport because sport researchers and other stakeholders wish to determine the extent to which grit may play a role in helping athletes overcome such adversity in the pursuit of long-term success. Given that individuals’ grit levels have been shown to vary across achievement domains (Cormier et al., 2019), a person’s grit level in sport might impact achievement-striving behaviours in sport to a greater degree than the same person’s achievement-striving behaviours in school (Mosewich et al., 2021). We propose that a summary of existing grit research in sport would be invaluable for sport researchers in determining current trends/gaps in the literature and would inform stakeholders of the value of assessing and/or fostering grit in athletic contexts. To this end, the purpose of this research was to broadly examine the construct of grit in the sport literature.

A scoping review framework was determined to be optimally suited for addressing the study purpose. Daudt et al. (2013) describe the scoping review as an endeavour to “map the literature on a particular topic or research area and provide an opportunity to identify key concepts, gaps in the research; and types and sources of evidence to inform practice, policymaking, and research” (p. 8). Scoping reviews allow for the inclusion of all forms of information, whether quantitative, qualitative, or grey literature (i.e., unpublished documents), and ultimately produce a collation of all existing knowledge within a specified area of research (Colquhoun et al., 2017). This methodology was selected over other forms of synthesis for a variety of reasons. Firstly, the assemblage of various sources of data can be used to identify
trends in the literature and generate new research questions. Secondly, because the investigation of grit in the context of sport is rapidly gaining popularity, the inclusion of all forms of evidence will likely broaden the list of publications eligible for inclusion, thus improving the scope of the resulting review. This breadth may also provide coaches, policymakers, and other stakeholders with a more comprehensive overview of the research being conducted in this area and may provide empirically supported guidance in how to increase grit in athletes. Lastly, scoping reviews can be particularly useful when examining the extent, range, and nature of a construct in an area not yet extensively reviewed (Mays et al., 2001). A preliminary search for existing scoping reviews addressing grit in sport was conducted prior to beginning the current investigation, however, none were found.

**Methods**

**Protocol**

The scoping review framework described by Arksey and O’Malley (2005) was used as an overall template for this study, but recent advances to the methodology were also considered (see Daudt et al., 2013; Levac et al., 2010; Peters et al., 2015; Pham et al., 2014; Tricco et al., 2018) to improve overall review quality. The scoping review process involves six distinct stages: identifying the research question, identifying relevant studies, study selection, charting the data, collating, summarizing, and reporting the results, and consultation with relevant stakeholders. Details regarding the steps taken for each stage of the framework follow.

**Identifying the Research Question**

The objectives of this scoping review were to: (a) determine the descriptive markers of the individual sources of grit research in sport, including sample demographics, year of publication, document type, and study design, (b) establish the scope (e.g., other assessed
constructs, details of interventions, key themes, and results) of the extant literature, (c) describe the current trends of grit measurement in sport, and (d) suggest key gaps that should be considered while moving forward with this avenue of research. For the purposes of this review, the working definition of grit was a person’s dispositional tendency towards passion and perseverance for long-term goals (Duckworth et al., 2007), and sport was described as any competitive activity guided by specific rules that involves specialized skill and physical exertion (Suits, 2007). These definitions exclude constructs popular in the sport literature (e.g., resilience, mental toughness, and self-control), and non-organized sport activities (e.g., unorganized sport, exercise, general fitness, and rehabilitation).

Identifying Relevant Studies

Inclusion Criteria. Sources were included in this review if they adhered to all of the following criteria: the document was published after 2007 (i.e., the publishing date of Duckworth et al.’s Grit-O Scale), the document was written in English, the research examined grit in athletes participating in sport rather than non-organized sport/exercise/general fitness activities, and the data were sourced from primary studies rather than position/opinion papers. Otherwise, all study designs were eligible, including those that utilized qualitative, quantitative, or mixed research methods.

Sources. Several different sources were used to ensure review comprehensiveness. Search strategies were reviewed by an experienced librarian and further refined through team discussion. Seven electronic databases were searched for peer-reviewed work (see Table 2.4). See Table 2.5 for an exemplar of a search term strategy used to identify relevant research in the PubMed database. Existing networks and knowledge of the review team were considered. A review of pertinent journals publishing research in sport sciences and sport psychology was also
conducted (see Table 2.4). A search of literature citing either of Duckworth and colleagues’ foundational journal articles (2007; 2009) was completed using the Web of Science cited reference search tool, due to the assumption that most, if not all, grit research would use either/both as citations. The reference lists from randomly selected articles were searched to identify any additional studies that were not found in the initial search, but eligible for inclusion. To search the grey literature, unpublished sources including graduate dissertations and conference proceedings were sought out (see Table 2.4).

**Results and Discussion**

The search for articles relevant to this review began on June 15, 2019, and yielded 1679 potentially relevant citations. For the first level of screening, only the titles, abstracts, and key words of citations were reviewed. All citations deemed relevant after initial screening were imported into Mendeley, where further screening was conducted once sample duplicates had been removed. The literature search was also updated in April, 2021. Figure 2 presents a detailed flowchart of the study selection process. After data characterization of the full-text articles was completed by the first author, 90 unique studies were determined to have met the inclusion criteria by the second and third authors (Cohen’s κ = 0.87) and were included in this review. A total of 84 documents were identified in the study identification phase, but three of these included multiple studies utilizing distinct samples (i.e., Gilchrist et al., 2018; Rhodes, 2020; Shields et al., 2018) and were therefore charted as unique data points. After all relevant studies had been identified, the first author began charting the data using Excel. The type of content ultimately chosen to be extracted was informed by the suggestions of Arksey and O’Malley (2005), and allowed for an iterative (rather than linear) process. The results extraction instrument used in this study can be found in Table 2.6. A summary of the studies included in this review
are listed in Table 2. We also note that effect sizes for the different studies (where reported in the original manuscripts) are also contained in Table 2.

**Consultation**

Given that grit appears to be important to coaches when making decisions about talent identification and development in athletes (Tedesqui & Young, 2020a), six collegiate-level coaches (one female) were recruited as knowledgeable stakeholders for the final step of this review. Upon receipt of institutional research ethics board approval, head coaches were identified through the university athletics department of the primary author (for communication sent to athletic directors and coaches, see Appendix A). Participation in this study was voluntary, and all participants gave their informed consent (for the participant consent form, see Appendix B) and were treated in accordance with the ethical guidelines for human research set forth by the American Psychological Association. The stakeholders had an average of 12.17 years of experience coaching at any level ($SD = 9.60$). The recruited coaches were interviewed after all data had been collated and were asked for their thoughts about the findings of this scoping review (for the coach consultation interview guide, see Appendix C). More specifically, coaches were asked to read a summary of the review and identify what findings were helpful to their work (for the scoping review summary given to coaches, see Appendix D), and to identify any perceived gaps in knowledge missing from the findings. Major themes from these interviews included the general belief that grit contributed to the success of athletes: “You see the less talented athlete that has grit and seems to be more successful than somebody that doesn’t seem to have that it factor. That grit factor” (Coach 6). However, on the basis of the coaches’ feedback it was clear that some confusion remained as to what grit constituted in athletes: “It’s all very similar but very different. If you were to put ten coaches in a room, they would all say ten
different words with ten different meanings, and it could all be the word grit” (Coach 1). The majority of the expert stakeholders indicated that they were interested in interventions that might be used to increase the grit levels of their athletes. However, while some coaches were confident that the training environments they created could affect athlete grit (“If I create an environment where everyone is well-respected, feels like they’re part of the team, and their values and training components are all matched, I can play an impact on what we might externally view as being grit” [Coach 1]), others were skeptical about whether or not grit could be taught (“I think one of the most interesting things to know would be how grit is grown. Because how do you teach that? You can’t! I’ve tried!” [Coach 4]). Finally, coaches stated that athletes who are gritty to the point of maladaptive outcomes are rare: “Can a player be too gritty? I think if they exist that they’re very few and far between” (Coach 5).

**Characteristics of Study Participants and Design**

A full summary of sample demographics can be found in Table 3. Most research (88.9%) sampled athletes competing in Westernized countries (i.e., Australia, Canada, Denmark, Norway, Spain, Sweden, UK, USA), and the majority of studies were conducted with collegiate athletes (57.7%). Male athletes were sampled most frequently (52.8%). Journal articles (48.9%) comprised the majority of the documents included in the review, and quantitative methods (82.2%) appeared to be the clear method of choice. A summary of the design characteristics of the studies included in this review are found in Table 4. The publication year of the articles spanned from 2009 to 2021, with the number of publications following a rising trend as time passed (see Figure 3).
Measuring Grit

Both the Grit-O and Grit-S were used by researchers, as was a 17-item instrument known as the Grit-R scale. The Grit-R hosts an additional ambition subscale (i.e., the desire for attainment, power, or superiority) that was originally developed by Duckworth but never incorporated into the grit concept nor the Grit Scale, and has not been validated in the literature. We were unable to find the original source of the 17-item Grit-R scale. The Grit-S was the most popular of the two validated Grit Scales (58.0%), and 12 investigations used modified versions of either the Grit-O or Grit-S (i.e., child-adapted, translated, and sport- and school-specific versions). A marked lack of consensus among researchers with respect to scoring the Grit Scales was observed in the data. While 65.4% of researchers followed Duckworth et al.’s (2007; 2009) original instructions to sum all items within the instruments to compute a composite grit score, over one third (34.6%) of the studies separated the two grit subscales and made inferences about athlete CI and PE.

General Overview of Findings

A number of studies examined differences in grit levels based on athlete sex (11.1%) and skill/competitive level (22.2%). Nine studies (10.0%) investigated the relationship between grit and sport performance. Studies that examined relationships between grit and a variety of adaptive psychological constructs/characteristics and determinants of success in sport were quite common (45.6%), and included relationships between grit and motivation (11.1%), mindfulness (5.6%), self-compassion (5.6%), and deliberate practice (6.7%). In a very small proportion of studies (2.2%), however, grit was associated with less adaptive or even maladaptive constructs in sport such as struggling to disengage from unattainable goals (Fong et al., 2016) or persisting to the point of injury (Crust et al., 2016). Sport researchers also assessed grit as it related to
analogous personality characteristics including hardiness (4.4%), resilience (4.4%), mental toughness (3.3%), self-control (4.4%), and conscientiousness (4.4%). The following subsections summarize these general areas of inquiry in more detail.

Population-Based Differences

The most frequently examined demographic characteristics were sex and athlete skill level. Although Duckworth and colleagues (2007, 2009) did not find any significant sex differences while initially validating the grit instruments, conflicting evidence from the general literature exists that indicates the opposite (see Christensen & Knezek, 2014), with females scoring significantly higher than their male counterparts (Aswini & Amrita, 2017; Jaeger et al., 2010). Eleven studies in this review examined differences in grit levels between the sexes, with ten failing to obtain statistically significant differences (Ali & Rahaman, 2012; Cormier et al., 2019; Criticos et al., 2020; From et al., 2020; Gilchrist et al., 2018 [Study 1 and 2]; Joseph, 2009; Nordvall et al., 2019; Symonds et al., 2018; Tedesqui & Young, 2017), and one study reporting that female athletes had scored significantly higher than male athletes (Cain et al., 2019).

Twenty studies examined grit levels across different skill/competitive levels. Across all study types, 13 studies found that athletes who competed at a higher skill/competitive level tended to have a higher grit score than those competing at a lower skill/competitive level. For example, grit scores were significantly higher in elite athletes than non-athletes (From et al., 2020; Kitano et al., 2018), and in collegiate athletes intending to continue on in competitive sport when compared to those who intended to play recreationally after graduation (Mayol, Ransford, et al., 2019). Grit was also higher in athletes competing in higher competitive tiers than those participating in lower competitive tiers, as demonstrated in CrossFit athletes (Cazayoux & DeBeliso, 2019), soccer players (Sigmundsson et al., 2020), and groups of mixed athletes
(Elumaro, 2016; Markgraf et al., 2015; Nordvall et al., 2019; Shewmake, 2016; Symonds et al., 2018). From a subscale perspective, the CI subscale alone appeared to increase with time spent in sport (Cousins et al., 2020), while only PE was related to skill group membership (Tedesqui & Young, 2017, 2018). Effect sizes for the aforementioned studies tended to be small in size, though some medium and large effect sizes were reported (see Table 2). Grit appeared to be unrelated to athlete skill level in seven studies included in this review, and did not differentiate between Japanese collegiate athletes (Ueno et al., 2018), athletes and non-athletes (Hom, 2018; Joseph, 2009; Shrivastava & Mishra, 2016), rostered from de-selected athletes (Sakamoto et al., 2018), and was not correlated with continued intercollegiate sport participation (Hayden, 2018). Furthermore, Meyer et al. (2017) found inconsistent results when comparing age-adjusted grit levels across high performance athletes (i.e., World Cup, Olympic, or professional level) and those competing at various divisions in the NCAA (i.e., Divisions I, II, and III)—grit levels were only significantly different between NCAA Divisions I and II athletes and no other significant differences were identified between the other skill/competitive levels.

**Grit and Performance Outcomes**

Whether or not grit is a predictor of performance is likely of high interest to athletes, coaches, program directors, and other stakeholders involved in team selection. Nine studies investigated the relationship between grit and athletic performance, with grit emerging as a significant predictor in six. In one example, investigators implemented a soccer-specific performance task to examine the effects of motivational feedback on athlete performance (Moles et al., 2017). Results showed that the scoring percentages of low-grit athletes who were given feedback emphasizing self-improvement, learning, and effort were 33% higher than their low-grit counterparts who received feedback focused on natural ability and winning. Other examples
included the increased likelihood of collegiate athletes higher in CI and PE to win a medal at the Ghana University Sports Association Games (Ansah & Apaak, 2019), the significantly improved season performance trajectories of grittier youth skiers (DeCouto et al., 2019), significant improvements in the performance of collegiate athletes following a day where their performance dipped one standard deviation below their mean subjective practice performance assessment (Doorley, 2020), improved free throw percentage in NCAA division I and III basketball players (Elliot, 2018), and improvements in the ball exit velocity of collegiate baseball players (Shaver, 2017). Grit did not emerge as a significant predictor of athletic performance in three studies (Criticos et al., 2020; Fawver et al., 2020; Joseph, 2009). Based on these results, it appears that grit should be considered when attempting to predict athlete prowess.

**Grit and Other Psychological Factors in Sport**

Higher levels of grit were associated with a variety of psychological factors in sport. These include reduced amounts of burnout (DeCouto et al., 2019), perceived life stressors (Ford et al., 2017), negative emotions (Doorley, 2020), facets of maladaptive perfectionism (Fawver et al., 2020; S. Martin, 2018), global hubristic pride (Gilchrist et al., 2018 [Study 2]), and lower levels of somatic (Auerbach, 2018) and sport-specific (Symonds et al., 2018) anxiety. Lower amounts of grit also predicted higher general anxiety disorder scores (Crane et al., 2020), and when combined with self-efficacy, self-control, and optimism, grit was a significant dispositional resource needed to overcome anxiety in a sport environment (Olefir, 2018). Furthermore, grit scores were found to be positively related to global and fitness-related authentic pride (Gilchrist et al., 2018 [Study 2]), facets of adaptive perfectionism (Fawver et al., 2020), optimism (Olefir, 2018), momentary positive affect (Rumbold et al., 2018), sport goal-specific hope, and positive emotions (Doorley, 2020). Researchers who examined the grit subscales found that CI and PE
were both positively related to adaptive facets of sport-specific perfectionism, and inversely associated with maladaptive facets of sport-specific perfectionism (Dunn et al., in press).

**Motivation.** Much of the motivational patterns brought about in a particular context can be understood by the types of goals an individual sets for themselves (Ames, 1992). *Mastery goal orientations* are those that are based on an individual’s own ability, and facilitates self-improvement and exertion of maximum effort (Ames, 1992; Vazou et al., 2006). To foster mastery goal orientations, coaches are encouraged to provide their athletes with *mastery-involving feedback* including praise for personal improvement rather than comparisons to others (Donald et al., 2019; Moles et al., 2017), thus creating a *mastery-involving motivational climate* (Ames, 1992). This motivational climate is theorized to create *implicit incremental theory beliefs* in athletes, meaning that an individual believes that success stems from effort and that talent is malleable. Mastery goal orientations were positively related to grit (Albert et al., 2021; Auerbach, 2018), and mastery-involving motivational climate explained 65% of the variance in athlete PE (Albert, 2020), though neither goal orientation nor motivational climate were related to whole grit scores (Albert et al., 2021). The directionality of these relationships were further examined using structural equation modelling—mastery-involving motivational climates indirectly contributed to collegiate athlete PE through implicit incremental theory beliefs (Albert, 2020). Quantitative results demonstrated significant positive relationships between grit and *intrinsic motivation* (i.e., the tendency to seek out challenges, and to extend one’s capacities as a means to explore and learn; Orris et al., 2019; Thapar & Nancy, 2018), while collegiate football athletes linked grit with their intrinsic motivation to compete in one qualitative study as evidenced through the following athlete quote: “Motivation is if you see something you want to do and you love it so much, there’s nothing real else that should stop you from doing it. But if
you love it, you’re going to pursue it” (p. 61, Dunn, 2019). Controlled motivation (i.e., behaviour that is driven by external rewards or punishment) was inversely related to grit in athletes (Scharneck, 2017). Furthermore, low levels of grit were a factor in high dropout rates among American adolescent male figure skaters (Newby, 2018), and the CI subscale was inversely related with thoughts of quitting sport in samples of mixed North American athletes (Tedesqui & Young, 2017, 2018).

Mindfulness. Mindfulness involves “paying attention in a particular way; on purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994, p. 4). Mindfulness-based interventions in sport have demonstrated inconclusive results when attempting to improve athlete performance outcomes or quality-of-life markers outside of sport (see Gardner & Moore, 2017; Noetel et al., 2019). Results from five studies examining mindfulness in relation to grit in sport were similarly mixed, though the majority of the studies reported null findings. T. A. Cote (2019), DiBernardo (2018), and Goodman et al. (2014) each evaluated athlete grit during multi-week interventions designed to improve mindfulness. Results of all three studies indicated that athlete grit scores had not been significantly affected by mindfulness training. While it could be that a five- or six-week long intervention is simply not enough time to significantly impact the grit levels of athletes (Credé, 2018), this explanation is contested by other interventions of similar length that have significantly affected grit (e.g., Alan et al., 2019; Rhodes et al., 2018). Researchers who employed cross-sectional methods found that grit explained 15.9% of the variance in mindfulness in collegiate athletes (Brennan et al., 2018), but did not find a significant relationship between grit and mindfulness in a sample of youth male soccer players (Auerbach, 2018).
**Self-Compassion.** *Self-compassion* is a state of balanced awareness that leads to the desire to reduce one’s suffering through understanding and kindness (Neff & Vonk, 2009). Self-compassion entails being moved by one’s own suffering along with a desire to alleviate that suffering, using elements of self-kindness, common humanity, and mindfulness (Neff, 2003a, 2003b). Like grit, self-compassion seems to help individuals flourish in a variety of domains including sport (Mosewich, 2020; Mosewich et al., 2013, 2019). Preliminary evidence from two sources suggested that self-compassion was a significant predictor of grit in athletes (Mayol, Dobersek, et al., 2019; Orris et al., 2019), though self-compassion was unrelated to grit in a third study (Doorley, 2021). When grit was treated as a multidimensional construct, sport-specific PE was positively correlated with sport-specific self-compassion, whereas sport-specific CI was unrelated (Johnson, 2020; Mosewich et al., 2021). Evidence from sport researchers suggests that self-compassion may moderate overly critical/evaluative thoughts (Mosewich et al., 2014) or rumination (Frentz et al., 2020) that might arise in athletes in response to encountering emotionally difficult sport situations (Ferguson et al., 2014). These results were supported by one qualitative study that we reviewed, where athletes agreed that the gritty pursuit of sport-related goals is made more enjoyable with a self-compassionate lens due to an enhanced appreciation for self-reflection, realistic standards for performance, and willingness to adapt (Johnson, 2020). Thus, gritty self-compassionate athletes might be more likely to persist through setbacks than their peers and attain long-term sport achievement.

**Deliberate Practice.** Deliberate practice (DP) requires significant amounts of time purposely pushing up against one’s current level of ability in a skill to ultimately become an expert in that domain (Ericsson et al., 1993). This method of skill development often requires much more effort and is much less enjoyable than other forms of practice; therefore, the ability
to persevere is imperative. Six studies in this review explored the relationship between grit and DP. In four cases, whole grit scores were positively correlated with hours spent in DP (i.e., Fawver et al., 2020; Larkin et al., 2015; Tedesqui & Young, 2017, 2018), while CI alone was significantly associated with the number of miles ran per week in long-distance runners (Cousins et al., 2020). It should be noted that one replication study failed to find any association between grit and time spent in practice (Tedesqui et al., 2018). Overall, the findings that grittier athletes are more likely to engage in higher amounts of DP mirrors the results of Duckworth et al. (2011) who linked grit to the success of Scripps National spelling bee competitors via DP as a mediating mechanism. Extant literature has also found DP an effective form of sport skill development (J. Cote et al., 2005; Ericsson, 2006; Ward et al., 2004). It should be noted that all six of these studies used self-report measures based on the retrospective recollection of the average number of hours participants spent engaging in various forms of practice (running the risk of recall errors or social desirability bias), rather than directly recording the hours spent in DP in real time.

**Maladaptive Psychological Factors.** Some sport researchers have suggested that grit may also be associated with a number of less adaptive psychological factors, particularly as it relates to the stubborn pursuit of goals. For example, the doctors of high-altitude climbers speculated that it was the grittier mountaineers who “were more rigid, stubborn, and inflexible” (p. 607) and were often those who chose to persist despite dangerous weather and lose fingers and toes to frostbite as a consequence (Crust et al., 2016). Gritty runners were also shown to have difficulty disengaging from unachievable personal goals (Fong et al., 2016). Results of a study by Tedesqui and Young (2020a) appear to contradict these findings. Tedesqui and Young interviewed a number of high performance coaches and noted that “coaches did not equate grit with mindless perseverance. Instead, many coaches described gritty athletes as those who are
able to think critically and self-assess, make appropriate decisions, and follow through” (Tedesqui & Young, 2020a, p. 131). While research exists which illustrates possible maladaptive outcomes associated with athlete grit, we note that the expert stakeholders interviewed for this study felt that athletes who were particularly inflexible in the achievement-striving process were exceedingly rare.

**Grit and Other Determinants of Success in Sport**

Questions about grit’s distinctiveness from other existing concepts have followed the construct into the domain of sport, and was the focus of several researchers included in this review. As noted previously, Meyer and colleagues (2017) stated that “practitioners should avoid using terms (or labels) like grit because little if any evidence exists to support the significance of the construct in the sport domain” (p. 363). Several constructs were identified in this review as having conceptual ties to grit, including hardiness, resilience, mental toughness, self-control, and conscientiousness.

**Hardiness and Resilience.** Hardiness and resilience are both patterns of protection/adaptation used when an individual encounters stressful conditions (Fletcher & Sarkar, 2013; Kobasa, 1979). Both are conceptually similar, though hardiness is understood to be a static and stable personality trait (Luthar & Cicchetti, 2000), whereas resilience is a dynamic disposition that may change across time and environments (Galli & Gonzalez, 2015). While each of these character strengths include similar elements of perseverance, grit differentiates itself from these constructs in that it also involves attaining a specific goal over a very extended period of time (Duckworth et al., 2007). Several survey-based studies included in this review reported a positive and significant relationship between hardiness and grit in athletes (Atkinson & Martin, 2020; Hayden, 2018; Madrigal et al., 2016; J. J. Martin et al., 2015), and between resilience and
grit in athletes (Atkinson & Martin, 2020; Hayden, 2018; J. J. Martin et al., 2015; Shrivastava & Mishra, 2016). Though these constructs were moderately correlated (see Table 2), grit alone demonstrated unique predictive power over hardiness and resilience, accounting for 8% of the variance in a regression model predicting sport engagement (J. J. Martin et al., 2015).

**Mental Toughness.** Mental toughness is another predictor of success that shares many of the theoretical underpinnings of grit, but is specific to the sport domain (Connaughton et al., 2008). Mental toughness is germane to the adversarial conditions of sport, and includes the subcomponents of confidence, challenge, control, and commitment (Earle & Clough, 2014). Similar to resilience, mental toughness varies within individuals over time and is best conceptualized as a state-like property (Anthony et al., 2016; Gucciardi et al., 2015), whereas grit is considered to be a stable personality disposition (Duckworth et al., 2007). Grit and mental toughness were found to be significantly correlated in three quantitative studies, but all relationships were moderate or low in strength (Johnson, 2020; Joseph, 2009; Scharneck, 2017). Furthermore, mental toughness only accounted for 18% of the total variance in grit scores (Joseph, 2009), providing empirical evidence that supports grit’s distinctiveness.

**Self-Control.** Self-control refers to the willpower required to inhibit impulsive, short-term behaviour, while grit involves years or decades of effort needed to reach a specific life goal (Duckworth & Gross, 2014). The relationship between self-control and grit was investigated by studies included in this review, and results revealed that self-control was significantly correlated to grit (Olefir, 2018; Shields et al., 2018 [Study 2], Tedesqui & Young, 2018; Toering & Jordet, 2015). Additionally, high performance coaches who were interviewed about the traits they believed to be the most relevant for athlete development prioritized grit and its subscales over self-control (Tedesqui & Young, 2020a).
Conscientiousness. Conscientious individuals are those who display an awareness of their own behaviour and the impact that they have on others around them (Costa & McCrae, 1992). It is important to note that conscientiousness has been the construct most touted as being the “old wine” in the “new bottle” of grit (see Credé et al., 2017), but important differences should be noted. While both concepts may share similarities in terms of a drive for success, they differ in terms of their temporality: “Grit overlaps with achievement aspects of conscientiousness but differs in its emphasis on long-term stamina rather than short-term intensity” (Duckworth et al., 2007, p. 1087). As a result, both constructs are related to different outcomes—conscientiousness is closely associated with short-term tidiness and organization (McCrae & Costa, 1990), while grit is more predictive of an individual’s overall number of career changes (Duckworth et al., 2007). These differences were generally supported by results included in this review. Though one publication found a strong positive correlation between the two constructs ($r = .69, p < .001$; From et al., 2020), Nai and colleagues (2016) found that while conscientiousness was a significant predictor of the grit levels of NCAA collegiate athletes, it only explained 34.9% of grit’s variance once combined with the other Big Five personality factors. Moreover, grit was a successful predictor of athlete skill level, while conscientiousness showed no significant differences between groups (Elumaro, 2016). Lastly, the PE subscale was a stronger predictor of athlete DP than conscientiousness subscales (i.e., achievement striving and dutifullness; Tedesqui & Young, 2018). Taking into account both the results from this scoping review and those outside of sport research, the relationship between grit and other similar personality characteristics (i.e., hardiness, resilience, mental toughness, self-control, and conscientiousness) should continue to be examined before the possibility of an existing singularity is considered.
Implications for Measurement of Grit in Sport

There are clear inconsistencies in how grit is measured in sport contexts. Five principal issues were raised by the current scoping review: (a) inconsistencies in the Grit Scales used, (b) contradictions in whether grit is best measured as a higher-order construct or by its subscales, (c) uncertainty in whether grit should be conceptualized and measured as a domain-general or sport-specific construct, (d) the overuse of cross-sectional, self-reported, and quantitative methods when exploring how grit operates in athletes, and (e) mixed psychometric evidence.

Which Scale Should be Used? The Grit-S scale (Duckworth & Quinn, 2009) was used to measure grit in 58.0% of the studies that met the inclusion criteria in this study, while the Grit-O scale was only used in 28.4%. Researchers may be choosing to use the Grit-S because it is shorter and was deemed to be psychometrically stronger than the Grit-O by Duckworth and Quinn (2009) in their original validation of the measure. For sport researchers the clear choice of either Grit Scale is muddied, because support for both instruments has been reported. More specifically, Rhodes et al. (2018) argued that the Grit-O scale demonstrated stronger content validity over the shorter version, due to it containing items that may be relevant to athletes in sport contexts that were removed from the Grit-S (e.g., “I achieved a goal that took years of hard work”). Sport researchers should be deliberate when choosing a grit instrument, as it is unclear whether the Grit-O or Grit-S offers a more valid assessment of the construct in athletes.

How Should Grit Scores be Analysed? In the context of this review, 18 studies found additional differential associations when choosing to analyse grit subscales over a total grit score (Albert, 2020; Cazayoux & DeBeliso, 2019; Cormier et al., 2019; Cousins et al., 2020; Dickson, 2020; Dunn et al., in press; From et al., 2020; Johnson, 2020; Legg et al., 2017; Mosewich et al., 2021; Newland et al., 2020; Nogueira et al., 2019; Rhodes et al., 2018; Shields et al., 2018)
Credé and colleagues (2017) posit that researchers might be able to better predict long-term success when grit subscales are analysed separately because “[PE] is a much better predictor of performance than either [CI] or overall grit and should therefore probably be treated as a construct that is largely distinct from consistency to maximize its utility” (p. 502). That being said, it should be noted that the focus of Credé et al.’s meta-analysis was in the academic domain rather than the sport domain. These differences may be attributable to the increase in predictive validity with the use of facet subscales (Paunonen & Ashton, 2001), and researchers should consider the possible added value in evaluating each grit facet separately.

**Is Grit Best Conceptualized as Domain-Specific?** When asked if current grit instruments provided a sound representation of the construct in athletes, NCAA coaches expressed concerns that the language used in the Grit-S and Grit-O was too broad, and that a grit questionnaire specifically geared toward sport might remediate this problem (Morgan, 2016). Such an instrument would ultimately capture the intricacies of the domain, and perhaps produce a more refined and accurate measurement of grit in athletes. Two cross-sectional studies found merit in measuring grit as a domain-specific personality characteristic rather than domain-general characteristic in samples of intercollegiate athletes (Cormier et al., 2019; Mosewich et al., 2021). Both studies used a modified version of the Grit-O which had been altered to reflect domain-specific CI and PE in sport and school (e.g., all items in the sport-specific scale were preceded by the phrase, “As an athlete in sport”). School-specific grit significantly accounted for 10–20% of unique variance in respondents’ GPA beyond the variance explained by a global measure of grit, supporting the argument that grit might vary as a function of the context in which it is considered. Mean contrasts from both studies revealed that intercollegiate student-
athletes reported significantly higher levels of CI and PE in sport than in school or overall, which may be due in part to athletes’ tendency to report higher levels of athletic identity over academic identity (Mosewich et al., 2021). Rhodes (2020 [Study 4]) further examined the domain-specificity of grit in sport by creating a sport-specific Grit Scale named the Sporting Grit Scale. The instrument has demonstrated acceptable factorial validity (in terms of adequate goodness of fit following a confirmatory factor analysis), acceptable test-retest reliability ($r = .94, p < .001$), and marginal internal consistency ($\alpha = .67$); the instrument was also successful in differentiating between athletes competing at different skill levels (Rhodes, 2020 [Study 4, 5]). Given that a large body of research already exists to support the examination of personality dispositions as domain-specific (e.g., Hanoch et al., 2006; Kaufman & Baer, 2004; Mitchelson & Burns, 1998; Thienot et al., 2014; Zohar, 1998), future researchers may gain greater insight into how grit operates in athletes by using grit instruments that match the achievement domain in which samples perform. Furthermore, future instruments might instruct participants to consider grit in the more micro contexts of the technical, tactical, physical, or mental aspects of their primary sport. This possible future direction would mirror work completed in the education domain, where subject-specific measures (e.g., math, language studies) of grit were found to be superior predictors of achievement than global grit measurements (Miele et al., 2022; Schmidt et al., 2019; Teimouri et al., 2022).

**Enrichment in Grit Measurement, Study Design, and Methods.** The majority of the studies included in this review were categorized as using self-reported data, cross-sectional research designs, and/or quantitative methods. Only one study, conducted with NCAA division II collegiate athletes had team head coaches complete an informant-report grit survey for each of their athletes in addition to the self-reported grit survey provided by the athletes themselves.
(Morgan, 2016). Results suggested that coaches consistently rated their athletes’ grit score lower than each athlete. Thus, future research might consider using informant-report measures or compute other third-party observations of the grit levels of participants to address the dearth of non-self-report data used to infer grit in athletes. Future investigations to examine inter-rater reliability estimates would also help inform professionals of the (in)consistency of scoring grit within and across individuals. Moreover, objective behavioural or observational methods (e.g., the amount of time participants spend training in the gym) may help overcome some of the inherent subjective limitations of self-reported questionnaires (Duckworth & Yeager, 2015). Considering the popularity of cross-sectional designs featured in this review, it is important to note that both longitudinal and experimental designs could offer results that may otherwise be impossible to produce. Cross-sectional designs impede researchers from making any sort of causal interpretation, whereas longitudinal and experimental research may be helpful in analysing if, when, and how differences in grit emerge in sport contexts (Schaie, 1983). Longitudinal data might also prove useful to assess outcomes that cannot be assessed otherwise, such as retention over a competitive season, whether high levels of grit during childhood produce positive benefits into adulthood, or the intra-individual achievement of long-term success. Only 16 studies used qualitative or mixed methods to understand grit-specific experiences, ideas, beliefs, and values of the athletes included in this review, but the themes generated from these studies were rich. For example, coaches felt that no matter their base level of talent, grit can galvanize athletes and push them to achieve long-term success (Morgan, 2016). Interviews of six active or retired athletes who had successfully transitioned to the Olympic Training Centre in Colorado Springs revealed that determination, focused purpose, and hard work all helped create an optimal athlete-environment fit (Poczwardowski et al., 2014). One athlete who scored highly
in PE described their predisposition for persistence as: “I pictured it as I’m going to build a bridge, and no matter what it takes, I’m going to get to the other side” (p. 41). Lastly, superordinate themes generated from Olympic swimmers who were asked about the factors that led to their increased grit included: (1) passion was developed from key social influencers, (2) commitment to athletic mastery, (3) development of cognitive skills which enhanced consistency, and (4) a concept of self that supported sacrifices and ruthless goal pursuit (Rhodes, 2020 [Study 2]). Qualitative research offers highly desirable insights to the distinct meaning of grit to individual athletes, and future researchers should consider using qualitative or mixed methods to reach a stronger and more accurate understanding of the concept of interest (Sparkes, 2015).

**Mixed Psychometric Evidence.** Some psychometric evidence supporting the validity and reliability of the Grit Scales has been reported in the general literature (e.g., Eskreis-Winkler et al., 2014; Mason, 2018; Von Culin et al., 2014), but mixed psychometric evidence was found in this review. Two studies examined the latent structure of both the Grit-O and Grit-S scales and found that a better model fit was obtained with the Grit-O (after removing one and two item[s] from the original scale, respectfully; Cormier et al., 2019; Dunn et al., in press), while two other investigations found that the Grit-S demonstrated superior factor structure (Meyer et al., 2017; Shaban, 2020). The Grit-O scale was used by Cazayoux and DeBeliso (2019) who reported good to excellent test-retest reliability estimates (CI subscale: $r = .78$, ICC = .83; PE subscale: $r = .78$, ICC = .76; whole scale: $r = .87$, ICC = .91), however, these analyses were based on only 25 CrossFit athlete respondents, the time interval between measurements was quite variable (from one to three weeks), and no analyses were reported controlling for the time interval. Further psychometric evidence supporting the use of the Grit-O was reported in five studies (Cormier et
al., 2019; Dunn et al., in press, Mosewich et al., 2021; Shields et al., 2018 [Study 1]; Tedesqui & Young, 2017) but each had removed items from the original scale to obtain adequate two-factor models. Researchers who had employed the Grit-S found acceptable fit indices (Legg et al., 2017; Newland et al., 2020). Some researchers removed the Grit Scales from their investigations altogether—Albert (2020) dropped all CI items of the Grit-O as they did not significantly load on the whole grit latent construct, while Peterson (2017) removed the Grit-S from their final analyses due to unacceptable Cronbach alpha levels. Finally, although there are the common perceptions between athletes and coaches that sport-specific and general grit are related (Lindemann-Litzsinger, 2017), and that grit in sport can be trained (Tedesqui & Young, 2019), there is evidence to suggest that the psychometrics of ratings obtained from athletes and coaches should be examined independently (Morgan, 2016).

Given the inconsistency in the use/scoring of the scale and subscales (e.g., Meyer et al., 2017; Peterson, 2017), and the wide variety of samples used in examinations of grit in sport (e.g., youth versus elite athletes), it is suggested that future efforts be made towards thoroughly evaluating the psychometric properties of the Grit Scales (e.g., Grit-S, Grit-O, domain-general, domain-specific), the subscales (e.g., Prusak et al., 2018), across various populations (e.g., athlete levels and sport types), time (e.g., one month to one year test-retest reliability estimates), and raters (e.g., inter-rater reliability of coaches, consistency between coach and athlete).

**Implications for Application of Grit in Sport**

Empirically driven methods shown to increase grit levels are likely of great interest to various stakeholders in the sport context. Duckworth (2016) has argued that grit can be developed over time, stating that “you can grow your grit from the inside out” (p. 92). Interviews from head coaches of NCAA division II agreed with this sentiment but recognized that the
process of “cultivating or coaching grit was too difficult” (Morgan, 2016, p. 69). While it is believed that establishing a culture that normalizes gritty behaviour may ultimately aid in fostering grit at an individual level (Alan et al., 2019), research is limited in respect to the types of applicable interventions that can be used with athletes.

Of the seven studies we reviewed that examined changes in grit over multi-week interventions, only one intervention type was found to consistently improve passion and perseverance. Functional Imagery Training (FIT) was used in three studies (Rhodes, 2020; [Study 5, 6]; Rhodes et al., 2018) to increase grit and in two male professional soccer teams competing in the English Football Leagues One and Two, as well as a large sample ($n = 210$) of athletes of various skill levels competing in different sports. Participants were invited to participate in a single FIT educational session, followed by a 15–minute booster session 6 weeks after the initial consultation. FIT aims to develop competency in goal setting, self-awareness, and positive/motivational imagery to enhance task mastery. The intervention groups demonstrated a significant increase in grit scores when compared to the control groups, and these improvements were sustained when measured again 12 weeks later. Furthermore, Rhodes (2020; [Study 6]) demonstrated that only athletes in the FIT condition maintained grit level improvements after 15–17 weeks, while those assigned to a condition which taught traditional motor imagery did not. Future research should be done to replicate these findings and coaches could also consider adding FIT principles to their mental performance training programs.

Novel avenues for future researchers exploring how to grow grit include the encouragement of a growth mindset in athletes (Legg et al., 2017). A growth mindset references the belief that ability can be improved through hard work, while those with a fixed mindset hold that ability remains static regardless of effort (Dweck, 2006). Cross-sectional results indicate that
growth mindset is positively correlated to grit scores (Battle, 2020; Legg et al., 2017; Sigmundsson et al., 2020), and was directly related to athlete grit in a mediation model (Albert et al., 2021). Of course, while the relationship between the constructs exists, it is impossible to conclude if a growth or fixed mindset affects grit levels or if it is the presence of grit that determines the type of mindset that athletes adopt. Fortuitously, this relationship has been examined outside of sport. One longitudinal intervention has been successful in increasing and sustaining grit level growth over time by encouraging elementary school students \( (n = 3,200) \) to believe that their abilities were malleable and could be improved with hard work (see Alan et al., 2019). Because grit requires those to maintain effort towards a long-term goal despite failures, perhaps it is the perception that gritty individuals have towards failing itself that causes them to persevere. Future work may also aim to grow grit through social support and positive feedback (Donald et al., 2019), especially for those with low grit (Moles et al., 2017), by improving self-compassion (Mayol, Dobersek, et al., 2019) and healthy self-regulation (Fong et al., 2016; Thapar & Nancy, 2018). From a coach’s perspective, fostering mastery goal orientations (Auerbach, 2018; Moles et al., 2017), in addition to contesting and partnership orientations (Shields et al., 2018) may be beneficial in developing grit, along with using coaching styles that are autonomy-supportive rather than controlling (Scharneck, 2017).

**General Discussion**

**Study Limitations**

Although this review is the first to offer a scoping perspective of grit in sport contexts, it does not come without limitations. Firstly, there is a possibility that this review may have missed some studies relevant to our inclusion criteria. Several facets of the methodology of this work could have contributed to this, including limited time restrictions, an incomplete/erroneous peer-
reviewed or grey literature database selection, examination of only of the title, keywords, and abstract of all search results rather than the entire main body of text, or the exclusion of studies written in languages other than English. However, given the reality of limited resources available for this review (e.g., time, translators, other team members), the first author attempted to be thorough in the literature search, had consulted with a kinesiology-specialized librarian when selecting appropriate databases, and included a PRISMA flow chart for future researchers to replicate these findings and assess the comprehensiveness of its contents. Secondly, given that Arksey and O’Malley’s (2005) scoping review framework does not include a quality appraisal stage no such assessment was made, making it impossible to identify any gaps in the literature related to the quality of the included research. However, because the primary function of a scoping review is to gain comprehensive coverage of a particular topic in a specific context, this investigation was able to incorporate a wider range of methodologies, study designs, and document types that may have been overlooked in a review that used rigour as a selection criterion. Lastly, it is important to point out that the documents included in this scoping review came from predominantly Western cultural contexts, meaning that the conclusions drawn in our discussion may not be fully representative of the sport domain across cultures. Grit researchers have recently begun exploring the possibility that grit may operate differently in collectivist cultures (e.g., Datu et al., 2016; Jin & Kim, 2017; Raphiphatthana et al., 2019). For example, Datu and colleagues (2017) proposed an alternative model of grit which adds a third dimension to the construct—adaptability to situations—which captures an individual’s ability to cope with changing circumstances and adjust effectively to setbacks in goal attainment. There is a need to examine athlete grit outside of Westernized countries, and researchers should also consider the possibility that grit might be conceptualized differently in non-Western cultures.
Conclusion

Given the main findings from this scoping review, there is a need for more researchers to explore possible correlates of grit, in addition to its measurement, mechanisms, and outcomes. Most of the research sampled male and female collegiate athletes competing in Westernized countries, and quantitative methods were the clear methodology of choice. The Grit-S was the most popular of the two validated Grit Scales, though there were some inconsistencies present in this review in the approach used by researchers to score the instrument. With respect to demographic characteristics, the majority of the collated results did not show any significant differences between male and female athletes, and the relationship between grit and athlete skill/competitive level was predominantly positive (i.e., with athletes competing at higher competitive levels demonstrating higher levels of grit). The majority of the studies which examined the relationship between grit and athletic performance demonstrated that grit was indeed a significant predictor. Much of the extant sport literature assessed the relationships between grit and motivation, mindfulness, self-compassion, and deliberate practice in sport contexts, though other variables should be considered in relation to grit (e.g., identity or perceived task value; see Mosewich et al., 2021) in order to best understand the constellation of character strengths held by highly successful athletes. Although some studies provided evidence suggesting that grit might be associated with less adaptive psychological factors, these results were largely contested by extant literature and therefore should be interpreted with caution. Grit was shown to be distinctive from other similar determinants of success (i.e., hardiness, resilience, mental toughness, self-control, and conscientiousness), thereby strengthening the argument that grit should continue to be considered a useful and unique motivational disposition by sport researchers. Future directions include the amelioration of the Grit Scales for athletes, as well as
the implementation of novel interventions that may improve athlete grit. We hope this review will provide a solid foundation for various stakeholders involved in sport to understand the merits of passion and perseverance, and ultimately use this information to assist athletes in reaching personally meaningful success in sport.
References


*International Journal of Social Research Methodology, 8*(1), 19–32. 
https://doi.org/10.1080/1364557032000119616


https://doi.org/10.1016/j.dhjo.2019.100839


https://doi.org/10.1177/1948550615574300


DiBernardo, R. (2018). *Implementation and impact of the Mindfulness Meditation Training for Sport (MMTS) 2.0 protocol with a division III women’s college basketball team and*
coaching staff (Publication No. 10810453) [Doctoral dissertation, Boston University].

ProQuest Dissertations and Theses Global.


Own the Podium. (2019). *Own the podium 2017/8 annual report.*


### Summary of Study Details Included in Scoping Review

<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author</strong></td>
<td>n</td>
<td>Sex</td>
<td>Age</td>
</tr>
<tr>
<td>Albert (2020)</td>
<td>523</td>
<td>MIX</td>
<td>N/A</td>
</tr>
<tr>
<td>Ali &amp; Rahaman (2012)</td>
<td>40</td>
<td>MIX</td>
<td>N/A</td>
</tr>
<tr>
<td>Ansah &amp; Apaak (2019)</td>
<td>644</td>
<td>MIX</td>
<td>21.97</td>
</tr>
<tr>
<td>Atkinson &amp; Martin (2020)</td>
<td>87</td>
<td>MIX</td>
<td>35.94 ± 9.26</td>
</tr>
<tr>
<td>Auerbach (2018)</td>
<td>71</td>
<td>M</td>
<td>15.81 ± 0.82</td>
</tr>
<tr>
<td>Battle (2020)</td>
<td>288</td>
<td>MIX</td>
<td>N/A</td>
</tr>
</tbody>
</table>

(continued)
Brennan et al. (2018) | 349 | MIX | 191 M; 158 F | 19.60 ± 1.23 | Collegiate | Quantitative: Survey | Grit accounted for significant 15.9% of the variance in mindfulness when added as a fourth step into a stepwise multiple regression model after sex, age, and sport type.

Cain et al. (2019) | 51 | MIX | 24 M; 27 F | 19.40 ± 1.29 | Collegiate | Quantitative: Survey | Female swimmers and divers had significantly higher levels of grit than males.

Cazayoux et al. (2019) | 85 | N/A | N/A | N/A | Amateur | Quantitative: Survey | Advanced CrossFit athletes scored significantly greater than novice athletes for both whole Grit score ($d = 0.57$) as well as CI subscale ($d = 0.59$). No statistical difference in PE scores were observed between the same groups.

Cormier et al. (2019) | 251 | MIX | 149 M; 102 F | 20.34 ± 2.0 | Collegiate | Quantitative: Survey | Intercollegiate student-athletes had significantly higher CI and PE scores in sport than general and school ($d$, range: 0.11 to 0.82). Grit-school accounted for significant amounts ($R^2$ range: .26 to .29) of incremental variance in respondents' GPA beyond that explained by grit-general.

Cote (2019) | 60 | M | 19.77 ± 1.5 | Collegiate | Mixed: Survey, interview, experimental task | Mindfulness Meditation Training for Sport had no significant impact on athlete grit levels.

Cousins et al. (2020) | 153 | MIX | 23 M; 130 F | 40.50 ± 9.0 | Amateur | Quantitative: Survey | Grit was not associated with successful completion of an ultramarathon or race distance. CI was positively correlated with number of years running ($r = .17, p = .039$) and weekly miles run ($r = .217, p = .007$).

Crane et al. (2020) | 453 | N/A | 19.79 | Collegiate | Quantitative: Survey | Grit scores were inversely related to generalized anxiety ($R^2 = .026, p = .002$) and sport concussions ($R^2$ range: .016 to .038, $p < .05$)

Criticos et al. (2020) | 9 | MIX | 5 M; 4 F | N/A | Collegiate | Mixed: Survey, focus groups, longitudinal | Athletes’ grit scores fluctuated over the 6-week study. A higher grit score did not necessarily mean better performance.

Crust et al. (2016) | 14 | MIX | 10 M; 4 F | 44.4 ± 12.0 | Amateur | Qualitative: Interview | Grittier mountaineers may be those that persevere in highly dangerous situations.

(continued)
<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author</strong></td>
<td><strong>n</strong></td>
<td><strong>Sex</strong></td>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>Dean (2020)</td>
<td>6</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>DeCouto et al. (2019)</td>
<td>174</td>
<td>MIX 82 M; 91 F</td>
<td>15.9 ± 1.3</td>
</tr>
<tr>
<td>DiBernardo (2018)</td>
<td>10</td>
<td>F</td>
<td>19.3 ± 1.06</td>
</tr>
<tr>
<td>Dickson (2020)</td>
<td>200</td>
<td>MIX 152 M; 45 F; 3 N/A</td>
<td>19.68 ± 3.05</td>
</tr>
<tr>
<td>Donald et al. (2019)</td>
<td>378</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Doorley (2020)</td>
<td>67</td>
<td>MIX 7 M; 60 F</td>
<td>19.85 ± 1.25</td>
</tr>
<tr>
<td>Dowell et al. (2021)</td>
<td>74</td>
<td>M</td>
<td>13.23 ± 0.96</td>
</tr>
<tr>
<td>Dunn (2019)</td>
<td>6</td>
<td>M</td>
<td>N/A</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dunn et al. (2021)</td>
<td>251 MIX 149 M; 102 F 20.34 ± 2.0 Collegiate Quantitative: Survey</td>
<td>Structural equation modeling revealed that perfectionistic strivings were positively associated with CI ($\beta = .29, p &lt; .001$) and PE ($\beta = .92, p &lt; .001$). In contrast, perfectionistic concerns were negatively associated with CI ($\beta = -.47, p &lt; .001$) and PE ($\beta = -.66, p &lt; .001$).</td>
<td></td>
</tr>
<tr>
<td>Elliot (2018)</td>
<td>175 M N/A Collegiate Quantitative: Survey</td>
<td>3.1% of the variance in basketball free throw percentage was significantly explained by grit score. Neither skill level, nor the interaction between grit and NCAA skill level, were significantly related to an individual’s free throw performance.</td>
<td></td>
</tr>
<tr>
<td>Elumaro (2016)</td>
<td>142 MIX 84 M; 58 F 24.79 ± 10.0 Collegiate Quantitative: Survey</td>
<td>Higher levels of CI and PE predicted higher levels of athlete skill level. There were no significant differences between athletes using the Big Five Inventory constructs as predictors.</td>
<td></td>
</tr>
<tr>
<td>Fawver et al. (2020)</td>
<td>169 MIX 81 M; 88 F 15.82 ± 1.80 Youth Quantitative: Survey</td>
<td>Greater amounts of time spent in individual practice was associated with higher grit levels. No significant effects were documented between grit and technical performance and speed performance.</td>
<td></td>
</tr>
<tr>
<td>Fong et al. (2016)</td>
<td>126 MIX 31 M; 95 F 38.0 ± 11.0 Amateur Quantitative: Survey</td>
<td>Grit mediated the relationship between future time perspective ($r = .41, p &lt; .05$) and goal disengagement ($r = -.27, p &lt; .05$). Runners with higher grit may delay their disengagement in unattainable goal pursuits, which may reflect maladaptive self-regulation.</td>
<td></td>
</tr>
<tr>
<td>Ford et al. (2017)</td>
<td>345 MIX 166 M; 179 F N/A Collegiate Quantitative: Survey</td>
<td>Athletes with higher levels of grit reported significantly less life stressors. Regression analyses revealed that the effect of both negative and positive life stressors explained 24.4% of the variance in grit. The lower the perceived effect of a life stressor, the higher the level of total grit.</td>
<td></td>
</tr>
<tr>
<td>From et al. (2020)</td>
<td>128 MIX 58 M 70 F 24.27 ± 4.97 High performance Quantitative: Survey</td>
<td>Elite athletes scored higher on grit compared to non-athletes ($d = 0.30$), with CI ($d = 0.46$) particularly distinguishing the two groups. There was a strong positive relationship between grit and conscientiousness ($r = .69, p &lt; .001$), driven by PE ($r = .65, p &lt; .001$).</td>
<td></td>
</tr>
<tr>
<td>Gilchrist et al. Study 1 (2018)</td>
<td>109 MIX 41 M; 68 F 19.55 ± 1.05 Collegiate Quantitative: Survey</td>
<td>Experiences of pride (i.e. the emotional response to success or mastery) were positively associated with grit ($r = .26, p = .003$). No sex differences were observed in grit.</td>
<td></td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gilchrist et al.</strong></td>
<td><strong>Study 2 (2018)</strong></td>
<td>Quantitative: Survey</td>
<td>Both global authentic pride (β = .33, p &lt; .001) and global hubristic pride (β = -.26, p = .003) were significant predictors of grit. Fitness-related authentic pride was also a significant predictor of grit (β = .42, p = .003). No sex differences were observed in grit.</td>
</tr>
<tr>
<td>Goodman et al.</td>
<td>(2014)</td>
<td>Quantitative: Survey, interview, 5-week intervention</td>
<td>No differences in grit levels were evident between groups after receiving the 5-week Mindfulness-Acceptance-Commitment and Hatha yoga intervention.</td>
</tr>
<tr>
<td>Hayden (2018)</td>
<td>39 MIX 19 M; 20 F</td>
<td>Quantitative: Survey</td>
<td>Higher resilience and grit result in lower levels of detachment style coping (β = -.08, p &lt; .05). No relationship was found between grit and continued sport participation. Grit was inversely related to tension reduction (r = -.53, p = .036) and keeping to oneself (r = -.55, p = .03).</td>
</tr>
<tr>
<td>Hom (2018)</td>
<td>187 MIX 63 M; 124 F</td>
<td>Quantitative: Survey</td>
<td>Grit did not differentiate between athletes and non-athletes, but did predict engagement in high intensity physical activity (r = .24, p &lt; .02)</td>
</tr>
<tr>
<td>Johnson (2020)</td>
<td>81 MIX 30 M; 51 F</td>
<td>Mixed: Survey, interview</td>
<td>Mental toughness was related to whole Grit-Sport (r = .47, p &lt; .05) and sport-specific CI (r = .36, p &lt; .01) and PE (r = .42, p &lt; .01). Only PE was related to self-compassion-sport subscales (r range: .22 to .26, ps &lt; .01). Self-compassion and grit can complement one another to create adaptive athlete outcomes.</td>
</tr>
<tr>
<td>Joseph (2009)</td>
<td>57 MIX 20 M; 37 F</td>
<td>Quantitative: Survey</td>
<td>No significant difference in grit between collegiate/non-collegiate athletes, nor between sex. Neither mental toughness nor grit emerged as significant predictors of performance. Mental toughness significantly explained 18% of total variation in grit scores.</td>
</tr>
<tr>
<td>Kitano et al. (2018)</td>
<td>839 M N/A Youth</td>
<td>Quantitative: Survey</td>
<td>Grit was significantly higher in students participating in professional sport than those participating in recreational sport/no sport at all. Grit scores in athletes were significantly explained by self-rated academic performance (β = .27, p &lt; .05), positive experiences in junior high school (β = .22, p &lt; .05), support from significant others (β = .16, p &lt; .05), insomnia (β = -.11, p &lt; .05), and vigorous-intensity physical activity (β = .09, p &lt; .05).</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author</strong></td>
<td><strong>n</strong></td>
<td><strong>Sex</strong></td>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>Larkin et al. (2015)</td>
<td>385</td>
<td>M</td>
<td>13.85 ± 1.04</td>
</tr>
<tr>
<td>Legg (2020)</td>
<td>61</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Legg et al. (2017)</td>
<td>527</td>
<td>MIX</td>
<td>N/A</td>
</tr>
<tr>
<td>Lindemann-Litzsinger (2017)</td>
<td>33</td>
<td>MIX</td>
<td>N/A</td>
</tr>
<tr>
<td>Madrigal et al. (2016)</td>
<td>524</td>
<td>MIX</td>
<td>19.5 ± 1.16</td>
</tr>
<tr>
<td>Markgraf et al. (2015)</td>
<td>499</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Martin J. J. et al. (2015)</td>
<td>75</td>
<td>MIX</td>
<td>37.0 ± 11.01</td>
</tr>
<tr>
<td>Mayol, Dobersek, et al. (2019)</td>
<td>332</td>
<td>MIX</td>
<td>19.52 ± 1.36</td>
</tr>
<tr>
<td>Mayol, Ransford, et al. (2019)</td>
<td>391</td>
<td>MIX</td>
<td>19.52 ± 1.36</td>
</tr>
<tr>
<td>Citation Information</td>
<td>Participant Information</td>
<td>Methodology</td>
<td>Key Overall Findings/Themes</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td><strong>Meyer et al.</strong> (2017)</td>
<td>305 F 21.5 ± 4.1 Mixed</td>
<td>Quantitative: Survey</td>
<td>Confirmatory factor analysis revealed superior model fit of the Grit-S over Grit-O in high performance, NCAA Div I, II, and III athletes. Grit significantly differed between NCAA Division I and II athletes (partial $\eta^2 = .035$), but did not differ between the remaining groups.</td>
</tr>
<tr>
<td><strong>Moles et al.</strong> (2017)</td>
<td>71 M 15.81 ± 0.82 Youth</td>
<td>Quantitative: Survey, experimental task</td>
<td>Scores of low-grit athletes in an ego-involving feedback condition were 33% lower than counterparts participating in a mastery-involving feedback condition ($d = 0.66$). High-grit athletes scored 20% higher than those low in grit in the ego-involving feedback condition ($d = 0.59$).</td>
</tr>
<tr>
<td><strong>Morgan</strong> (2016)</td>
<td>148 MIX 67 M; 81 F 20.8 ± 1.43 Collegiate</td>
<td>Mixed: Survey, informant-reported questionnaires, interview</td>
<td>Regardless of athlete talent level, grit activates and transforms it into long-term success. Elements that identify a gritty athlete are not apparent and cultivating/coaching grit is difficult. Grit scales should be modified to be sport-specific. Coaches consistently rated their athletes’ grit levels lower than the athlete self-reported grit.</td>
</tr>
<tr>
<td><strong>Mosewich et al.</strong> (2021)</td>
<td>169 MIX 119 M; 50 F 20.33 ± 2.03 Collegiate</td>
<td>Quantitative: Survey</td>
<td>Self-compassion had consistent positive relationships with PE across sport, school, and global contexts ($r$ range=.33 to .39, $p&lt;.001$), but was unrelated to CI. Student athletes indicated higher Grit-Sport CI/PE than Grit-School CI (partial $\eta^2$ range:.039 to .188) and PE (partial $\eta^2$ range:.196 to .364). Grit-Sport PE was significantly correlated with athletic identity ($r = .26, p &gt; .01$), while Grit-Sport CI was not. Larger differences in academic grit over sport grit, and in academic identity over athletic identity were associated with higher GPA. Larger differences in sport grit over academic grit, and in athletic identity over academic identity were associated with lower GPA.</td>
</tr>
<tr>
<td><strong>Nai et al.</strong> (2016)</td>
<td>495 N/A N/A Collegiate</td>
<td>Quantitative: Survey</td>
<td>Big Five personality traits significantly explained 34.9% of the variance in grit, with conscientiousness being the largest contributor.</td>
</tr>
<tr>
<td><strong>Newby</strong> (2018)</td>
<td>107 MIX 23 M; 69 F; 15 N/A N/A Youth</td>
<td>Qualitative: Interview</td>
<td>Low levels of grit may increase the dropout rates of male adolescent figure skaters, while high levels of grit may contribute to athlete retention.</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Newland et al.</strong> (2020)</td>
<td>304</td>
<td>MIX 175 M; 129 F</td>
<td>68.5 ± 8.18</td>
</tr>
<tr>
<td><strong>Nogueira et al.</strong> (2019)</td>
<td>241</td>
<td>MIX 148 M; 93 F</td>
<td>31.80 ± 9.87</td>
</tr>
<tr>
<td><strong>Nordvall et al.</strong> (2019)</td>
<td>151</td>
<td>MIX 64 M; 87 F</td>
<td>19.2 ± 2.1</td>
</tr>
<tr>
<td><strong>Olefir</strong> (2018)</td>
<td>98</td>
<td>M</td>
<td>18.28 ± 1.33</td>
</tr>
<tr>
<td><strong>Orris et al.</strong> (2019)</td>
<td>88</td>
<td>M</td>
<td>19.40 ± 1.29</td>
</tr>
<tr>
<td><strong>Peterson</strong> (2017)</td>
<td>186</td>
<td>MIX 112 M; 74 F</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Pettersen et al.</strong> (2020)</td>
<td>71</td>
<td>MIX 38 M; 33 F</td>
<td>23.79 ± 4.43</td>
</tr>
<tr>
<td><strong>Poczwardowski et al.</strong> (2014)</td>
<td>6</td>
<td>MIX 4 M; 2 F</td>
<td>N/A</td>
</tr>
<tr>
<td>Citation Information</td>
<td>Participant Information</td>
<td>Methodology</td>
<td>Key Overall Findings/Themes</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Prusak et al. (2018)</td>
<td>327 MIX 198 M; 129 F N/A Masters</td>
<td>Quantitative: Survey</td>
<td>Correlational results generally supported the CI/PE subscales and provided ample construct validity. Lower levels of motivation were negatively related to grit while higher levels were positively related.</td>
</tr>
<tr>
<td>Rhodes Study 1 (2020)</td>
<td>9 MIX 7 M; 2 F 35.14 ± 10.11 High performance</td>
<td>Qualitative: Narrative coding of biographies</td>
<td>Grounded theory was used to develop a model of grit in elite athletes. Athlete/coach autobiographies were coded into produce five overarching categories of grit: social influencers, mastery, cultural identity, personality, and performance routines.</td>
</tr>
<tr>
<td>Rhodes Study 2 (2020)</td>
<td>8 MIX 4 M; 4 F 22.0 ± 3.8 High performance</td>
<td>Qualitative: Interview</td>
<td>Olympic swimmers were interviewed about the factors that led to their increased grit: interests developed from key social influencers, athletic mastery, cognitive skills, and a concept of self which supported sacrifices and ruthless goal pursuit.</td>
</tr>
<tr>
<td>Rhodes Study 4 (2020)</td>
<td>181 MIX 144 M; 37 F 21.42 ± 5.53 High performance</td>
<td>Quantitative: Survey</td>
<td>A novel 10-item unifactorial sport-grit scale was created, which demonstrated adequate fit, test-retest reliability, and internal consistency.</td>
</tr>
<tr>
<td>Rhodes Study 5 (2020)</td>
<td>167 MIX 130 M; 37 F 21.61 ± 5.49 High performance</td>
<td>Quantitative: Survey, 6-week intervention</td>
<td>Athlete novel sport-grit scores improved significantly after a 6-week Functional Image Training (FIT) intervention when compared to those in a control condition ($d = 0.96$).</td>
</tr>
<tr>
<td>Rhodes Study 6 (2020)</td>
<td>30 M 24.3 ± 4.2 High performance</td>
<td>Quantitative: Survey, 6-week intervention</td>
<td>Athletes who participated in a FIT intervention demonstrated greater and sustained increases in sport-grit at 15 weeks ($d = 1.85$) compared to those who participated in a task specific imagery intervention or control condition.</td>
</tr>
<tr>
<td>Rhodes et al. (2018)</td>
<td>24 M 25.8 ± N/A High performance</td>
<td>Quantitative: Survey, 6-week intervention</td>
<td>Grit scores were improved after a 6-week FIT intervention, and continued to be sustained significantly afterwards when compared to a control group (partial $\eta^2 = .204$). All players perceived that FIT had helped improve their performance.</td>
</tr>
<tr>
<td>Rumbold et al. (2018)</td>
<td>324 MIX 209 M; 115 F 19.64 ± 1.71 Collegiate</td>
<td>Quantitative: Survey</td>
<td>Mediation analysis revealed significant indirect effects of grit on emotional exhaustion through momentary engagement ($b = -.10$, $p &lt; .05$), and on positive affect ($b = .47$, $p &lt; .05$) through emotional exhaustion ($R^2 = .22$). Grit and emotional exhaustion were associated with momentary positive affect ($b = .14$, $p &lt; .05$).</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sakamoto et al.</strong> (2018)</td>
<td>383 M 9.7 ± 1.1 Youth</td>
<td>Quantitative: Survey, experimental task</td>
<td>No differences in grit were found between the approved and rejected athlete groups. No significant correlation was found between grit and tests of executive function (i.e. Stroop Test and Design Fluency Test).</td>
</tr>
<tr>
<td><strong>Scharneck</strong> (2017)</td>
<td>219 MIX 78 M; 141 F N/A Collegiate</td>
<td>Quantitative: Survey</td>
<td>The relationship between grit and mental toughness were significant but weak ($r = .25, p &lt; .05$). Autonomous motivation ($r = .22, p &lt; .05$) and autonomy-supportive coaching ($r = .16, p &lt; .05$) were positive predictors of grit, while controlled motivation ($r = -.28, p &lt; .05$) and controlling coaching ($r = -.30, p &lt; .05$) were negative predictors.</td>
</tr>
<tr>
<td><strong>Shaban</strong> (2020)</td>
<td>155 MIX 97 M; 58 F N/A Collegiate</td>
<td>Quantitative: Survey</td>
<td>The factor structure of a novel Arabic Grit-S demonstrated superior fit indices for Egyptian athletes than that of the Arabic Grit-O.</td>
</tr>
<tr>
<td><strong>Shaver</strong> (2017)</td>
<td>33 N/A N/A Collegiate</td>
<td>Quantitative: Survey</td>
<td>Collegiate baseball players were found to have higher than average grit scores. Athletes with grit scores higher than 2.5 demonstrated increased ball exit velocity.</td>
</tr>
<tr>
<td><strong>Shewmake</strong> (2016)</td>
<td>392 MIX 236 M; 156 F 21.6 ± 2.59 Youth</td>
<td>Quantitative: Survey</td>
<td>College level athletes had higher grit levels than those athletes who played at the high school level (partial $\eta^2 = .014$).</td>
</tr>
<tr>
<td><strong>Shields et al. Study 1</strong> (2018)</td>
<td>799 MIX 376 M; 423 F 19.1 ± 1.30 Collegiate</td>
<td>Quantitative: Survey</td>
<td>Endorsement of a partnership orientation to sport predicted higher levels of grit ($\beta = .31, p &lt; .001$), while endorsement of the war orientation did not significantly predict grit.</td>
</tr>
<tr>
<td><strong>Shields et al. Study 2</strong> (2018)</td>
<td>1179 MIX 632 M; 547 F 19.2 ± 1.38 Collegiate</td>
<td>Quantitative: Survey</td>
<td>Partnership orientation to sport was a significant positive predictor of PE ($\beta = .13, p &lt; .001$), and CI ($\beta = .30, p &lt; .001$). A war orientation to sport negatively predicted PE ($\beta = -.11, p &lt; .001$).</td>
</tr>
<tr>
<td><strong>Shrivastava &amp; Mishra</strong> (2016)</td>
<td>80 N/A N/A Mixed</td>
<td>Quantitative: Survey</td>
<td>Sportsperson and non-sportsperson grit were not found to be significantly different from each other. Grit was positively correlated with both resilience ($r = .53, p &lt; .05$) and agency ($r = .37, p &lt; .05$).</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sigmundsson et al. (2020)</td>
<td>63 M N/A Mixed</td>
<td>Quantitative: Survey</td>
<td>An elite football team scored significantly higher on the grit scale than a U15 team (d = 0.44). Grit was positively correlated with growth mindset (r = .27, p &lt; .05).</td>
</tr>
<tr>
<td>Symonds et al. (2018)</td>
<td>325 N/A N/A Collegiate</td>
<td>Quantitative: Survey</td>
<td>A statistically significant negative correlation between grit and sport-specific anxiety was found (r = -.20, p &lt; .05). No differences were found between males/females. Grit increased based on year in college with the exception of seniors.</td>
</tr>
<tr>
<td>Tedesqui et al. (2018)</td>
<td>164 MIX 145 M; 125 F</td>
<td>21.27 ± 6.91 Mixed</td>
<td>Quantitative: Survey</td>
</tr>
<tr>
<td>Tedesqui &amp; Young (2017)</td>
<td>250 MIX 9 M; 2 F</td>
<td>N/A Mixed</td>
<td>Quantitative: Survey</td>
</tr>
<tr>
<td>Tedesqui &amp; Young (2018)</td>
<td>270 MIX 132 M; 118 F</td>
<td>23.40 ± 10.14 Mixed</td>
<td>Quantitative: Survey</td>
</tr>
<tr>
<td>Tedesqui &amp; Young (2020a)</td>
<td>11 MIX 9 M; 2 F</td>
<td>46.0 ± 11.3 High performance</td>
<td>Qualitative: Interview</td>
</tr>
<tr>
<td>Tedesqui &amp; Young (2020b)</td>
<td>13 MIX 10 M; 3 F</td>
<td>17.40 ± 2.99 Mixed</td>
<td>Quantitative: Survey, informant survey, longitudinal</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Citation Information</th>
<th>Participant Information</th>
<th>Methodology</th>
<th>Key Overall Findings/Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thapar &amp; Nancy (2018)</strong></td>
<td>50</td>
<td>M</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Toering &amp; Jordet (2015)</strong></td>
<td>134</td>
<td>M</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Ueno et al. (2018)</strong></td>
<td>496</td>
<td>MIX</td>
<td>428 M; 68 F</td>
</tr>
</tbody>
</table>

*Note. Statistical results are reported using the same number of decimal places used in the original source. N/A = not applicable; MIX = mixed sex study; M = only males included in study; F = only females included in study; CI = consistency of interests; PE = perseverance of effort; OR = odds ratio; \(d\) = Cohen’s measure of sample effect size; Grit-S = short grit scale; Grit-O = original grit scale; DP = deliberate practice.*
Table 2.2

*Summary of Study Sample Demographics Included in Scoping Review*

<table>
<thead>
<tr>
<th>Demographic Information</th>
<th>n</th>
<th>% of studies sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Country of Study Origin</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Australia</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Canada</td>
<td>12</td>
<td>13.3</td>
</tr>
<tr>
<td>Denmark</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Egypt</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>India</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Japan</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Norway</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Sweden</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>UK</td>
<td>7</td>
<td>7.8</td>
</tr>
<tr>
<td>Ukraine</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>USA</td>
<td>53</td>
<td>58.9</td>
</tr>
<tr>
<td><strong>Athlete Skill Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amateur</td>
<td>741</td>
<td>4.0</td>
</tr>
<tr>
<td>Collegiate</td>
<td>10606</td>
<td>57.7</td>
</tr>
<tr>
<td>High Performance</td>
<td>1058</td>
<td>5.8</td>
</tr>
<tr>
<td>Masters</td>
<td>631</td>
<td>3.4</td>
</tr>
<tr>
<td>Youth</td>
<td>3334</td>
<td>18.1</td>
</tr>
<tr>
<td>Not Specified/Mixed</td>
<td>2021</td>
<td>11.0</td>
</tr>
<tr>
<td><strong>Athlete Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6251</td>
<td>34.0</td>
</tr>
<tr>
<td>Male</td>
<td>9707</td>
<td>52.8</td>
</tr>
<tr>
<td>Not Disclosed</td>
<td>2433</td>
<td>13.2</td>
</tr>
</tbody>
</table>

*n = 90, total number of studies included in the scoping review. **n = 18391, total number of athletes who participated in the studies included in the scoping review.*
**Table 2.3**

*Summary of Study Design Characteristics Included in Scoping Review*

<table>
<thead>
<tr>
<th>Study Characteristics</th>
<th>n</th>
<th>% of studies sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Document Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Article</td>
<td>44</td>
<td>48.9</td>
</tr>
<tr>
<td>Conference</td>
<td>19</td>
<td>21.1</td>
</tr>
<tr>
<td>Dissertation</td>
<td>27</td>
<td>30.0</td>
</tr>
<tr>
<td><strong>Methodology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualitative</td>
<td>9</td>
<td>10.0</td>
</tr>
<tr>
<td>Quantitative</td>
<td>74</td>
<td>82.2</td>
</tr>
<tr>
<td>Mixed Methods</td>
<td>7</td>
<td>7.8</td>
</tr>
<tr>
<td><strong>Grit Instrument</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grit-O</td>
<td>23</td>
<td>28.4</td>
</tr>
<tr>
<td>Grit-S</td>
<td>47</td>
<td>58.0</td>
</tr>
<tr>
<td>Grit-R</td>
<td>5</td>
<td>6.2</td>
</tr>
<tr>
<td>Not Specified/Other</td>
<td>6</td>
<td>7.4</td>
</tr>
<tr>
<td><strong>Grit Scoring Method</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subscales</td>
<td>28</td>
<td>34.6</td>
</tr>
<tr>
<td>Whole</td>
<td>53</td>
<td>65.4</td>
</tr>
</tbody>
</table>

*Studies using qualitative methods (n = 9) were not included as no scale was used.*
Table 2.4

Selected Grey Literature Databases

<table>
<thead>
<tr>
<th>Selected Databases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Scholar</td>
</tr>
<tr>
<td>MEDLINE</td>
</tr>
<tr>
<td>PsycINFO</td>
</tr>
<tr>
<td>PubMed</td>
</tr>
<tr>
<td>Scopus</td>
</tr>
<tr>
<td>SPORTDiscus</td>
</tr>
<tr>
<td>Web of Science</td>
</tr>
</tbody>
</table>

Selected Peer-Reviewed Journals

<table>
<thead>
<tr>
<th>European Journal of Physical Education and Sport Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Journal of Sport Science</td>
</tr>
<tr>
<td>International Journal of Sport and Exercise Psychology</td>
</tr>
<tr>
<td>Journal of Applied Sport Psychology</td>
</tr>
<tr>
<td>Journal of Clinical Sport Psychology</td>
</tr>
<tr>
<td>Journal of Sport &amp; Exercise Psychology</td>
</tr>
<tr>
<td>Journal of Sports Sciences</td>
</tr>
<tr>
<td>Medicine and Science in Sports and Exercise</td>
</tr>
<tr>
<td>Psychology of Sport and Exercise</td>
</tr>
<tr>
<td>Research Quarterly for Exercise and Sport</td>
</tr>
<tr>
<td>The Sport Psychologist</td>
</tr>
</tbody>
</table>

Selected Grey Literature Databases

<table>
<thead>
<tr>
<th>Dissertations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis Canada</td>
</tr>
<tr>
<td>Aurora</td>
</tr>
<tr>
<td>EThOS (UK)</td>
</tr>
<tr>
<td>DART Europe</td>
</tr>
<tr>
<td>Trove (Australia)</td>
</tr>
<tr>
<td>EBSCO Open Dissertations (USA)</td>
</tr>
<tr>
<td>Open Access Thesis and Dissertations</td>
</tr>
<tr>
<td>ProQuest Dissertations and Thesis Global</td>
</tr>
<tr>
<td>PQTD Open</td>
</tr>
<tr>
<td>Conference Proceedings</td>
</tr>
<tr>
<td>First Search (Proceedings)</td>
</tr>
<tr>
<td>First Search (Conference Papers)</td>
</tr>
</tbody>
</table>
Table 2.5

*Search Term Strategy Specific to the PubMed Database*

<table>
<thead>
<tr>
<th>Search Hedge 1</th>
<th>Search Hedge 2</th>
<th>Search Hedge 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>grit or gritty or ‘perseverance of effort*’ or ‘consistency of interest*’</td>
<td>athlet* OR team OR sport OR performance</td>
<td>‘adapted sport’ OR ‘alpine ski*’ OR ‘aquatic sport’ OR archery OR athletics OR badminton OR baseball OR basketball OR biathlon OR bicycling OR ‘body building’ OR bowling OR boxing OR ‘contact sport’ OR ‘cricket (sport)’ OR dance OR dancing OR ‘disability sport’ OR diving OR ‘endurance sport’ OR ‘extreme sport’ OR ‘field hockey’ OR fencing OR football OR golf OR gymnastic* OR hockey OR ‘horseback riding’ OR ‘ice hockey’ OR ‘individual sport’ OR jogging OR judo OR jumping OR karate OR kickboxing OR lacrosse OR martial arts OR motor sport OR mountaineering OR ‘para sport’ OR race* OR racing OR racquet sport OR ‘rock climbing’ OR roller skating OR rowing OR rugby OR run OR running OR skateboarding OR skating OR ski OR skiing OR soccer OR softball OR squash OR swim OR ‘team sport’ OR tennis OR track OR triathlon OR volleyball OR ‘weight lifting’ OR ‘wheelchair sport’ OR ‘winter sport’ OR wrestling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Search Hedge 4</th>
<th>Hedge 1 AND Hedge 2</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Search Hedge 5</th>
<th>Hedge 1 AND Hedge 3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Search Hedge 6</th>
<th>Hedge 3 AND Hedge 4</th>
</tr>
</thead>
</table>
**Table 2.6**

*Study Characteristics and Results Extraction Instrument*

<table>
<thead>
<tr>
<th>Review Title</th>
<th>Grit in sport: A scoping review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Question</td>
<td>What is known in the literature about the association between grit and sport in athletes?</td>
</tr>
</tbody>
</table>
| Inclusion Criteria (PCC) | *Population* – Athletes of any age, any sex, any ability, and any performance level.  
*Concept* – Any research that either qualitatively identifies grit as a theme in a sport context, or quantitatively measures grit in the context of sport using one of two existing grit scales (see Duckworth et al., 2007; Duckworth & Quinn, 2009).  
*Notes* – Quantitative research that reports grit as either a composite (i.e., total grit score) or separate (i.e., CI and PE subscales) score will be considered.  
*Context* – Participation in organized sport. |
| Exclusion Criteria       | *Documents published before 2007* – Any research proceeding Duckworth et al.’s (2007) original paper defining the construct of grit and detailing the original grit scale will not be considered for review.  
*Non-English resources* – The confines of this particular scoping review does not allow for the time nor the resources to conduct a search outside of the primary researcher’s parent language.  
*Research focused exclusively on contexts other than organized sport* – Non-organized sport activities such as unorganized sport, exercise, general fitness and rehabilitation do not fulfil the targeted context.  
*Data was sourced from position/opinion papers* – Primary sources will only be considered for inclusion. |
<table>
<thead>
<tr>
<th>Study Details and Characteristics</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Article title</td>
</tr>
<tr>
<td></td>
<td>Year of publication</td>
</tr>
<tr>
<td></td>
<td>Name of journal</td>
</tr>
<tr>
<td></td>
<td>Country of origin</td>
</tr>
<tr>
<td></td>
<td>Athlete type (i.e., performance level and sport)</td>
</tr>
<tr>
<td></td>
<td>Number of participants</td>
</tr>
<tr>
<td></td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>Sex</td>
</tr>
<tr>
<td></td>
<td>Source of result (e.g., case study, intervention, measurement validation, etc.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results Extraction</th>
<th>Aims/purpose of study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overview of methods</td>
</tr>
<tr>
<td></td>
<td>Instrument used to measure grit (i.e., Grit-O, Grit-S, any alterations made)</td>
</tr>
<tr>
<td></td>
<td>Reported grit score</td>
</tr>
<tr>
<td></td>
<td>Other assessed constructs (if applicable)</td>
</tr>
<tr>
<td></td>
<td>Construct definition</td>
</tr>
<tr>
<td></td>
<td>Instruments</td>
</tr>
<tr>
<td></td>
<td>Correlations to measured grit levels</td>
</tr>
<tr>
<td></td>
<td>Details of intervention (if applicable)</td>
</tr>
<tr>
<td></td>
<td>Intervention type, comparator, and details of these</td>
</tr>
<tr>
<td></td>
<td>Duration of the intervention</td>
</tr>
<tr>
<td></td>
<td>Reported changes in grit levels</td>
</tr>
<tr>
<td></td>
<td>Details of produced themes (if applicable)</td>
</tr>
<tr>
<td></td>
<td>Key overall findings</td>
</tr>
</tbody>
</table>
Figure 2.1

PRISMA Flow Diagram (Adapted from Tricco et al., 2018)

2044 records identified through database searching: original search (n = 1655) and updated search (n = 389)

32 records identified through additional sources (e.g. grey literature): original search (n = 24) and updated search (n = 8)

2076 records identified: (n = 1679) and updated search (n = 397)

367 records excluded as duplicates

1709 unique records screened for inclusion

1504 records excluded as not relevant

205 full-text articles assessed for eligibility

121 full-text articles excluded: unobtainable (n = 5) not relevant (n = 116)

84 documents included in review (describing 90 unique studies)
Figure 2.2

*Years of Publication of the Included Studies*

Note. The rate of publications per year has generally risen as time has passed, with most having been published in 2020. *This figure reflects the number of studies published until data collection was completed on April 12, 2021.*
CHAPTER III

Study 2 - A Quantitative Assessment of the Predictive Utility of Grit in Sport‡


‡ This chapter is presented exactly as it was submitted for publication (with the only exception being the formatting of the document, the renumbering of tables/figures, the sequential numbering of pages to match the remainder of the dissertation, updating of out-of-date citations, and the insertion of a bridging summary and appendices). While this manuscript is largely my own work, Drs. Leah Ferguson, Nancy Gyurcsik, Jennifer Briere, Amber Mosewich, and Kent Kowalski each provided feedback on the written document.
Bridging Study 1 and Study 2

Findings from Study 1 suggested that there was a growing body of literature exploring the associations between grit and various cognitive, affective, and behavioral variables within the context of sport. This scoping review identified relationships between grit and factors such as athlete sex, skill/competitive level, sport performance, motivation, mindfulness, self-compassion, and deliberate practice. It also collated constructs that have been criticized for sharing significant overlap with grit. My consultation with collegiate-level coaches provided valuable input and identified areas for future research, including improvement of the measurement of grit in sport contexts and designing interventions to enhance athlete grit levels. Given the findings highlighted in Study 1, it seemed warranted that further research should be conducted to address concerns about the conceptual overlap and discriminant validity of the grit in sport measurement when compared against other pre-existing psychological constructs. As such, the purpose of Study 2 was to examine the predictive utility of grit in relation to important athlete outcomes—including sport performance and well-being—beyond other determinants of success (i.e., conscientiousness, self-control, and mental toughness). Furthermore, I assessed whether a novel grit subscale (adaptability to situations) significantly predicted the same important sport outcomes as a means to investigate whether this novel subscale was a stronger predictor of sport performance and well-being over the heavily critiqued consistency of interests grit subscale.
Abstract

In competitive sport, an athlete’s ability to overcome setbacks and sustain their pursuit of long-term goals is essential for success. Grit (i.e., passion and perseverance over long-terms) has been linked to success in a variety of domains but is often critiqued for its limited predictive utility when compared to other psychological variables including self-control, conscientiousness, and mental toughness. The purpose of this study was to examine whether grit predicted important athlete outcomes (i.e., various measures of sport performance and athlete well-being) beyond other determinants of success. Data from 214 collegiate student-athletes (111 women, 103 men; $M_{age} = 21.02, SD = 2.26$) from Western Canadian universities were analysed. When predicting performance, the addition of the grit subscales (i.e., consistency of interests, perseverance of effort, adaptability to situations) explained an additional 11% of variance ($R^2 = .37, F[7, 203] = 7.16, p < .001$) beyond self-control, conscientiousness, and mental toughness in subjective sport performance perceptions; however, grit did not add unique variance when entered into models predicting athlete goal achievement perceptions or highest level of competition. When predicting well-being, addition of the grit subscales added 18% of unique variance ($R^2 = .43, F[7, 203] = 21.43, p < .001$) beyond other determinants of success in eudaimonic well-being, and 5% ($R^2 = .17, F[7, 203] = 6.95, p < .001$) in satisfaction with sport, but did not add any unique variance to the model predicting mood. The partial support of the predictive utility of grit illustrates the complexity of forecasting success in sport and offers evidence that grit should continue to be studied as a motivational disposition in the domain of sport.
**Introduction**

Although sport involvement has many well-documented benefits (e.g., improvements in strength and cardiovascular function, meaningful social support; Gayman et al., 2017; Oja et al., 2015), the sport environment can be rife with various stressors and setbacks (e.g., lack of financial support, risk of injury, poor performance; Hanton et al., 2005; Mosewich et al., 2014). In the world of competitive sport, an athlete’s ability to overcome these setbacks and sustain their pursuit of long-term goals is essential for success (Fletcher & Sarkar, 2012). Therefore, it is likely of great interest to various sport support bodies (e.g., coaches, athletic directors, sport organizations), including athletes themselves, that they are equipped with the dispositions that may enable their ability to persevere when setbacks do occur, including grit.

*Grit*—passion and perseverance over long terms—has been linked to success in a variety of domains (Duckworth et al., 2007; Duckworth & Quinn, 2009), including sport (for a review, see Cormier et al., 2021). Grit is typically characterized by two facets: *consistency of interests* (CI) and *perseverance of effort* (PE). CI has been defined as one’s ability to hold their attention to and direct their actions towards a single goal over long periods of time. PE is conceptualized as the ability to overcome challenges or difficulties while in pursuit of the same long-term goal (Duckworth et al., 2007). At a general level, gritty people have the capacity to pursue personally meaningful goals over weeks, months, and even years, despite failure or boredom (Duckworth et al., 2007). In contrast, less gritty individuals may be more likely to give up or change course (i.e., pursue a different goal or objective) when faced with similar setbacks (Duckworth & Gross, 2014). As such, grit is predominantly conceptualized as an adaptive disposition that is positively related to healthy constructs and outcomes; and inversely related to unhealthy constructs and
outcomes, particularly in circumstances where adversity is regularly encountered (Houston et al., 2021).

Recently, both the measurement of grit and its novel contribution to the personality literature has been questioned (see Credé, 2018). First, concerns have been raised about the dimensionality of the grit construct, specifically whether it should continue to be operationalized as a higher-order construct comprised of two lower-order facets as was originally proposed by Duckworth and colleagues (2007). Evidence exists that supports the separate study of the two grit subscales (Credé et al., 2017; Credé, 2018; Houston et al., 2021), and most findings show that the relationship between grit and other psychological variables—including achievement and well-being—can be largely attributed to PE (e.g., Cormier et al., 2021; Datu, 2021). The critique regarding the dimensionality of grit has been acknowledged by the original authors of the grit scale, who made a call for the development of restructured or reimagined grit measurements (Duckworth et al., 2021), and has resulted in the addition of a third subscale to the original measurement. *Adaptability to situations* (AS) refers to an individual's ability to adjust effectively to the changes in their environment that may affect long-term goal pursuit (e.g., modifying one’s ambitions to account for new opportunities or insoluble barriers; Datu et al., 2017). While this novel Triarchic Model of Grit was originally validated for use in collectivistic societies, evidence from cross-cultural research designs suggests that the AS subscale might also be a significant predictor of the well-being of members of individualistic societies (Datu et al., 2021).

Secondly, grit has been criticized for contributing limited discriminant validity over and above pre-existing psychological constructs (Credé et al., 2017). Researchers can fall into a *jangle fallacy* (Kelley, 1927) when they erroneously put forward a novel concept or measurement that captures an already existing construct. This fallacy is particularly pervasive in
the many subfields of psychology, providing researchers with a false sense of complexity when simpler principles could be used to capture existing phenomena and fundamentally hindering scientific communication (Gonzalez et al., 2020). The potential jangle fallacy of grit has been the subject of several reports (e.g., Ponnock et al., 2020), and these criticisms have extended into the domain of sport research (Meyer et al., 2017). Constructs that have been thought to pose conceptual overlap with grit include self-control, conscientiousness, and mental toughness, discussed next.

Conceptually, self-control reflects an individual’s capacity to change or interrupt their inner responses so that their behaviour is aligned with their goals despite more appealing alternatives, while grit represents the long-term effort spent over years or decades needed to reach a specific life goal (Duckworth & Gross, 2014). Evidence suggests that the measurement of self-control and its subscales are positively related to grit (e.g., Tedesqui & Young, 2018; Toering & Jordet, 2015). However, it is thought that the self-control needed to resist everyday temptations is not essential for gritty individuals to be successful in the pursuit of personally meaningful long-term goals (Duckworth & Gross, 2014; Gonzalez et al., 2020). Conscientious individuals are those who display an awareness of their own behaviour and the impact it may have on others around them (McCrae & Costa, 1990), and has been the construct most touted as being the ‘old wine’ in the ‘new bottle’ of grit (Credé et al., 2017; Schmidt et al., 2020).

However, the two constructs also differ in terms of their temporality in that grit emphasizes long-term stamina while conscientiousness emphasizes short-term intensity (Duckworth et al., 2007). As a result, both constructs have been shown to be related to different outcomes. Grit is more predictive of an individual’s overall number of career changes (Duckworth et al., 2007), while conscientiousness is closely associated with short-term tidiness and organization (McCrae &
Furthermore, grit remains predictive of outcomes of interest (e.g., retention, sport performance, skill group membership) once conscientiousness had been controlled (see Ionel et al., 2023; Tedesqui & Young, 2018). Lastly, mental toughness is conceptualized as a state-like property that enables athletes to bounce back after experiencing a setback (Gucciardi et al., 2015; Sheard et al., 2009). While mental toughness is a strong predictor of success in sport (Crust, 2007), evidence suggests that it varies within an individual over time whereas grit is considered a more stable trait (Duckworth et al., 2007). Though few peer-reviewed publications have empirically compared the two constructs, those that have found moderate-sized positive correlations (Denovan et al., 2022; Pettersen et al., 2023).

Based on what is currently known, more work must be done to determine whether grit should be cast aside as a redundant psychological construct already captured by pre-existing measures of known psychological constructs, or if it indeed contributes distinctive conceptual and empirical value to the sport literature. Therefore, the purpose of this study was twofold. Firstly, to examine whether grit offers predictive utility when compared to other psychological determinants of success. Secondly, to assess if a novel grit subscale would significantly predict important sport outcomes. With these purposes in mind, we hypothesized that (1) sport-specific PE and AS would explain a significant amount of variance beyond self-control, conscientiousness, and mental toughness when predicting various measures of sport performance in collegiate athletes, while sport-specific CI would not; and (2) sport-specific PE and AS would explain a significant amount of variance beyond self-control, conscientiousness, and mental toughness when predicting various measures of well-being in collegiate athletes, while sport-specific CI would not.
Methods

Participants

A total of 227 (109 men, 118 women) collegiate student-athletes (M\text{age} = 21.02 \text{ years}, SD = 2.26) from Western Canadian universities participated in this study. All males self-identified as men and all females self-identified as women. Most participants self-identified as White/Caucasian (80.6%), followed by mixed origin (9.3%), Indigenous (2.6%), and Black (2.2%). Participants were recruited from a variety of varsity sports, including basketball, football, ice hockey, soccer, track and field, volleyball, and wrestling.

Measures

Demographics. A demographic questionnaire was used to obtain information about respondents’ age, sex, gender, ethnicity, and sport experience.

Grit. A sport-specific version (Grit-Sport; Cormier et al., 2019) of the original Grit Scale (Duckworth et al., 2007) was used to assess participants’ sport-specific grit. The Grit-Sport scale has been modified to measure athletes’ sport-specific passion and perseverance (e.g., all items in the Grit-Sport are preceded by the phrase: “As an athlete in sport...”). The 12-item measure is comprised of two subscales: CI (six items; e.g., “As an athlete in sport, I often set a goal but later choose to pursue a different one”) and PE (six items; e.g., “As an athlete in sport, setbacks don’t discourage me”). A third subscale—AS—was also administered (four items; e.g., “As an athlete in sport, changing plans or strategies is important to achieve my long-term goals”; Datu et al., 2017). Participants responded to items on a 7-point scale (1 = strongly disagree, 7 = strongly agree), where higher scores on each subscale reflected higher levels of that factor. The six CI items were reverse scored. Acceptable validity and reliability evidence supporting the use of the
Grit-Sport has been reported by researchers (α = .79 – .82; Cormier et al., 2019; Johnson et al., 2023), as well as for the AS subscale (α = .88; Datu et al., 2017).

**Self-Control.** A sport-specific version of the Brief Self-Control Scale (BSCS; Tangney et al., 2004) evaluated self-control in sport. Thirteen items make up two facets of self-control: *restraint* (seven items; e.g., “People say that I have iron self-discipline as an athlete”) and *impulse control* (six items; e.g., “As an athlete in sport, I am good at resisting temptation”). Evidence for the internal consistency of the BSCS has been demonstrated (α = .83 – .85; Tangney et al., 2004). Participants were asked to rate each item on a 5-point scale (1 = not at all like me; 5 = very much like me) with some items reversed scored. A composite score of the BSCS was calculated, with higher scores indicating higher amounts of self-control.

**Conscientiousness.** The NEO Conscientiousness subscales from the International Personality Item Pool (IPIP; Goldberg et al., 2006) were used to measure individual conscientiousness. The instrument hosts 60 items and six total facets (10 items per facet): *self-efficacy* (α = .92; e.g., “I know how to get things done”), *orderliness* (α = .78; e.g., “I do things according to a plan”), *dutifulness* (α = .82; e.g., “I keep my promises”), *achievement striving* (α = .78; e.g., “I set high standards for myself and others”), *self-discipline* (α = .85; e.g., “I am always prepared”), and *cautiousness* (α = .76; e.g., “I avoid mistakes”). Previous research has found evidence of validity and reliability for the measure (α = .80; Goldberg et al., 2006). Higher composite scores indicate higher levels of domain-general conscientiousness. There is a mix of normal and inversely scored items on the IPIP NEO Conscientiousness subscale, and higher scores indicate higher amounts of the construct.

**Mental Toughness.** The 14-item Sports Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009) was used to evaluate mental toughness. The SMTQ has three subscales:
confidence (six items; $\alpha = .80$; e.g., “I have what it takes to perform well while under pressure”), constancy (four items; $\alpha = .74$; e.g., “I am committed to completing the tasks I have to do”), and control (four items; $\alpha = .71$; e.g., “I worry about performing poorly”). Participants were asked to rate each item on a 4-point scale (1 = not at all true; 4 = very true). The SMTQ hosts a combination of normal and inversely scored items and was calculated as a composite score with higher scores indicating higher amounts of mental toughness in sport.

**Performance.** Perceived performance was measured using three different indicators. Firstly, participant performance was gauged based on their response to: “In your primary sport, what is the highest level of competition you have ever competed at?”. Participants were asked to indicate whether they had ever competed at the local, provincial, regional, national, elite for age, or international levels. Secondly, the Sport Performance Perceptions Scale (SPPS; Adam et al., 2023) was used to assess subjective sport performance perceptions. The SPPS ($\alpha = .89 – .94$) has 32 items, hosting five individual facets: athlete development (six items; e.g., “I complete training that is event or position specific”), mastery and improvement (seven items; e.g., “When I am training I am focused on improving my sport specific skills”), preparedness and strategy (seven items; e.g., “I am confident making strategic decisions during competition”), recovery and injury prevention (eight items; e.g., “I take rest after a big competition to improve my recovery”), and psychological skills (four items; e.g., “I feel like I can manage my emotions in my training”). Composite scores were computed with higher scores indicating higher perceived performance. Lastly, subjective performance was assessed using the single-item Subjective Sport Performance (SSP) measure adapted from Doorley and colleagues (2022) to assess athlete goal achievement perceptions. Participants were asked to “indicate how well you performed in your primary sport...
over the past year relative to your own personal goals,” and rated their response on a 5-point scale (1 = I fell significantly short of my goals; 5 = I significantly surpassed my goals).

Well-Being. Two approaches to athlete well-being were considered—hedonic and eudaimonic well-being. To assess hedonic well-being (i.e., pleasure and happiness), both a sport-specific version of the Affect Balance Scale (ABS; Bradburn & Noll, 1969) and the Satisfaction with Sport Scale (SSS; Baudin et al., 2011) were administered. The ABS has 10 total items and two subscales: positive affect (five items; α = .61 – .67; e.g., “During the past few weeks, did you ever feel that things were going your way in your sport?”) and negative affect (five items; α = .57 – .65; e.g., “During the past few weeks, did you ever feel depressed or very unhappy because of your sport?”). Participants were instructed to consider their responses as they pertained to the domain of sport and were asked to rate items on a binary scale (1 = Yes; 0 = No). Higher scores indicated positive athlete mood, while lower scores were indicative of negative athlete mood.

The SSS was developed based off the original Satisfaction with Life Scale (Diener et al., 1985), and is comprised of five items (α = .76; e.g., “In most ways my sport life is close to my ideal”) rated on a 7-point scale (1 = strongly disagree; 7 = strongly agree). Higher scores indicate higher satisfaction with sport. Eudaimonic well-being (i.e., the actualization of human potential) was assessed using the 5-item Eudaimonic Well-Being in Sport Scale (EWBSS; α = .74; e.g., “My goals in sport have been a source of satisfaction”; Kouali et al., 2020). Participants were asked to rate each item on a 6-point scale (1 = strongly disagree; 6 = strongly agree), with a higher total score indicating higher eudaimonic well-being.

Procedures

Upon receipt of institutional research ethics board approval, head coaches of collegiate teams were contacted to obtain approval to deliver the questionnaires to their student-athletes.
(for communication with athletic directors, coaches, and the study recruitment poster, see Appendix E). Participation in this study was voluntary, and all student-athletes gave their informed consent (for participant consent form, see Appendix F) and were treated in accordance with the ethical guidelines for human research set forth by the American Psychological Association. Participants had the option to complete the questionnaire package either online or with pen and paper.

**Data Analysis**

SPSS Version 28.0 (IBM Corp., 2021) was used to calculate all statistics. Data were screened (Tabachnick & Fidell, 2019), and participants were excluded from the final participant pool if they had >2 missing points from any measure used in hypothesis testing. This resulted in the removal of 11 participants who accounted for a total of 179 missing data points. After replacing missing data using mean substitution (Tabachnick & Fidell, 2019), the entire data set was screened for the presence of outliers. Two additional participants were removed from final analysis due to unacceptable Mahalanobis and Cook’s distance values (Tabachnick & Fidell, 2019). Assumptions of linearity, multicollinearity, normality and homoscedasticity were met. The remaining 214 participants (103 men, 111 women) comprised the final sample and had a total of 58 missing data points across 38,979 items (0.15% of total data). Descriptive statistics were calculated, and six hierarchical multiple regression analyses were performed with measures of sport performance (i.e., highest level of competition, subjective performance perceptions in sport, athlete goal achievement perceptions single-item measure) and well-being (i.e., mood, satisfaction in sport, eudaimonic well-being in sport) entered as the dependent variables to test the study hypotheses. Gender was entered in the first step of each analysis; followed by self-
control, conscientiousness, and mental toughness in step two; and the Grit-Sport subscales (i.e., AS, CI, and PE) in step three.

**Results**

Descriptive statistics (i.e., means, standard deviations, and bivariate correlations) can be found in Table 3.1.

**Predicting Performance**

As shown in Table 3.2, when the three grit subscales were added into the third step of the model to predict subjective performance perceptions in sport, an additional 11% of variance in performance perceptions was explained: $R^2 = .37, F(7, 203) = 7.16, p < .001$. Both mental toughness ($\beta = .20, p < .01$) and AS ($\beta = .28, p < .001$) significantly contributed to the final regression model. The three grit subscales did not add any unique variance when added in step three to the model predicting highest level of competition: $R^2 = .20, F(7, 203) = 7.32, p < .001$. In the final step of the regression analysis, only athlete gender ($\beta = -.30, p < .001$) and mental toughness ($\beta = .30, p < .001$) emerged as significant predictors. Lastly, when predicting athlete goal achievement perceptions with a single-item measure, the three grit subscales did not add any unique variance when added into the model, $R^2 = .06, F(7, 203) = 1.93, p = .07$. In the final step of the regression analysis, no psychological variable emerged as a significant predictor. As only the AS subscale emerged as a significant predictor of just one of our three chosen measures of performance, hypothesis 1 was marginally supported.

**Predicting Well-Being**

As shown in Table 3.2, when the three grit subscales were added into the third step of the model to predict eudaimonic well-being in sport, an additional 18% of variance was explained: $R^2 = .43, F(7, 203) = 21.43, p < .001$. Mental toughness ($\beta = .31, p < .001$), AS ($\beta = .18, p < .05$),
and PE (β = .35, p < .001) each significantly contributed to the final regression model. When predicting satisfaction in sport, the addition of the three grit subscales added 5% of unique variance to the model in step three, $R^2 = .17$, $F(7, 203) = 6.95$, $p < .001$. In the final step of the regression analysis, both mental toughness (β = .29, p < .001) and PE (β = .24, p < .01) added significantly to the model. Lastly, the three grit subscales did not add any unique variance when added in step three to the model predicting affect balance in sport: $R^2 = .11$, $F(7, 203) = 3.57$, $p < .01$. In the final step of the regression analysis, only mental toughness (β = .28, p < .01) emerged as a significant predictor. As the PE and/or AS subscales acted as significant predictors of two of our three chosen measures of well-being, hypothesis 2 was partially supported.

**Discussion**

As a whole, our work adds to the developing area of sport-specific literature that seeks to examine grit in comparison to other psychological traits (e.g., Denovan et al., 2022; Ionel et al., 2023; Pettersen et al., 2023; Tedesqui & Young, 2018). In this study, we aimed to compare the unique variance contributed by the grit subscales to conceptually similar constructs—including self-control, conscientiousness, and mental toughness—when predicting various measures of athlete well-being and sport performance. We found evidence to suggest that the PE grit subscale added significant variance to hierarchical multiple regression models predicting two of our three chosen measures of well-being, but not to any of our measures of sport performance. We also found that CI did not significantly add to any regression model. We also examined whether AS—a new subscale of grit—significantly added to the regression models predicting these same outcome variables. AS was a positive predictor of one measure of well-being and one measure of sport performance. The partial support of our hypotheses illustrates the complexity of forecasting success in sport and contributes some answers (and many questions) to the conversation about
the predictive utility of grit in sport when compared to other psychological variables including self-control, conscientiousness, and mental toughness that we clarify and consider below.

**Perseverance of Effort**

As was found in our study, other researchers have found that the PE grit subscale tended to be positively associated with various measures of well-being (e.g., An et al., 2021; Datu, 2021; Hou et al., 2022). While PE was a predictor of both eudaimonic well-being in sport and satisfaction with sport (though with small effect sizes), it did not add to the final step of the regression model predicting athlete mood. This finding is consistent with others from the general psychology literature, where researchers have posited that persistent goal-directed behaviour over time can lead to finding satisfaction and fulfilment, but is minimally related to positive, short-term mood (Von Culin et al., 2014). While the cross-sectional nature of our research makes it impossible to draw any conclusions about the directionality or causality of these relationships, we can hypothesize that our findings might fit within existing psychological theories. For instance, our findings might support Locke and Latham’s (1990) *Goal Setting Theory*, in that PE and AS might maximize an athlete’s chances of attaining a personal goal which consequently increases their eudaimonic well-being, satisfaction in sport, and the likelihood of setting and working towards a new goal. On the other hand, our findings might also support the ‘happy-productive worker thesis,’ where increased levels of various indicators of well-being lead to greater persistence on a task (Zelenski et al., 2008). Future researchers should consider using appropriate methodologies to assess the directions of these effects (Marsh, 2007).

PE was shown to be positively related to two of our sport performance measures, which supports past research that found positive correlations between PE and domain-specific performance (e.g., school grades and entrepreneurial success; Cormier et al., 2019; Salisu et al.,
We were surprised that PE did not significantly add to any of our models of performance beyond self-control, conscientiousness, and mental toughness. This null result may be attributed to the nature of sport performance, as PE is unlikely to create much difference in domains where success is highly complex to accomplish and is often out of an individual’s control (Credé et al., 2017). It is also important to recognize the possibility that—at the collegiate level at least—PE enables athletes to persist in sport and reach higher levels of competition but ultimately does not have any direct effects on their performance (Pettersen et al., 2023).

Consistency of Interests

Several concerns have been raised about the null relationship of the CI grit subscale with other psychological variables, including achievement and well-being. Our work adds to extant research indicating that the CI subscale of grit offers minimal predictive power when shaping important outcomes (e.g., Cormier et al., 2021; Datu, 2021). These results are problematic if they are to be considered alongside Duckworth et al.’s (2007) original conceptualization of grit, as much of the conceptual distinctiveness of the construct from other determinants of success relies on it being a stable trait that comes about over long periods of time. It is possible that long-term dedication to excellence in sport does not significantly affect an athlete’s chances of performing well during critical moments in competition (e.g., championship games, final minutes of a match) that are important to their goals or overall progression in sport, but this goes against decades of sport research supporting goal setting (e.g., Healy et al., 2018; Kyllo & Landers, 1995). It is perhaps more likely that there are larger psychometric issues present in the CI subscale that are obfuscating the path forward, such as the extent to which it accurately measures an individual’s intent to pursue their long-term goals (see Datu et al., 2021).
Adaptability to Situations

The second purpose of our study was to assess the predictive utility of the new AS grit subscale that was developed and validated as a part of Datu and colleagues’ (2017) Triarchic Model of Grit. We found evidence to support the predictive utility of the AS subscale in regression models predicting subjective sport performance perceptions and eudaimonic well-being in sport. Recall that AS is conceptualized as an individual’s ability to adjust their goals due to unexpected changes (Datu et al., 2017). In the realm of sport, a variety of setbacks can occur that might block an athlete’s progress towards their long-term goals (e.g., injuries, coach decisions, and organizational-level choices; Hanton et al., 2005; Mosewich et al., 2014). Therefore, athlete adaptability might allow for a greater chance of success. Our finding that AS was a significant predictor (though with a small effect size) of subjective sport performance perceptions supports findings from other sport researchers who have found that athletes who can easily adjust their actions based on specific situational and contextual demands are more likely to be successful (e.g., Hollands et al., 2010; McCardle et al., 2017). Future researchers should consider further validating the AS subscale in other sport samples and explore the differences between AS and other similar constructs such as adaptability (Martin et al., 2012), buoyancy (Martin & Marsh, 2008), or psychological flexibility (Hayes et al., 2006).

The Predictive Utility of Other Determinants of Success

While the PE and AS grit subscales predicted unique variance beyond conscientiousness and self-control in some of our dependant variables of interest, they were not the most consistent predictors. Mental toughness emerged as a significant contributor (with small to medium effect sizes) and significantly added to the final step of five of our six regression models (except for the subjective sport performance single-item measure). While it was beyond the scope of this study
to assess why mental toughness dependably predicted our outcomes of interest over grit, we speculate that a likely reason is the temporal difference in the two constructs (Duckworth et al., 2007; Gucciardi et al., 2015; Sheard et al., 2009). That is, it seems sensible to consider that an athlete’s in-the-moment capacity to produce success despite setbacks or challenges might be a superior indicator of sport performance and well-being over their ability to hold their attention to their sport-related goals over long periods of time, at least for the collegiate athletes included in our sample. Another possible reason for the predictive strength of mental toughness might lie in the unique contribution of the items related to athlete confidence present within the SMTQ questionnaire (e.g., “I have an unshakable confidence in my ability;” Sheard et al., 2009). Self-belief (and its related psychological constructs, such as self-efficacy) is tied to enhanced athlete well-being and performance (Wurtele, 1986) and is not represented in the conceptualization or measurement of grit. This missing piece might (at least partially) explain why mental toughness was the overall strongest predictor of our outcomes of interest.

Although mental toughness did emerge as a strong predictor of our chosen dependent variables, self-control and conscientiousness were not significant contributors to any of our models in the final step of the regression analysis. While both concepts were positively correlated with grit, we can postulate why neither added any predictive value to our outcomes of interest. Firstly, it might be that the distinguishing feature of long-term goal pursuit in grit is what is primarily responsible for its predictive power (Jin & Kim, 2017), a factor that is not represented in the conceptualizations of both conscientiousness and self-control (Duckworth & Gross, 2014; Duckworth et al., 2007). Secondly, evidence implies that self-control is best understood and measured as a domain-specific construct (see Duckworth & Tsukayama, 2015). As the intention of this study was to keep our findings specific to the domain of sport, we
decided to alter the instructions and items of the BSCS to direct participants to consider their responses “As an athlete in sport.” However, since conscientiousness is commonly considered to be a personality trait across domains (Meyer et al., 2023) we opted not to modify the IPIP NEO Conscientiousness subscale items in any way, making it the only domain-general survey of our battery of questionnaires. Despite our good intentions, it is possible that these choices may have altered our participants’ interpretation of the items and therefore affected the reliability and validity of the two measures (Chan, 2009).

**Study Limitations**

Certain features of our study create limitations on interpreting our results. First, while we had hoped to extend the generalization of our findings by recruiting participants from various universities in Western Canada, we must also recognize that our sample was comprised of highly educated individuals residing in an industrialized country and largely self-identified as White/Caucasian (80.6%). Researchers should consider how intersectionality and diverse identities might influence individual differences and aim to capture a more representational snapshot of student-athletes in their work. Second, while we believe that one of the strengths of this study was our use of sport-specific measurements and our increased accuracy in assessing sport-specific psychological variables, it should be noted that some of our measures were not previously validated or contextualized for use as domain-specific measurements (i.e., Brief Self-Control Scale, Affect Balance Scale, Grit AS), which may have impacted our results. Finally, our significant and/or null results might have been due to our chosen outcome measures. Due to the complexities of sport, there has been no established gold standard for measuring athlete sport performance. Future researchers might consider testing the explanatory value of the grit subscales against other well-established measurements of athletic performance relevant to
specific sports (e.g., Elferink-Gemser et al., 2007; Kolman et al., 2019), evaluating success using longitudinal methodologies where researchers follow athletes over their playing career (Bailey, 2019), and continuing to use objective assessments of athletic performance rather than retrospective subjective measurements of participants’ sport performance.

**Future Directions**

First, we recommend that researchers consider the possibility that the CI subscale in its current form does not accurately measure an individual’s intent to pursue their long-term goals and should therefore work to improve its construct validity. As suggested by Datu (2021), items from the CI subscale might be tapping into one’s ability to focus on short-term interests and projects (e.g., “My interests change from year to year”), rather than personally meaningful endeavors. Second, while this study does provide some evidence to continue considering grit in sport as a useful indicator of adaptive outcomes, little is understood about how grit supports these positive outcomes. Accordingly, efforts must also be made to establish the precursors, mechanisms, and outcomes of grit—through appropriate methods of analysis such as grounded theory or path modelling (for further discussion, see Holt et al., 2022; Marsh, 2007; respectively)—as to better understand the construct in the domain of sport. Finally, it was not within the scope of our study to assess each of the theoretical and psychometric shortcomings of grit, and we encourage researchers to remain skeptical about the construct of grit, particularly its predictive power in domains outside of sport. Other aspects that will need to be addressed include the factor structure and criterion validity of the original and shortened grit questionnaires (Credé, 2018; Credé et al., 2017; Duckworth et al., 2021); the possibility of reference, availability, and social desirability biases present in self-report grit measures (Bazelais et al., 2016; Datu et al., 2017, Lira et al., 2022); and the erroneous belief that grit alone can be used to
overcome systematically embedded inequities such as poverty, racial discrimination, gender prejudice, or disability in sport (Tefera et al., 2019; Tewell, 2020).

**Conclusion**

Our work advances the study of grit in the domain of sport by providing some evidence for the predictive utility of its subscales over and above other similar determinants of success. While our results suggest that the grit subscales were not the best predictors of our chosen measures of sport performance and athlete well-being, AS and PE emerged as significant predictors in hierarchical multiple regression models predicting subjective sport performance perceptions, eudaimonic well-being in sport, and satisfaction in sport. Considering the various critiques of the predictive validity of grit in other domains, our findings suggest there might be certain nuances present in the competitive sport environment that make the grit subscales valuable when predicting athlete performance and well-being. We believe our findings establish enough evidence for researchers to not abandon their exploration of grit as a useful motivational disposition in the domain of sport, but to continue on in an informed manner.
References


137
bifactor approach. *Current Psychology*. Advance online publication.

https://doi.org/10.1007/s12144-022-03314-5


https://doi.org/10.1207/s15327752jpa4901_13


https://doi.org/10.1177/0963721414541462


https://doi.org/10.1080/00223890802634290


psychology, and theology (pp. 393-411). Oxford University Press.

https://doi.org/10.1093/acprof:oso/9780190204600.003.0019


https://doi.org/10.1093/acrefore/9780190236557.013.152


https://doi.org/10.1080/1750984x.2022.2028305


Meyer, J., Jansen, T., Hübner, N., & Lüdtke, O. (2023). Disentangling the association between the Big Five personality traits and student achievement: Meta-analytic evidence on the role


Table 3.1

**Descriptive Statistics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>M</th>
<th>Std</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Grit – Composite</td>
<td>1-7</td>
<td>5.23</td>
<td>.60</td>
<td>a = .73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Grit – AS</td>
<td>1-7</td>
<td>5.61</td>
<td>.74</td>
<td>.58***</td>
<td>a = .54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Grit – CI</td>
<td>1-7</td>
<td>4.54</td>
<td>1.03</td>
<td>.73***</td>
<td>.10</td>
<td>a = .74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Grit – PE</td>
<td>1-7</td>
<td>5.67</td>
<td>.72</td>
<td>.77***</td>
<td>.61***</td>
<td>.19***</td>
<td>a = .67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. SC</td>
<td>1-5</td>
<td>3.70</td>
<td>.60</td>
<td>.52***</td>
<td>.24***</td>
<td>.37***</td>
<td>.45***</td>
<td>a = .84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Consci</td>
<td>1-5</td>
<td>3.73</td>
<td>.45</td>
<td>.48***</td>
<td>.16*</td>
<td>.35***</td>
<td>.45***</td>
<td>.69***</td>
<td>a = .94</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. MT</td>
<td>1-4</td>
<td>2.88</td>
<td>.38</td>
<td>.49***</td>
<td>.43***</td>
<td>.24***</td>
<td>.46***</td>
<td>.52***</td>
<td>.42***</td>
<td>a = .76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. HLC</td>
<td>1-6</td>
<td>3.93</td>
<td>1.06</td>
<td>.13</td>
<td>.02</td>
<td>.13</td>
<td>.10</td>
<td>.08</td>
<td>.15*</td>
<td>.30***</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. SPPS</td>
<td>0-10</td>
<td>8.07</td>
<td>0.78</td>
<td>.48***</td>
<td>.48***</td>
<td>.17*</td>
<td>.49***</td>
<td>.45***</td>
<td>.38***</td>
<td>.49***</td>
<td>.13</td>
<td>a = .88</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. SSP</td>
<td>1-5</td>
<td>2.85</td>
<td>1.05</td>
<td>.13</td>
<td>.20**</td>
<td>.01</td>
<td>.14*</td>
<td>.12</td>
<td>.08</td>
<td>.20**</td>
<td>.04</td>
<td>.09</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. ABS</td>
<td>0-10</td>
<td>7.61</td>
<td>1.68</td>
<td>.18*</td>
<td>.15*</td>
<td>.10</td>
<td>.14*</td>
<td>.22**</td>
<td>.11</td>
<td>.32***</td>
<td>.03</td>
<td>.18**</td>
<td>.23***</td>
<td>a = .52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. SSS</td>
<td>5-35</td>
<td>25.21</td>
<td>5.09</td>
<td>.27***</td>
<td>.25***</td>
<td>.07</td>
<td>.32***</td>
<td>.18*</td>
<td>.17**</td>
<td>.31***</td>
<td>.05</td>
<td>.36***</td>
<td>.30***</td>
<td>.26***</td>
<td>a = .78</td>
<td></td>
</tr>
<tr>
<td>13. EWBSS</td>
<td>5-30</td>
<td>25.70</td>
<td>2.98</td>
<td>.52***</td>
<td>.49***</td>
<td>.17*</td>
<td>.57***</td>
<td>.32***</td>
<td>.29***</td>
<td>.50***</td>
<td>.10</td>
<td>.22**</td>
<td>.50***</td>
<td>.33***</td>
<td>.50***</td>
<td>a = .73</td>
</tr>
</tbody>
</table>

**Note.** Grit – AS: Adaptability to Situations; Grit – CI: Consistency of Interest; Grit – PE: Perseverance of Effort; SC: Brief Self-Control Scale; Consci: International Personality Item Pool NEO Conscientiousness subscale; MT: Sport Mental Toughness Questionnaire; HLC: Highest level of competition in sport; SSP: Subjective sport performance single-item measure; SPPS: Subjective Performance Perceptions in Sport scale; ABS: Affect Balance Scale in Sport; SSS: Satisfaction in Sport Scale; EWBSS: Eudaimonic Well-Being in Sport Scale.

* p = < .05, ** p = < .01, *** p = < .001
Table 3.2

Performance and Well-Being Hierarchical Multiple Regressions

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Performance Hierarchical Multiple Regressions</th>
<th>Well-Being Hierarchical Multiple Regressions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R^2$ $\Delta R^2$ $\Delta F$ $\beta$ $t$</td>
<td>$R^2$ $\Delta R^2$ $\Delta F$ $\beta$ $t$</td>
</tr>
<tr>
<td><strong>Highest Level of Competition in Sport</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.13</td>
<td>.01</td>
</tr>
<tr>
<td>SC</td>
<td>.18</td>
<td>.11</td>
</tr>
<tr>
<td>Consci</td>
<td>.13</td>
<td>.14</td>
</tr>
<tr>
<td>MT</td>
<td>.24</td>
<td>.29</td>
</tr>
<tr>
<td>Grit – AS</td>
<td>.29</td>
<td>.30</td>
</tr>
<tr>
<td>Grit – CI</td>
<td>.12</td>
<td>.11</td>
</tr>
<tr>
<td>Grit – PE</td>
<td>.12</td>
<td>.10</td>
</tr>
<tr>
<td><strong>Subjective Performance Perceptions in Sport</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.13</td>
<td>.01</td>
</tr>
<tr>
<td>SC</td>
<td>.29</td>
<td>.20</td>
</tr>
<tr>
<td>Consci</td>
<td>.10</td>
<td>.12</td>
</tr>
<tr>
<td>MT</td>
<td>.34</td>
<td>.29</td>
</tr>
<tr>
<td>Grit – AS</td>
<td>.30</td>
<td>.27</td>
</tr>
<tr>
<td>Grit – CI</td>
<td>.09</td>
<td>.10</td>
</tr>
<tr>
<td>Grit – PE</td>
<td>.12</td>
<td>.12</td>
</tr>
<tr>
<td><strong>Subjective Sport Performance single-item measure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>SC</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Consci</td>
<td>.01</td>
<td>.02</td>
</tr>
<tr>
<td>MT</td>
<td>.22</td>
<td>.22</td>
</tr>
<tr>
<td>Grit – AS</td>
<td>.07</td>
<td>.07</td>
</tr>
<tr>
<td>Grit – CI</td>
<td>.00</td>
<td>.01</td>
</tr>
<tr>
<td>Grit – PE</td>
<td>.00</td>
<td>.01</td>
</tr>
</tbody>
</table>

Note. Highest level of competition coded as 1 = local, 2 = provincial, 3 = regional, 4 = national, 5 = elite for age, 6 = international; Gender coded as 0 = man, 1 = woman; SC: Brief Self-Control Scale; Consci: International Personality Item Pool NEO Conscientiousness subscale; MT: Sport Mental Toughness Questionnaire; Grit – AS: Adaptability to Situations; Grit – CI: Consistency of Interest; Grit – PE: Perseverance of Effort.

* $p < .05$, ** $p < .01$, *** $p < .001$
CHAPTER IV

Study 3 – Towards a Grounded Theory of Grit in Sport
Bridging Study 2 and Study 3

The results from Study 2 were somewhat of a lynchpin for where I would take the third and final study of my dissertation. Adhering to my pragmatist worldview, I was fully prepared to reconsider a primary focus on grit in the third study if it did not offer any unique variance to any of my six regression models, as this meant that other psychological constructs might be better predictors of important athlete outcomes and should be the focus of study instead. However, this was not the case, as the grit subscales indeed predicted a significant amount of unique variance in some measures of well-being and sport performance. Deciding where to go next, I realized that I had already gained insight into varsity coaches’ perspectives of grit in sport in Study 1, but had limited knowledge about how athletes’ perceived and experienced grit as they went about their training and competitions. This gap was reflected in the sport literature, and results from the scoping review (Chapter II) revealed that only 17.8% of researchers had chosen to employ qualitative methodologies when exploring grit in sport (and only four of these 16 studies were peer-reviewed journal articles; the remainder being graduate dissertations or theses). It was also recognized that exploring athletes’ meanings and experiences of grit in the sport environment would provide insight into the larger sport-specific theoretical framework of grit. And so, I endeavoured to use qualitative methodologies to gain greater insight into social and psychological factors that underlie the processes underpinning grit in sport. I knew that this was going to be a challenging step forward but was spurred onwards knowing that this understanding could help in explaining the outcomes associated with grit in competitive sport from Study 2, and ultimately inform the design of interventions and policies to enhance grit development in sport settings in the future. Thus, the purpose of Study 3 was to construct a grounded theory of grit in competitive sport.
Abstract

To be successful, competitive athletes are expected to overcome the many setbacks and demands of sport throughout the entirety of their playing career. Grit—or passion and perseverance over long terms—has been linked to positive outcomes in the sport domain, but progress in the field has been hindered by a lack of sufficient theory. The purpose of this study was to construct a grounded theory of competitive athletes’ grit in sport. Constructivist grounded theory methodology was adopted. Twenty-eight participants (15 women, 13 men; 22 athletes, 5 coaches, 1 sport parent) involved in competitive sport participated in semi-structured interviews. Data analysis involved an iterative process of initial coding, focused coding, axial coding, and theoretical integration. Results suggested that grit was understood to be a malleable dispositional tendency that was formed over time as athletes amassed various sport experiences. With the encouragement from supportive others, athletes would adopt adaptive cognitions about success and failure. These cognitions would then develop into a propensity to identify and strive towards long-term goals in sport. Grit was understood to lead to several outcomes, including sport-specific goal achievement, thriving, and languishing. This study advances the study of grit in sport by providing researchers and practitioners with an understanding of the processes that encapsulate competitive athletes’ sport-specific grit. Implications for practice (e.g., how sport support persons might foster grit in athletes) and recommendations for future research (e.g., improving the measurement of grit in sport) are also discussed.
Introduction

Athletes are often lauded for impressive displays of physical ability—buzzer beating shots, dives into the stands, overtime shootouts, and underdog comebacks—but to achieve triumphs they must grapple with setbacks (e.g., injury, poor performances; Mosewich et al., 2014) and demands (e.g., extreme investments of time and energy, Hughes & Leavely, 2012). Competitive athletes in particular must also be able to successfully manage these demands over the entirety of their playing career if they are to reach their long-term goals and avoid maladaptive outcomes (e.g., Cosh & Tully, 2014; Henriksen et al., 2020). Consequently, understanding the individual differences that lead to the successful attainment of long-term goals may ultimately enhance athletes’ overall sporting experience and maximize the positive outcomes that may arise from the sport environment. Grit—or passion and perseverance over long terms (Duckworth et al., 2007)—offers one pathway forward.

Grit is contingent on one’s striving towards higher-order goals (Duckworth et al., 2007). While others might change their interests from year to year, gritty individuals are able to maintain their attention towards the same goal over time and continue to work strenuously despite setbacks, plateaus in progress, and boredom (Duckworth et al., 2007). Grit has shown promise in its prediction of long-term performance outcomes over and above other traditional measures (e.g., IQ tests) in various domains (e.g., Duckworth et al., 2011; Schmidt et al., 2020; Tang et al., 2019). For example, grittier individuals tend to achieve higher levels of education (Duckworth & Quinn, 2009), undergo lower levels of attrition/burnout in their vocations (Eskreis-Winkler et al., 2014; Halliday et al., 2017; Robertson-Kraft & Duckworth, 2014; Salles et al., 2014), and experience an increased likelihood of entrepreneurial success (Mueller et al., 2017).
There has also been a significant amount of interest in the role grit might play within the domain of sport, particularly as it relates to athlete engagement and success (for a review, see Cormier et al., 2021). More specifically, gritty athletes tend to accumulate more time directly (e.g., attending practice) and indirectly (e.g., watching soccer games) involved in sport-specific activities (Larkin et al., 2015), and be more engaged in their sport (Atkinson & Martin, 2020; Martin et al., 2015) than their less gritty peers. Grit is also linked to factors that keep athletes in their sport for longer. More specifically, grit is related to increased rate of recovery in patients undergoing anterior cruciate ligament reconstruction (Pascual-Leone et al., 2023), and is inversely related to thoughts of quitting or switching out of sport (Tedesqui & Young, 2018).

With respect to athlete outcomes, researchers have found positive relationships between grit and athlete competitive level (though null results have also been reported; e.g., Larkin et al., 2023; Meyer et al., 2017; Pettersen et al., 2023; Tedesqui & Young, 2018); and between grit and athlete well-being (e.g., Cormier et al., 2021).

While grit is generally viewed as an adaptive construct that is related to many desirable outcomes, progress in the field has been hindered by a lack of sufficient theory. One proposed theory—the Optimal Performance and Health (OPAH) model of grit (Datu, 2021)—proposes that grit leads to increased achievement through sustained behavioural effort, mastery-approach goals, and the use of creative cognitive strategies to successfully accomplish a wide range of demands. Furthermore, the model suggests that grit enhances an individual’s well-being as it disposes them to seek autonomy, relatedness, and competence while in the process of goal pursuit; better manage their own emotions; and uphold optimistic beliefs about themselves, others, and the environment in which they operate. While the OPAH model provided an important step forward for researchers, it was created to capture the process by which grit relates
to well-being and performance within general contexts. Since evidence suggests that grit is best conceptualized as a domain-specific construct (Cormier et al., 2019; Mosewich et al., 2021), it seems necessary to develop a theory that is grounded within the specific context in which individuals are persistently striving towards personally meaningful long-term goals. Constructing a theory that seeks to interpret and co-construct athletes’ meanings and experiences of grit within the sport environment may enable researchers to better identify the social and psychological factors that catalyze grit, identify the adaptive and maladaptive outcomes that might precipitate from grittiness in sport, and create specific interventions or policies to inform the development of grit in sport settings. More generally, there are unique nuances present in the sport environment that set it apart from other domains (e.g., business, education, medicine) that might impact the experiences of individuals engaging within this context.

If sport psychology researchers are to understand the paths by which athletes successfully experience high levels of performance over long periods of time, theories concerning the development and achievement of long-term goals in sport are required. Therefore, the purpose of this study was to interpret the processes by which athletes have acquired grit in the sport domain, explore the behaviors and cognitions experienced by athletes who are striving towards their long-term goals, and describe the by-products of being gritty in sport using a constructivist grounded theory approach. Final products include the generation and diagramming of a substantive competitive sport-specific constructivist grounded theory.

**Method**

*Grounded Theory Methodology*

Considering the importance of exploring grit from the lived experiences of athletes, grounded theory methodology (GTM)—representing a series of methodological approaches
originally proposed by Glaser and Strauss (1967)—was chosen as the best qualitative methodology to suit the research question. Grounded theory is popular among sport and exercise researchers, and field-specific best practices have been issued (e.g., Holt et al., 2022; Holt & Tamminen, 2010a, 2010b; Weed, 2009, 2010). Of the many varieties of grounded theory that exist (e.g., Clarke, 2003; Corbin & Strauss, 2014; Glaser, 1978; Schatzman, 1991), Kathy Charmaz’s *constructivist grounded theory* (1990, 1995, 2000, 2006) was chosen, as it is congruent with my pragmatist philosophical perspective and the purpose of the study.

Constructivist grounded theories are not *discovered* from the data; rather, they are constructed by researchers and participants through their “past and present involvements and interactions with people, perspectives, and research practices” (Charmaz, 2006, p. 10). Constructivist grounded theory aims to understand (rather than explain) the studied phenomenon; articulate the scope, depth, power, and relevance of data; and offer an imaginative interpretation of the data while acknowledging the subjectivity inherent in theorizing (Charmaz, 2006). As constructivist grounded theory is methodologically based in the pragmatist tradition, both method and theory perceive reality as social and fluid; locate individual experiences within a social context; and view human beings as agentic (Charmaz, 2017). It is important to note that this research was not approached as *tabula rasa*. Since I have previously emersed myself in the grit in sport literature via a scoping review (Cormier et al., 2021), constructivist GTM was further considered an ideal approach to employ in this investigation. Most significantly, GTM encourages the researcher not to dismiss extant theoretical and research literature when in pursuit of substantive theory generation (Thornberg, 2012).
Sampling and Participants

Participants were eligible for inclusion in this study if they had participated, coached, or parented athletes who competed at the intermediate skill level or higher (Baker et al., 2015). After obtaining the approval of the institutional research ethics board, 28 total participants (15 women, 13 men) were recruited for this study using social media, email, and focused snowball sampling (for recruitment materials, see Appendix G). Participation in this study was voluntary, and all participants gave their informed consent (for the participant consent form, see Appendix H) and were treated in accordance with the ethical guidelines for human research set forth by the American Psychological Association.

Athletes (n = 22), coaches (n = 5), and a sport parent (n = 1) representing various ages ($M_{age} = 27.3$ years, $SD = 8.2$), sport types (beach volleyball = 3; curling = 1; football = 1; soccer = 4; swimming = 1; track and field = 6; volleyball = 10; wrestling = 2), and competitive levels (provincial = 2; regional = 7; national = 10; international = 7; retired = 1) were interviewed. The majority of participants’ ethnic origins and nationalities were White (67.9%) and Canadian (78.6%). All personal identifiers were removed from the raw data, and participant-identified pseudonyms were used during the interpretation and description of results.

There were several phases of data generation. Purposeful sampling was initially used to recruit participants for this study. To illustrate, athletes who self-identified as being gritty in sport were initially invited to take part in the first stages of data generation, leading to several collegiate players being recruited. As data generation and analysis progressed, participants were selected using theoretical sampling to check, qualify, and elaborate upon the preliminary categories that were developed (Charmaz, 2006). For example, as athletes often spoke about the influence that their home life and sport environment had on their decision to continue pursuing
long-term goals in sport, a need to understand the processes by which relevant social agents influenced these environments was identified. Thus, coaches and sport parents were recruited for the second phase of the study. Finally, older athletes competing at higher skill levels (i.e., international, professional) who were identified by their peers and coaches as being exceptionally gritty were recruited. This was done to lessen the possibility of self-selection bias that may have been present in the initial gathering of data, and to understand the processes by which goal commitment may or may not change as an athlete reaches the end of their competitive career. This sampling procedure allowed similarities and differences in the data through constant comparison to be identified. Sampling was completed when the generation of new data no longer sparked new insights, concepts, or interpretations (i.e., theoretical saturation; Charmaz, 2006).

**Data Generation**

Data was generated using one-on-one semi-structured interviews. Having received training in semi-structured interviewing, I prioritized building rapport with participant; took the role of the active listener; and avoided leading the participant through the use of neutral and open-ended questions. The interview guides were modified as needed for athlete, coach, and parent participants, and evolved over time to reflect the themes being constructed in the ongoing analysis phase (for an exemplar of the interview guide, see Appendix I). Generally, all interviews included open-ended questions and probes about the participants’ sport history, their understanding of the meaning of grit in the sport environment, and personal experiences or observations of other athletes’ grit in sport. To encourage participants to focus their discussion on grit (rather than other constructs that are salient in sport contexts, such as mental toughness), participants were shown a portion of Dr. Angela Duckworth’s TEDtalk video (Duckworth, 2013)
and provided with a definition of grit (i.e., “grit is passion and perseverance over very long terms”). Participants were then asked how these explanations differed from their initial understanding of the construct.

Given that the primary function of grounded theory is to build concepts and theory from the ground up, interviewing in grounded theory should be driven by the evolving analysis to uncover the greater meaning and dimensionality of the created categories (Foley et al., 2021). Therefore, the questions that participants were asked over the span of this project evolved and became increasingly focused. For example, early iterations of interviews included general questions about whether athletes consciously employed any tools to grow their grit in sport (e.g., “Can you tell me how or where you might have learned to be gritty?”). However, as data analysis progressed, it became clear that gritty athletes remained engaged in long-term goal pursuit because of their perceptions of winning and losing. Thus, questions were introduced in these later interviews to further elucidate this process (e.g., “What does success mean to you?” and “What does failure mean to you?”). Participants were invited to participate in a follow-up interview, at which time they were asked to expand and reflect upon certain themes generated from their initial interview. Initial interviews lasted between 36 to 103 minutes ($M_{\text{time}} = 63$ min) and follow up interviews lasted between 9 to 31 minutes ($M_{\text{time}} = 17$ min). In total, 1933 minutes of audio was recorded. All interviews were audio recorded, transcribed verbatim (resulting in 493 pages of single-spaced text), and organized and stored using NVivo 12.

**Data Analysis**

A wholly iterative process was employed by moving back and forth between gathering and analyzing data. Formal analysis was conducted immediately after interviews had been transcribed to ensure that data were constantly compared against itself, within itself, and beside
others throughout the research process (Bruce, 2007). All interviews and transcriptions were done by me, which aided my familiarity with the raw data. Data were then analysed following Charmaz’s (2006) protocol for coding in grounded theory practice. That is, initial coding (i.e., line-by-line examination of each fragment of data for events and actions using gerunds) was completed before moving onto focused coding (i.e., selecting and categorizing the most useful and frequent codes generated in initial coding phase), axial coding (i.e., describing the finer dimensions and properties of the focused codes), and finally to theoretical integration (i.e., the assimilation of codes generated in the axial coding phase through the identification of relationships). For example, the initial code “having friendships that are completely removed from the sport environment,” was placed with similar codes describing “life outside of sport.” This code was then subsumed under the “balanced self-identity” category in the axial coding stage, and finally positioned as the “balance” moderator between grit and adaptive outcomes in the final theoretical integration of the substantive grounded theory.

The intention was to evaluate the quality of the grounded theory throughout the research process (Charmaz & Thornberg, 2020). As such, I aimed to ensure that the analysis process was grounded in the data (and that I was not forcing preconceived concepts into the results) by regularly engaging in reflections, memo-writing, and diagramming to reveal preconceptions (Charmaz, 2006). As mentioned previously, I had been previously immersed in the grit in sport literature, and therefore acknowledge that this knowledge likely influenced how codes and connections were identified in the data. However, the existing empirical literature was approached with theoretical sensitivity and was critically considered throughout the research process; not to replicate these findings but to avoid ‘reinventing the wheel’ (Charmaz & Thornberg, 2020). Then, a delayed literature review was conducted (Strauss & Corbin, 1998) to
examine the coherence of the theory with extant developmental psychology literature. Previous research was also used to determine whether category labels could be assigned to ensure consistency with the extant literature. My supervisor served as a critical friend to challenge my construction of knowledge, and we met regularly during the data analysis stage. Further assessment of the final grounded theory was provided by kinesiology experts (four professors, three graduate students) to establish the originality of the theory (i.e., whether it provided fresh insights into the conceptual understanding of grit in sport), and by the participants of the study to ensure that the final model resonated with them (i.e., adequately represented their experiences of grit in sport).

Results

In the following section, a recursive theoretical model (see Figure 5.1) is presented that outlines the processes by which grit is acquired and sustained in the competitive sport environment, and the eventual outcomes of being gritty in sport. These results were constructed from predominant themes and shared understandings between study participants and me. From discussions with athletes and other sport support persons (i.e., coaches, sport parents), grit was understood to be a malleable dispositional tendency that was shaped as athletes moved through a variety of positive and setback experiences within the sport landscape. With the encouragement from supportive others, athletes were more likely to adopt adaptive cognitions about success and failure in sport. Once athletes resolved to pursue a career within the domain of sport, these adaptive cognitions developed into sport-specific grit—which is characterized by a propensity to identify and strive towards long-term goals in sport despite setbacks. Finally, grit in sport led to several outcomes. First, grit facilitated sport-specific goal achievement (provided there are opportunities to move forward in sport). Second, gritty athletes who were self-aware and
maintained a balanced self-identity experienced longevity, satisfaction, and healthy transitions out of sport. Last, athletes whose self-identities resided solely in sport tended to experience isolation from others, burnout, and long-term injuries. See Table 4.1 for representative quotes for each category.

**The Sport Environment**

When considering the long-term pursuit of success, the domain in which an individual sets and strives for their goals becomes inexorably linked to how they chart and navigate their course. Consequently, several nuances of the sport domain were acknowledged by participants. First, failure was understood to be a common and publicly experienced element present in the landscape of sport. Second, success in sport demands total commitment and sacrifices from athletes. Third, participants acknowledged that success was often influenced by factors outside of an athlete's direct control, such as coach decisions and injury. Fourth, these uncontrollable qualities create a perception that there is no clear pathway to success in sport. And lastly, participants recognized that athletic careers are remarkably short-lived, and no matter the amount of success one experiences they must eventually move on to other pursuits. The developed model is grounded in the competitive sport milieu, and the categories developed in the later stages of analysis are contextualized by the features of this environment.

**Sport Experiences**

Within the sport environment, athletes were exposed to a variety of experiences—both positive and negative. These experiences shaped athletes’ decisions to continue in the sport, and are described below.

**Sport Setback Experiences.** All participants described at least one setback experience in their playing careers (or in the playing careers of the athletes they coached or parented). Negative
sport experiences included injuries, getting cut from a team or starting roster, losing important matches, detrimental relationships with coaches or teammates, and the COVID-19 pandemic. The setback created a “nexus event” (Tom, international-level coach), where an athlete is forced to make a conscious decision to continue in sport or quit. Ultimately, the scale of these setback events was not so catastrophic that athletes were forced to leave their sport, but they did cause them to re-appraise how much they valued their participation in sport.

**Positive Sport Experiences.** While the experience of a negative event was important to an athlete’s development of perseverance and passion, positive sport experiences were also a significant determinant in their ultimate decision to continue in sport. Positive experiences in sport were often described as initial athletic aptitude and winning meaningful games. Other positive sport experiences included close relationships with coaches and teammates, and experiential opportunities (e.g., travel, leadership roles). Athletes acknowledged that these successes encouraged them to seek further opportunities in sport.

**Support from Others**

Athletes were more likely to internalize the gainful lessons they learned from setbacks and positive experiences in sport when given support from others. Sport support persons gave their athletes the autonomy to make their own decisions, encouraged them to take prideful ownership over the effort it took to succeed, and created safe environments where it was acceptable to fail. Athletes also emphasized the positive influence of other athletes on their perceptions of failure and success, particularly when their peers would model adaptive cognitions in response to setbacks.
Adaptive Cognitions

From the variety of experiences that they encountered in the sport environment, athletes began to consolidate various schemas about failure and success. These adaptive cognitions allowed them to persist in sport, and are further described below.

Optimistic Conceptualizations of Failure. Failure can be an emotionally painful experience, which may lead some individuals to throttle their effort or steer clear of circumstances that risk a high likelihood of loss. Athletes’ (at least partially) successful navigation through sport setbacks led to their optimistic conceptualization of failure. More specifically, participants displayed a set of cognitions that enabled them to approach difficult tasks with earnest effort and without the fear that failing would affect their goal progress. First, gritty athletes accepted setbacks as unavoidable by-products of sport and were emotionally nonreactive when they occurred. Next, gritty athletes viewed setbacks as temporary challenges that were separate from themselves and did not internalize them as permanent personal inadequacies. Michelle (international-level athlete) told a story of her brother, who left sport because he believed he was “never going to be able to compete at that certain level again” after suffering an injury, while not seeing her own injury as the end of her story: “But at the same time, when I had my surgery, the doctor said there's a good chance I'd never be able to run at a competitive level again either. But I proved them wrong. I got through it.” Third, gritty athletes perceived failure experiences as valued opportunities to grow rather than breaking points. To demonstrate, international-level athlete and coach, Mia and Caleb (respectively), shared: “If you don't fail, you're not even trying… if you're not pushing yourself hard enough [to fail], you're not even trying.” and “I love to fail. It's my favorite thing in the world, because once I fail, I know I'm getting better.”
Mastery-Orientated Conceptualizations of Success. From their previous positive experiences in sport, athletes learned that success was created through consistent effort. Consequently, they felt like they had a greater amount of control over their progression in sport (rather than it being solely due to uncontrollable factors). Participants also described how they had learned to embrace many definitions of success: “If your goals are to get wins and medals, you're going to not get them all the time… So, you need to redefine [success] in a way that’s more accepting of those challenges” (Trent, retired national-level athlete). Because success could be achieved outside of the competition environment, it was possible for athletes to experience “little wins” (Ayobami, national-level athlete) with more frequency in their everyday training. Most often, athletes viewed success as perpetually pursuing their personal best, rather than reaping extrinsic rewards. Taken together, these adaptive cognitions led athletes to hold a positive view of sport, which would subsequently prompt them to take gritty actions towards their sport-specific goals.

Decision to Pursue Competitive Sport

Of course, athletes would not actually remain on competitive sport pathways unless they consciously decided to pursue them. As a result, an athlete’s commitment to their sport greatly influenced the likelihood with which they would identify and pursue a long-term goal in sport.

Grit in Sport

Ultimately, grit was positioned as a malleable dispositional tendency to set and strive for clear long-term goals within a specific domain despite setbacks, which aligns with Duckworth’s (2007) original conceptualization as well as more recent updates to the construct (Cormier et al., 2019). The two facets of grit—passion and perseverance—are described in more detail below.
**Passion.** Participants often described their enjoyment of various facets of sport participation (e.g., competition, the social fabric of the team environment). However, a general love for sport alone did not fully saturate this category. It was far more important for participants to explicitly identify a specific long-term goal for sport (e.g., competing at the Olympic Games, or being a member of a national team). The language used to describe long-term goal achievement—including: “go-getter” (Megan, international-level), “eye on the prize” (Christopher, regional-level athlete), “never losing sight” (David K., national-level athlete), and “need to see it all the way through” (Michael, national-level athlete)—emphasized how athletes utilized their long-term goals like the needle on a compass to motivate and direct their actions in the present. While their long-term goal remained steadfast once it had been chosen, several athletes cautioned against keeping it at the centre of their attention. More specifically, thinking too much about their idealized future could cloud the small (but very important) steps athletes would need to take to progress in their every-day training. Overall, the passion facet of grit acted as a North Star to athletes as they sought out further sport experiences and progressed onwards in sport.

**Perseverance.** Athletes viewed perseverance in sport as effortful and intentional self-regulatory reactions used to return to their ideal psychological and physical states after a temporary disruption in goal pursuit. Athletes also described the assiduous perseverance required to engage with day-to-day challenges while training and performing. To do this, athletes would engage in a variety of resourceful behaviours inside and outside of the structured training environment (e.g., practice on their own, analyze additional game tape, seek feedback from others, and optimize their nutrition, sleep, and recovery). Athletes would also set a series of reasoned and foresighted short- and mid-term goals, and acknowledged that their goals had to
stay flexible if they were to respond effectively to unforeseen obstacles. Adaptability was viewed by athletes as the pivots taken to *remain* on the path to their ultimate objective, rather than their *abandonment* of it. In sum, athletes used perseverance to overcome setbacks in sport through self-regulation, going “the extra mile” (Michelle, international-level athlete), and adaptability in response to unforeseen obstacles, which ultimately allowed them to amass more sport experiences and advance in sport.

**Outcomes of Grit**

Athletes’ identification of their long-term goals and persistence past setbacks in their daily training environments led to a variety of outcomes of grit in sport. That is, opportunities in competitive sport led to goal attainment, and athletes with balanced self-identities were more likely to attain outcomes related to thriving. However, it is also important to note that obsession-driven grit could result in athlete languishing.

**Opportunities in Competitive Sport.** Participants realistically assessed that it was simply not possible to progress in their sport careers if athletes did not have the resources to move forward. So, while athletes’ grit led to their successful attainment of goals, the opportunities available to them was a critical factor in whether they would be able to reach them.

**Balance.** While the participants included in this grounded theory study conceptualized grit as steadily pursuing a long-term goal in sport and persevering through the setbacks that blocked their paths forward, they cautioned against consequences of placing their athletic pursuits at the centre of their self-identities. To achieve a balanced self-identity, many athletes sought relationships and pursued hobbies outside of the sport environment. Balance also meant having an acute sense of self-awareness, so that athletes could prevent symptoms of burnout or injury. Athletes who were able to maintain a balanced self-identity and uphold their self-
awareness in sport felt like they were then more likely to reap the positive outcomes of grit in sport.

**Obsession.** Alternatively, athletes whose self-identity existed solely within the realm of sport were more likely to suffer from the negative outcomes of grit in sport. Descriptions of obsession were common among many athletes, and a number of participants reported that athletes must fully devote themselves to their training to attain success. However, having these “blinders” (Claire, regional-level athlete) increased the chances that athletes would experience the maladaptive outcomes of grit in sport.

**Goal Attainment.** Athletes unanimously agreed that grit—paired with opportunities—led to sport-specific goal attainment. While they warned against the continual presence of uncontrollable factors, athletes felt that if they unfailingly maintained their focus on their long-term goal and persevered past each of the setbacks that might obstruct their path, they would be able to get close to attaining the goals they had set out to accomplish.

**Thriving.** Participants also described a series of adaptive outcomes that came from grit in sport, including longevity, satisfaction, and healthy transitions, discussed next.

**Longevity.** Athletes who possess grit have a strong passion for their sport and are willing to persevere through difficult setbacks, and thus continue on the path to goal attainment for longer periods of time. Balance allowed athletes to maintain their mental and physical health, avoid burnout and injury, and ultimately have longer careers in their sport.

**Satisfaction.** Because of the experiences they had accrued over time, athletes felt as though they had “squeezed out almost as much as [they] could have” (Bruce, national-level coach) from their experiences, and were therefore profoundly satisfied when they looked back on their sport.
careers. Regardless of their extrinsic achievements, gritty athletes felt personally fulfilled, prideful, and content with how they played and trained.

**Healthy Transitions.** Almost all the participants included in this study observed that gritty athletes were able to create the same success they had experienced in sport within their vocations afterwards. Furthermore, athletes with balanced personal identities suffered less personal distress both during career transitions and while transitioning out of sport. Retiring athletes looked forward to pursuing other long-term goals outside of sport that had gained significance as they matured.

**Languishing.** Participants warned that obsession-driven grit might lead to a series of maladaptive outcomes, including isolation from others, burnout, and long-term injury, which is discussed in more detail next.

**Isolation From Others.** Athletes who are intensely immersed in the pursuit of their long-term goal might struggle to make time for other important people and relationships. This isolation from others might lead to loneliness, particularly for those that exclusively spend their time training. There was also a general sense that athletes who were over-committed to their goals came across as off-putting to others. Participants described these individuals as “a bit much” (Riley, regional-level athlete), “unsportsmanlike” (Megan, international-level athlete), and “stuck in the past” (Brook, international-level athlete); they also tended to alienate others because of their obsession with their goals.

**Burnout.** When combined with an obsession for their long-term goal, gritty athletes might be more prone to pushing themselves too hard, and subsequently experience burnout from sport. To demonstrate, Ayobami (national-level athlete) shared a story of a peer who—while outwardly passionate and perseverant in sport—recently left sport entirely. Comparing himself
with his teammate, Ayobami reflected that a major reason why he was able to continue in his own athletic career was because he balanced his life outside of sport:

I've done the weight cuts; I've experienced all the things he’s experienced. But the thing that he probably didn't experience was just not being in a wrestling environment. [I have] the on/off switch. His was on for too long, but because I had the off switch I didn't burn out.

**Long-Term Injury.** Like burnout, athletes who were unable (or unwilling) to determine when they were chronically pushing their bodies to overexertion experienced a greater likelihood of long-term injury. As shared by Mia (international-level athlete): “Sometimes your body and mind are always trying to be the best. So, you could have some backlash.”

**Discussion**

The purpose of this study was to develop a substantive grounded theory of grit competitive sport. This was the first grounded theory to explore the processes of grit in the competitive sport environment, and the discussion that follows will further establish the originality (i.e., offering fresh insights on an old problem; Charmaz & Thornberg, 2020) and usefulness (i.e., informing new lines of research and application; Charmaz & Thornberg, 2020) of the research.

The processes and categories described in the grounded theory of grit support much of the existing sport-specific literature and extends the knowledge base. First, it is proposed in the theory that both setbacks and positive experiences in sport offer a petri dish for grit to later flourish in athletes. A novel contribution of this research lies in the supposition that exposure to both positive sport experiences and sport setbacks can ultimately create sport-specific grit. Second, the theory purports that social agents (i.e., coaches, parents, and peers) can play an active role in influencing athletes’ understanding of success and failure in sport. While this
finding supports quantitative research demonstrating a positive correlation between athlete grit and autonomy-supportive coaching styles (Donald et al., 2019), this substantive grounded theory extends the literature by further elucidating how strong social support systems enacted by parents, coaches, and teammates can play a role in developing athletes’ grit. Third, the findings suggest that gritty athletes accept failure as opportunities for learning and attribute success to hard work. As there has been extremely limited research conducted to understand the role of metacognitive knowledge in the development of grit (e.g., Arslan et al., 2013), researchers and practitioners have a restricted understanding of how athletes’ own reflections on their learning can contribute to long-term goal setting and striving. Accordingly, these findings extend the existing body of knowledge by proposing that competitive athletes’ perceptions of success and failure in sport can impact their propensity to set and strive for clear long-term goals.

Further original contributions of this substantive grounded theory lie in the suggested outcomes of grit in competitive sport (pending important moderators). Grit was perceived to be an important facilitator for athletes’ advancement to higher levels of competition, but it was not enough to create athletic success in sport without the provision of opportunities. This appraisal is reflected in the quantitative sport literature, where researchers have found mixed relationships between grit and skill group membership (e.g., Larkin et al., 2023; Meyer et al., 2017; Pettersen et al., 2023; Tedesqui & Young, 2018). Further supporting the resulting grounded theory, grit has been found to be positively correlated with life satisfaction (e.g., Martin et al., 2022), and with the successful transitions of athletes onto the next stages of their careers (Poczwardowski et al., 2014). In addition, the theory aligns with the suppositions from others that an athlete’s identity might affect the outcomes of their grit in sport (Mosewich et al., 2021; Tedesqui & Young, 2020). Given the ‘all-in’ nature of competitive sport, identity formation is often closely tied to an
athlete’s goals in sport (Warriner & Lavallee, 2008). Accordingly, the relationship between grit and self-identity warrants further examination as we attempt to understand the ‘dark side’ of grit in sport; and future researchers should continue to consider the motivating factors behind gritty athletes’ long-term goal consolidation and how this process can be bolstered to support balanced athlete self-identities.

When comparing the grounded theory developed in my research with other existing theories, several similarities and dissimilarities can be identified. Analogous to Datu’s (2021) OPAH model, the data generated in my research—grounded in the perspective of the study participants—suggests that numerous experiential, cognitive, and social elements interact to facilitate the link between grit and positive outcomes. Important differences between the two theories lie in my inclusion of the precursors to grit; incorporation of the circular pathway between sport-specific experiences, adaptive cognitions, and grit; emphasis on the importance of a balanced self-identity in determining whether an athlete would experience positive or negative outcomes; and the description of the context specificity of the grounded theory. There is also some overlap between the grounded theory generated in my research and other established grounded theories in sport. These include Fletcher and Sarkar’s (2012) grounded theory of psychological resilience and optimal sport performance, in which athletes tended to perceive stressors as opportunities for growth and support from others influenced athletes’ adaptive cognitions. Samuel and colleague’s (2023) Meta-model of Adaptation in Sport also offers a few similarities, including athletes’ use of self-regulation to respond to setbacks, and the role played by social support and athletic self-identity in the overall adaptation process in sport. Lastly, there are several parallels with the Sport Commitment Model (Scanlan, Carpenter, et al., 1993; Scanlan, Simons, et al., 1993). Sport commitment was conceptualized as the resolve to sustain
one’s participation in sport and was dependent on (amongst other factors) sport enjoyment and opportunities for involvement (Scanlan & Simons, 1992). Therefore, while my research shares similarities with other theories in the field of sport psychology, it also includes unique insights into the processes that enable athletes to attain their long-term goals in sport.

**Practical Implications**

Based on the categories that were identified as important precursors to grit in sport, sport support persons might consider the following when aiming to increase grit in athletes. Firstly, since both positive sport experiences and sport-related setbacks contributed to athletes’ grit in sport, coaches and parents should strive to provide athletes with opportunities for successes as well as interaction with significant challenges. Best practices should be followed to ensure that athletes reap the benefits of these experiences (e.g., scaffolding a clear curriculum of coping skills that are tailored to the athlete; Taylor & Collins, 2020). Second, sport support persons should consider implementing interventions at the developmental level, which might indirectly increase athlete grit via adaptive cognitions as they progress in sport (Credé et al., 2017). More specifically, coaches are encouraged to provide their athletes with mastery-involving feedback (Donald et al., 2019; Moles et al., 2017) or implement empirically driven interventions, such as functional imagery training (Rhodes et al., 2018). Lastly, grit is often defined differently across different groups of sport participants, and—as evidenced by my data and other research (e.g., Crust et al., 2016; Fong et al., 2016)—is sometimes understood as an ‘at-all-costs’ mindset that can be detrimental to athletes. It is important to note that athletes only experienced positive long-term outcomes and transitions away from sport if they maintained a balanced self-identity. Sport support persons can encourage healthy identity adjustment by introducing their athletes to self-
compassion (Cormier et al., 2023; Neff, 2003), which has been shown to help individuals cope with self-identity challenges (Kullman et al., 2021).

**Study Limitations**

The findings of this study should be considered within its limitations. While efforts were made to ensure the credibility of the research (i.e., generating high quality data, saturating the final theory with confirming and disconfirming evidence, thorough researcher reflexivity, and adherence to constructivist GTM procedures), it is possible that the study participants failed to remember and/or share information that was critical to the grounded theory, therefore preventing the capture of important categories (Sosniak, 2006). Second, I strove to uphold the quality principle of resonance (i.e., constructing concepts that represent the experiences of participants and other competitive athletes; Charmaz & Thornberg, 2020) by seeking out athletes from a variety of sports who represented the various stages of a standard athletic career (i.e., from those who were in the first year of their varsity careers to those who had recently retired). However, it is important to recognize the participants were primarily White, able-bodied athletes residing in Westernized countries. As both qualitative and grit research (see, respectively; Charmaz, 2017; Pendyala & Vyas, 2023) have been dominated by Anglo-North American worldviews and assumptions, future researchers must strive to integrate intersectionality into their research approaches (Smith et al., 2020).

**Future Directions**

While the current study provides fresh insights into the antecedents, processes, and outcomes of grit in competitive sport, there remain important avenues in need of further research. First, the categories outlined by the grounded theory were primarily driven at the individual-level. While the decision to interview individual athletes was done to enhance the overall
resonance of the theory, it may have resulted in a theory that might not have adequately represented the influence of cultural or normative factors unique to each sport and/or team (Balague et al., 2013). These norms may impact how the categories constructed in the theory are experienced by athletes in specific contexts, especially for those participating in sports that were not represented within this study (e.g., basketball, hockey, or tennis). Future researchers might consider how grit operates at a team level, while using appropriate methodologies to do so (e.g., ethnography; Creswell & Poth, 2018). Second, it appears that much can be done to improve the measurement of grit in sport. Based upon the categories constructed from this grounded theory, athletes’ sport-specific conceptualizations of passion do not seem to be fully represented in the existing grit scales (i.e., Cormier et al., 2019; Duckworth et al., 2007; Duckworth & Quinn, 2009). Future researchers might consider validating novel items for the consistency of interests subscale that fully capture the process of setting and progressing towards their long-term goals. Last, researchers should endeavor to test the proposed theory using appropriate methods of analysis (see Crutzen & Peters, 2021; Rohrer et al., 2022). Further, longitudinal research that follows the careers (i.e., from developmental levels to end-of-career; Bailey, 2019; Neale, 2020) of competitive athletes is needed to assess the generalizability of the proposed grounded theory to athletes outside of the participants of this study.

Conclusion

This manuscript introduces an original substantive grounded theory of grit in competitive sport. The study draws on discussions with athletes, coaches, and sport parents to identify the recursive experiential, cognitive, and social processes that interact to grow and sustain athletes’ grit and outlines the outcomes of grit in sport. Moving forward, future researchers must continue to consider the influence of the domain in which a gritty individual is setting and striving for
their long-term goals, as the nuances of a specific context are likely to influence distinctive outcomes and the processes by which grit is gained. Overall, I have aimed to produce an important step in the larger theoretical understanding of grit in competitive sport and believe that the findings provide important implications for future sport psychology research and practice.
References


https://www.ted.com/talks/angela_lee_duckworth_grit_the_power_of_passion_and_perseverance


182


### Table 4.1

**Representative Quotes for Each Category of the Grit in Competitive Sport Grounded Theory**

<table>
<thead>
<tr>
<th>Category</th>
<th>Representative Quotes</th>
</tr>
</thead>
</table>
| Nuances of the Sport Environment | Whether that's being cut, whether that's losing… We put [athletes] in a dense capsule of failure a lot of the time, which people don't experience outside of sport anymore. (Bruce, national-level coach)  
If you're really focused on your sport and want to improve, there's sacrifices I have to make. I have to miss family events and friends’ weddings and everything like that *all the time*. But it’s a choice I make to be able to be better at my sport… it’s choice you have to make of, “what's important now?”. (Michelle, international-level athlete)  
Hence a lot of national team goals, so much of that is out as out of your control. Yeah, there's opinions of, you have no idea when somebody watching you, the timing of it is massive. There's like a zillion things you can't control. (Lee, international-level athlete)  
But normal athletes, you get about 10 years, right? 10 summers, 10 winters, 10 springs, 10 falls. That's not a lot of time” (Michael, national-level athlete) |
| Sport Setback Experiences       | Let’s call [the setback] a nexus event…It's this mic drop kind of moment where now that 14-year-old girl who had her first knee scare is being sat down with her parents, her coaches, her physio and they're saying, “okay, we can get you back”. And she goes, “Yeah!” And. “we can get you stronger” and she goes, “Yeah!”, “but we need you to take responsibility in this moment”. Now we just put it back on her. (Tom, international-level coach)  
And I knew [achieving his goals] was gonna be tough, especially since (a) I'm black and (b) I’m short. There's gonna be a lot of things that people are gonna use that to try to push me back from my goal. (David K., provincial-level athlete)  
Like because of that injury, I was out of the sport for probably one or two years; and then when I came back, I was running extremely poorly. And that was really hard—not being able to compete at the level I was before. And the whole situation took probably three or four years to overcome. (Michelle, international-level athlete) |
| Positive Sport Experiences      | I had a couple good performances when I was younger, and then I felt like, ‘oh, okay’, I felt like I was good at something and that was a very good motivator. (Lee, international-level athlete)  
And also because I enjoyed it. I was like, “Why not keep doing it?”. And then grade 10 onwards I was like, “Oh! I'm actually like pretty good at this”. And then, and then it just kept progressing and progressing. And that's what got me to where I am now. (Ayobami, national-level athlete)  
Maybe it's the taste of winning that makes you want to go after it more; and when you get knocked down you're more willing to get back up. (Bruce, national-level coach)  
I think it's really related to past experience. I think someone that doesn't have great past experience or has struggled in the past, they're really likely to be less gritty for future stuff because they know they can fail at it. (Klea, national-level athlete) |
| Support from Others             | Myself, and my coaches under my staff, and co-coaches, we try and guide and educate and remind them that everything is their choice. Everything at this stage of the game up to them. We're not dictators. We're not going to rap them over the head with a ruler and force them to say, you cannot do this. But we're going to try and guide them and empower them to make the right decisions. (Tom, international-level coach) |
I think the way coaches and parents can support grittiness is the opposite to the helicopter parent. You know, taking all obstacles out of their way. It means it's hard to see them struggle, but it's also really wonderful to see them persevere and get through it to the other side and then celebrate that. (Martine, sport parent to two international-level athletes and one national-level athlete)

My coach pushes me more and more. And he's like, “okay, don't be scared to make errors. Just try the techniques and work to do those things well”. (Emma, national-level athlete)

I know a lot of guys where they have a negative view of sports because they had parents who would just rip into them after they had a bad game. So they're almost scared to have a bad game and they're scared to make a leap to the next level. I was always just given a “good job!” when something went bad or went good, but never a scolding when it went bad. Sports was always positive for me. (Cole, regional-level athlete)

It helps being surrounded with like-minded people who share the same goals that you're working towards… because they understand the struggle and they're all shooting for the same thing. So just having that support system definitely helps. (Adrienne, provincial-level athlete)

Eventually you're going to lose. Eventually one match. (Ayobami, national-level athlete)

Well in curling it's very structured, very routine, very “it's supposed to go this way,” but it doesn't always go that way. So I think many teams that I have played against in the past, you can actually see them kind of collapse. I don't know if that's the right word, but kind of give up or fold it in and, and say, “We're done with this one. We'll try again next time.” (Megan, international-level athlete)

I know that my setbacks weren't actually setbacks. People like to look at progression as being on a straight plane. But just because you had a setback doesn't mean you're not moving forward. (Michael, national-level athlete)

But for something like sports there’s always the chance for another game; and more specifically jumping in track events you'll always miss that last bar even if you have three attempts and you've just won. Right? (Dave, regional-level athlete)

So regardless of me making the team or not doesn't really slow down my process. Because my process and my journey of becoming—of reaching my goal—is unknown. I know what's at the end of the goal. But me getting to that goal, there's going to be a lot of ups and downs. I just saw my not making the national team as a minor setback. And so, my journey is still unfolding and I'll keep working hard. (David K., provincial-level athlete)

And I was like, “well, it's my last year. I may as well see that if I actually work hard and what my full potential is.” And then we had our first little mini open of the season. I was like, “Oh, that was really good! That was only a month of trying, and I'm already beating people that are older than me.” (Riley, regional-level athlete)

I think the way coaches and parents can support grittiness is the opposite to the helicopter parent. You know, taking all obstacles out of their way. It means it's hard to see them struggle, but it's also really wonderful to see them persevere and get through it to the other side and then celebrate that. (Martine, sport parent to two international-level athletes and one national-level athlete)

My coach pushes me more and more. And he's like, “okay, don't be scared to make errors. Just try the techniques and work to do those things well”. (Emma, national-level athlete)

I know a lot of guys where they have a negative view of sports because they had parents who would just rip into them after they had a bad game. So they're almost scared to have a bad game and they're scared to make a leap to the next level. I was always just given a “good job!” when something went bad or went good, but never a scolding when it went bad. Sports was always positive for me. (Cole, regional-level athlete)

It helps being surrounded with like-minded people who share the same goals that you're working towards… because they understand the struggle and they're all shooting for the same thing. So just having that support system definitely helps. (Adrienne, provincial-level athlete)

Eventually you're going to lose. Eventually one match. (Ayobami, national-level athlete)

Well in curling it's very structured, very routine, very “it's supposed to go this way,” but it doesn't always go that way. So I think many teams that I have played against in the past, you can actually see them kind of collapse. I don't know if that's the right word, but kind of give up or fold it in and, and say, “We're done with this one. We'll try again next time.” (Megan, international-level athlete)

I know that my setbacks weren't actually setbacks. People like to look at progression as being on a straight plane. But just because you had a setback doesn't mean you're not moving forward. (Michael, national-level athlete)

But for something like sports there’s always the chance for another game; and more specifically jumping in track events you'll always miss that last bar even if you have three attempts and you've just won. Right? (Dave, regional-level athlete)

So regardless of me making the team or not doesn't really slow down my process. Because my process and my journey of becoming—of reaching my goal—is unknown. I know what's at the end of the goal. But me getting to that goal, there's going to be a lot of ups and downs. I just saw my not making the national team as a minor setback. And so, my journey is still unfolding and I'll keep working hard. (David K., provincial-level athlete)

And I was like, “well, it's my last year. I may as well see that if I actually work hard and what my full potential is.” And then we had our first little mini open of the season. I was like, “Oh, that was really good! That was only a month of trying, and I'm already beating people that are older than me.” (Riley, regional-level athlete)

Well, it's all, I feel everything is about mindset. Someone could see an experience as a failure, but I could see them as something that I've learned from. When I said, “oh I've succeeded in everything.” Yes, I think I've succeeded in majority of stuff in my life, but not everything has been perfect. But I got the best out of it. It's all about how you interpret it and how you learn from it. So, if I feel like I've learned from everything in a certain way, I'm still winning from that experience. I'm still winning from it. So, I know I'll be a winner for future experiences too. (Klea, national-level athlete)

If I'm in a competition and I win or if I jump a personal best, that’s success for a point of time. But as soon as I'm done that jump, I want to jump a higher height, I want to get better. (Dave, regional-level athlete).
Decision to Pursue Competitive Sport

Maybe I need to run a few university meets. I think the first year of competition is when you are starting to lay it out, and when you're kind of seeing where you're at. Then you can make your goals of how far you wanna go. So I think just having those first few university meets will really help me lay that down. (Riley, regional-level athlete)

Like before I just kind of went in, [I wanted to see] what would happen. (Ayobami, national-level athlete)

Passion

If you love something that much, you're willing to get through the obstacles. (Mia, international-level athlete)

I wanted to be great at something, so I said, “okay, where's the top? You can't go any higher than this. This is your definition of great, Lee.” So, that was seared in my mind. That was my goal. I was going to be on the national team. (Lee, international-level athlete)

[I would] write on pieces of paper that I was going to play [for a specific team]. I had a little sheet with my goals on it always by my bed. (Sarah, regional-level athlete)

I write those big goals down on a vision board… But then it's my job day-to-day… to make that training session better than the last one. Because if you just think about the Olympics, it can paralyze you sometimes. (Brook, international-level athlete)

Perseverance

Adding on to this, I find that people with grittiness often go beyond what is expected of them. While some athletes do the minimum amount of work that is required, those with grit will go the extra mile to find ways to improve. (Michelle, international-level athlete)

But I always seek out extra opportunities as much as possible. I think that that networking piece and talking to someone that's already done it or can help you continue on your path or help you towards your goals. (David S., national-level athlete)

But if I make my goal, I already know what my next goal is because it's on the midterm tier list for my goals. And then from there, that would become the short-term goal and then a new, the long-term goal would become the mid and then a brand new long-term goal. (Dave, regional-level athlete)

I've always been like, “Alright, this is where I wanna be at and this is what I wanna do”. But I think at the same time when plans change… I'm still am alright with it. (Christopher, regional-level athlete)

Opportunities

If you're in a spot where that moment presents itself, then the [mental] preparedness will give you success. But if you never get to that point because of various roadblocks, there's no helping you, I guess. (Jaclyn, national-level coach)

Because you do get to a certain level where not only do you have to be mentally tough and gritty and disciplined, but you actually have to also be able to physically perform. You can't throw in someone who can't kick a ball in into that just because they're gritty and they believe they can. (Natalie, national-level athlete)

Grit alone I don't think leads to [success]. Cause there's a lot more things that you also have to be aware of as an athlete and as a person in order to get to that goal. With just grit, there's so many things that you can't accomplish. (David K., provincial-level athlete)

Balance

And so, with my Achilles [injury], I learned so much about who I was and what I was capable of. It gave me a different idea of what I needed to do in the world and made me see that it's much healthier to have a broad base of support in terms of sport and athletics and family. (Caleb, international-level coach)

But I don't know, I just, for me being able to get through things like that is you need to be able to find balance and focus on other things. I think sometimes people are too focused on sport and then when that's all you have then it's a lot harder. But if you can focus on other things, you stay positive and get through [setbacks]. (Michelle, international-level athlete)
To be a professional athlete you have to be super selfish in a lot of ways, and as my career has gone on, I've realized track and field was my whole life... But the older I've gotten, I would say that I see the other aspects of life so much more, and now track and field is just something I do. It's not who I am anymore. (Brook, international-level athlete)

Sure, grit is the passion and drive towards your long-term goals, but because I'm self-aware I know to get to my long-term goals I need breaks. I used to not be self-aware, and I thought to be gritty I just had to grind 24/7 and so I was confused when I wasn't getting results. But it was because I was too exhausted. (Maddie, national-level athlete)

Obsession

Sometimes you're so goal-orientated, and it's what you do day in and day out, but we don't all realize it's not the healthiest.

Sometimes... you focus so much on something. It's like, salad is really healthy for you, but if you eat it every single day, you're missing your protein. So, if you just focus on it all the time, you have this tunnel vision and you're stopping yourself from seeing the whole picture and that's not going to help you. (Natalie, national-level athlete)

I think if someone is on the platform for so long, I don't think they love it that much or they're that passionate about it or still that perseverant. I think they just continue it because they don't know life without it... I think athletes without their sport don't know who they are. I think also that's why people have grit and keep going are just like, “who would I be without my sport?” (Klea, national-level athlete)

I was trying to demand and get everything done and just do everything I possibly could to squeeze every bit I could out of the game and the practice and stuff. And I realized for an analogy, I was kind of gripping the hockey stick a little too tight. And I think there's a time and place to do that. But I think generally you kind of need to let it flow and just be you. (Maddie, national-level athlete)

Goal Attainment

[Grit] is such a huge predictor of who will go far or who will go from youth sports to university or college. And I think about girls that I played against as a youth who didn't go to university. I don't know what they're doing with their lives. But they were better than me when we were 15 or 16, but never played at the university level. And there's probably so many more factors than just grit, but I think that's such a huge predictor in youth sports of who will make that step to the next level. (Sarah, regional-level athlete)

And I think I generally do though believe that if you have the perseverance and the grit, you'll accomplish whatever you want to accomplish. You might just not do it right in that moment. (Claire, regional-level athlete)

Success should come if you hang onto it long enough and don't give up. (Natalie, national-level athlete)

I've been in sport a really long time and the people who I know who have had success are the ones... they're not necessarily the most talented. It's the ones that have that drive and put in the work. And I feel like everybody wants success, but not everybody's willing to put in the work to actually get it. (Michelle, international-level athlete)

Longevity

I think longevity in the sport [is an outcome of grit]. Opportunities, whether it’s playing time, opportunities to take it to the next level, or even outside of that with just... I think usually if you're gritty, you have good relationships with those around you, and that gives you opportunities—whether it be in a work opportunity or playing in a different province or internationally or whatever it is. (Sarah, regional-level athlete)

So even in my coaching, I see people who haven't quite hit puberty yet—because I coach grade eight and nines—and I'm like, “well, at your age the people who are running faster are the ones that have already developed, and they have built that strength. Your time will come you need to just give it time!” (Michelle, international-level athlete)

Grit leads to you sticking around. All my friends left last year. It was really hard. I almost didn't stay, but I stuck through it and it's like, “Man, I earned this.” (Maddie, national-level athlete)
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction</td>
<td>In August of 2024, [athlete] will have this ‘end of the journey’ sigh. And in that sigh, she is… content. It doesn't mean happy. It doesn't mean sad. It just means that she can reflect on the journey, on everything—the ups, the downs, the good, the bad, the wasted money, the wasted flights, just everything—and go and be content. (Tom, international-level coach)</td>
</tr>
<tr>
<td></td>
<td>This concept of grit and not giving up or pursuing your best self, whatever way you want to go with it, I think leads to a lot of personal fulfillment regardless of what the sport outcome is… I think that leads to some fulfillment life-wise. That grittiness, that struggle, that process, that suffering, is where fulfillment comes from. (Bruce, national-level coach)</td>
</tr>
<tr>
<td></td>
<td>If you can look back and know that you were a gritty athlete, you'd be pretty satisfied with how things went regardless of playing time or records or how many goals you scored or kills you had. (Mark, national-level coach)</td>
</tr>
<tr>
<td></td>
<td>This feeling of, “I put everything onto the table, and I didn't hold anything back.” I think that's a very satisfying feeling. (Caleb, international-level coach)</td>
</tr>
<tr>
<td>Healthy Transitions</td>
<td>There's athletes who are so successful in sport and then they're like, “Alright, sport's done. What's next?” And it's a healthy mindset. They have that drive and that determination. (Brook, international-level athlete)</td>
</tr>
<tr>
<td></td>
<td>Some of the grittiest athletes are pretty successful… in their careers now. They have… maybe not the exact job—well some of them do—have the exact job that they want or whatever, but they enjoy it. And whatever they're doing, they climb quickly, I think. Or if they don't like something they're like, “okay, I got to do something to change it.” (Trent, national-level retired athlete)</td>
</tr>
<tr>
<td></td>
<td>Feasible or even just not, I could keep playing professionally for a few years, but it's not really what I want anymore. And there's other values that I have in life: coaching, my relationship, and [continuing to play] would really affect those things. (David S., national-level athlete)</td>
</tr>
<tr>
<td>Isolation from Others</td>
<td>And then you look at some of the best sports players in the whole world, they wake up at three in the morning, go practice, go home, eat food, take a nap, practice, just practice, practice, practice, practice… I think that it's very difficult to separate the greatness to achieve something and loneliness because you have to put in so much work to be the pinnacle, to be the top, to be great. (Caleb, international-level coach)</td>
</tr>
<tr>
<td></td>
<td>And I think maybe I romanticized the sporting dream a little. It's quite a lonely experience living alone in Europe and playing pro. (David S., national-level athlete)</td>
</tr>
<tr>
<td></td>
<td>[Peer] is so focused on [her goal] that she has tunnel vision and neglects relationships along the way… I think she struggles to understand people who aren't as gritty and obsessed as she is with her ultimate goal. (Jaclyn, national-level coach)</td>
</tr>
<tr>
<td>Burnout</td>
<td>There's always a fine line between grit overexertion and over-training….You can overdo a lot of things. You can overdo your mental state to the point where you enter a rabbit hole, or you can go down lots of really, really steep paths. (Michael, national-level athlete)</td>
</tr>
<tr>
<td></td>
<td>Maybe you're setting really hard goals for yourself and then that could drain you or when you don't see that happening that could just send you kind of the wrong way or make you hate the sport or something. (Rebecca, regional-level athlete)</td>
</tr>
<tr>
<td>Long-Term Injury</td>
<td>There was no quitting. I was taking highly prescriptive, anti-inflammatories to run on a broken foot. Yet I was still competing on it because I had to… I pushed my body to the extreme, and the stress reaction turned into a stress fracture, which turned into bone chips, which turned into all these things, all because I was like, “I have to compete, I have to do this. (Brook, international-level athlete)</td>
</tr>
<tr>
<td></td>
<td>I think you can overwork yourself to a point of burnout and injury. I've seen it before with teammates, where they just will not stop to the point where their body physically has to stop them. (Maddie, national-level athlete)</td>
</tr>
</tbody>
</table>
Figure 5.1

*A Grounded Theory of Grit in Competitive Sport*
CHAPTER V

General Discussion
Introduction

My dissertation research program aimed to explore the role of grit (Duckworth et al., 2007) in competitive sport. To accomplish this goal, I designed three studies, each building upon the findings of the previous one. My research program was marked by a complementary progression, ultimately resulting in insight that informed the central purpose of the dissertation. Through three interrelated and sequential studies presented in my dissertation, I (a) described the existing body of grit in sport research and identified important gaps in the literature that needed to be addressed to advance the field, (b) assessed the predictive utility of the sport-specific grit subscales and found some evidence supporting their unique contribution to important collegiate athlete outcomes, and (c) constructed a grounded theory of grit in competitive sport. A brief summary of the findings from each individual study is shown in Table 5.1. From this work, my program of research contributes to the literature by offering advancements to both theory and measurement practices.

Integrated Interpretation of the Dissertation

The Relevance of Grit to Sport Participants

From the perspectives of the athletes and sport support persons that were interviewed in Studies 1 and 3, there was a collective conviction that grit was considered a desirable disposition to possess in sport. Athletes stated that grit was a virtue that they strived to cultivate and outwardly demonstrate, while coaches expressed their conscious efforts to recruit and train gritty athletes (e.g., “You see less talented athletes that have grit, and they seem to eventually be more successful than somebody that doesn’t seem to have that same ‘it’ factor. That grit factor” [Mark, national-level coach, Study 1]). The belief that grit is a desirable and useful disposition in sport is corroborated by research highlighted within the scoping review from Study 1. Supporting this
point, when coaches were interviewed about their perspectives on the various psychological determinants of success required to succeed in sport, grit was selected as the most important (Tedesqui & Young, 2020). Coaches also recognize that grit is one of many factors that enable their athletes to advance to higher skill levels, and more specifically because of their long-term commitment to training and athletic mastery (Morgan, 2016; Rhodes, 2020; Tedesqui & Young, 2020). Taken together, my own research and findings from previous research indicate that athletes and coaches perceive grit to be a valuable trait in sport; thus suggesting that it plays an important role in the achievement-striving process.

**The Relationship Between Grit and Sport Performance**

While athletes and sport support persons generally recognized the significance of grit in their sport experiences, the role that grit plays in the actual performance outcomes of athletes remains unclear. As found in the scoping review described in Study 1, composite grit scores in previous research were significantly linked to improvements in collegiate athletes’ subjective performance in practice following days where their performance had dipped considerably below their average performance assessment (Doorley et al., 2022). In addition, grit has been shown to be a significant moderator between feedback type (i.e., mastery vs. ego) and athlete performance in an experimental soccer shooting task (Moles et al., 2017). While these positive and significant results are encouraging, researchers have also found evidence to suggest that grit is unrelated to competitive adolescent alpine skiers’ end-of-season ranking (Fawver et al., 2020) and did not statistically differentiate between athletes competing at different skill levels (i.e., World Cup, Olympic, professional, NCCA divisions I, II, and III; Meyer et al., 2017). Even when looking at the subscales of grit, evidence for the relationship between grit and sport performance is similarly murky. Consistency of interests was a stronger predictor of youth soccer athlete
performance in an ecologically valid perceptual-cognitive ability task than perseverance of effort (Larkin et al., 2023), and perseverance of effort was positively related to athlete skill group membership while consistency of interests was not (Tedesqui & Young, 2017, 2018). However, both consistency of interests and perseverance of effort were unrelated to various indicators of ultramarathon runner performance (Cousins et al., 2020). Since it still seemed unclear whether or not grit in sport was significantly related to performance, I decided to use three separate measures of performance in Study 2 to assess the predictive utility of the sport-specific grit subscales. Two of these measures—the Sport Performance Perceptions Scale (Adam et al., 2023) and Subjective Sport Performance (Doorley et al., 2022)—were subjective measurements of participants’ retrospective sport performance. I also asked participants to indicate the highest level of competition they had ever competed at, which aimed to offer a slightly more objective assessment of sport performance based on their previous achievements.

Mirroring the extant body of literature (e.g., Cazayoux & DeBeliso, 2019; From et al., 2020; Ueno et al., 2018), I found mixed evidence supporting the relationship between grit and sporting achievement. No significant correlations were observed between the grit subscales and athletes’ highest level of competition. However, both the adaptability to situations (Datu et al., 2017) and perseverance of effort subscales were positively correlated to the Sport Performance Perceptions Scale and Subjective Sport Performance, while consistency of interests was positively correlated with the former only. Results from hierarchical multiple regression analyses indicated that the three grit subscales did not explain any unique variance over self-control, conscientiousness, and mental toughness in athletes’ highest level of competition or Subjective Sport Performance. As sport often involves a high degree of unpredictability (e.g., injuries, game conditions, opponents' performance, and coach choices; Sagar et al., 2009), it is possible that
long-term dedication to excellence in sport does not significantly affect an athlete’s chances of performing well during critical moments that are important to their goals or overall progression in sport beyond other determinants of success in sport. However, when predicting responses on the Sport Performance Perceptions Scale, the inclusion of the grit subscales explained additional variance when entered in the final step of the regression analysis. The novel adaptability to situations subscale was a significant predictor of the final model. The Sport Performance Perceptions Scale is a multi-dimensional questionnaire that assesses several facets of athlete performance, including athlete development, mastery, preparedness, recovery and injury prevention, and psychological skills; and it is possible that each of these components are largely within the control of athletes (Adam et al., 2023). Therefore, athletes who can adapt to various setbacks might be more likely to score highly on this measure of subjective performance. Given that it was only the adaptability to situations subscale that added significantly to just one of the models predicting sport performance, more research is needed to fully understand the role that the grit subscales play in athletic performance.

The mixed results from Study 2 correspond with the nuanced perspectives of athletes and sport support persons included in Studies 1 and 3. While sport participants clearly valued passion and perseverance in the achievement-striving process, it was also acknowledged by participants that grit alone could not create success in sport. Therefore, while grit facilitated an athlete’s ability to remain focused on their long-term goals and overcome setbacks, they also needed to demonstrate a wide variety of other physical, tactical, technical, and psychological abilities to separate themselves from their peers. To demonstrate, Natalie—an international-level athlete interviewed in Study 3—stated:
Because you do get to a certain level where not only do you have to be mentally tough and gritty and disciplined, but you actually have to also be able to physically perform. You can't throw in someone who can't kick a ball onto [a competitive soccer team] just because they're gritty and they believe they can.

Thus, the relationship between grit and athletic performance appears to be complex, with some researchers finding significant links while others did not (e.g., Meyer et al., 2017; Tedesqui & Young, 2017, 2018). My program of research adds to these mixed results and suggests that while grit may not predict objective performance measures, it may be a significant predictor of subjective performance perceptions and can be a catalyst to goal achievement when accompanied by opportunities to succeed. Despite these mixed results, my findings suggest that grit continues to be a valuable avenue of study for sport researchers and practitioners as it may be associated with other adaptive constructs besides achievement in sport.

**The Relationship Between Grit and Adaptive Constructs in Sport**

As I had identified in the various studies that were collated for the scoping review described in Study 1, grit was positively linked to several adaptive constructs, including mindfulness (Brennan et al., 2018), self-compassion (Johnson et al., 2020; Mayol et al., 2019; Mosewich et al., 2021; Orris et al., 2019), and deliberate practice (Fawver et al., 2020; Larkin et al., 2015; Tedesqui & Young, 2017, 2018). Grit was also examined alongside various indicators of well-being, but these results were unclear. For example, perseverance of effort was found to be positively associated with life satisfaction in Japanese triathletes (An et al., 2021), while composite grit scores were unrelated to life satisfaction in adult wheelchair basketball athletes (Martin et al., 2015). Additionally, higher composite grit scores indicated increased positive emotions (Doorley, 2020). Clearly, more work needed to be done to fully understand the
nuanced relationship between grit and well-being in sport context, and I designed Study 2 to examine the relationships between the sport-specific grit subscales and three different measures of well-being. Results indicated that the adaptability to situations and perseverance of effort grit subscales were positively correlated to each of my three chosen measures of well-being, while consistency of interests was only positively correlated with the Eudaimonic Well-Being in Sport scale. Furthermore, the inclusion of the three grit subscales in the final step of my hierarchical multiple regression analyses added unique variance when predicting Eudaimonic Well-Being in Sport and Satisfaction in Sport. Perseverance of effort was a significant contributor to both models, while adaptability to situations added only to Eudaimonic Well-Being in Sport. These results suggest that athletes who perceive that their lives are rife with meaning and self-actualization also have a robust ability to overcome setbacks and adapt to the ever-changing sport environment. Researchers have suggested that perseverance of effort and adaptability to situations might relate to well-being within the framework of emotion regulation theory (Gross, 2015). That is, persistent and adaptive individuals are more likely to cognitively reappraise setbacks as opportunities for improving their problem-solving skills, and these continued positive interpretations of challenges lead to increases in overall well-being (Datu et al., 2021). However, it was still unclear why grit and well-being were positively associated with one another in the context of sport, which led to the design and execution of Study 3.

The athletes and sport support persons included in Study 3 agreed that—when paired with a balanced self-identity—grit in sport led to a great sense of satisfaction once an athlete had come to the end of their journey in competitive athletics. Athletes who were gritty seemed to experience personal fulfillment, pride, and satisfaction with how they played and trained, regardless of their extrinsic achievements. To demonstrate, Caleb (an international-level coach
who was once a former international-level athlete) spoke to his experiences after retiring from sport and the expectations he had for his athletes that were finishing their athletic careers:

I think that if you commit yourself to something and trust the process and work as hard as you can on one thing and bear the load of responsibility—single-mindedly with a specific goal in mind—I really think that regardless of whether you succeed or fail there's this feeling of contentedness. This feeling of, “I put everything onto the table, and I didn't hold anything back”. I think that's a very satisfying feeling.

Furthermore, my findings also suggested that grit might be associated with languishing in sport. As identified in Study 3, gritty athletes whose self-identities resided solely in sport tended to experience isolation from others, burnout, and long-term injuries. These findings appear to support the supposition that grit can lead to maladaptive outcomes in sport (e.g., Crust et al., 2016; Fong et al., 2016) and other domains (e.g., Anestis & Selby, 2015; Houston et al., 2021; Lucas et al., 2015).

Considering the results from Studies 1 through 3, there appears to be a clear pattern associating grit in sport with other relevant and important constructs. Although grit may not forecast objective performance metrics, it could serve as a significant predictor of subjective performance evaluations and can facilitate goal attainment when paired with opportunities for success. As a whole, these results support the continued examination of grit by sport researchers and practitioners (e.g., Hamidi & Wazir, 2022; Larkin et al., 2016; Tedesqui & Young, 2018), as it may be related to other beneficial constructs beyond athletic achievement. However, these relationships are still complex, and the theoretical framework and measurement of grit in sport must be critically considered to move the field forward.
Contributions to Theory

My dissertation extends knowledge about several key tenants of the original grit theory proposed by Angela Duckworth and colleagues (2007; 2009), the first being the domain-specificity of the construct. As was shown in the scoping review described in Study 1, two studies have found evidence supporting the domain-specific conceptualization of grit in sport settings (Cormier et al., 2019; Mosewich et al., 2021). These results informed my decision to use a domain-specific version of the original grit scale in Study 2. In Study 3, participants further reinforced the domain-specificity of the construct by sharing how they made conscious decisions about the domains in which they would demonstrate grit. For example, Tom—an international-level coach—said the following about his athletes:

In my experience, individuals can be extremely gritty in sport, but not gritty in academics and vice versa… So, working with 18- to 25-year-olds I got kids that are gritty at the track and not gritty in the classroom, and gritty in the classroom and not gritty at track. And it's like, “How the hell can you be so good in this avenue but so bad in this other?”

Thus, this program of research evolves the theoretical framework by highlighting the importance of considering the unique nuances of the specific domain wherein which those goals are set.

Next, my dissertation continues to support Duckworth et al.’s (2007) conceptualization of grit as a dispositional tendency to pursue personally meaningful long-term goals over long periods of time despite the presence of setbacks. A novel contribution to the literature lies in my supposition that grit grows in competitive athletes over time, thus making it a malleable dispositional tendency. While Duckworth and her colleagues have previously determined that adolescent students’ scores on the Short Grit Scale were stable over a one-year span, few researchers have examined the temporal stability of grit scores over longer periods of time (e.g.,
Furthermore, it is to the best of my knowledge that no research examining this research question has been completed in the realm of sport. It seems clear from the participants included in Study 3 that grit in sport was stable, long-lasting, and internally caused by the time they had reached higher levels of competition, but that they had to move through various experiences in sport in order to fully embody this disposition.

Lastly, as stated within the grounded theory constructed in Study 3, I propose that previous setbacks and positive experiences in sport contribute to the development of grit in athletes. This finding highlights the importance of exposure to diverse sport-related situations and is substantiated by strong empirical evidence from the field of developmental psychology that shows that a wide breadth of experiences in early development is an indicator of future success (e.g., Busseri & Rose-Krasnor, 2009; Busseri et al., 2006). While my grounded theory does not specify the types or amounts of developmental practice activities that should be attained, researchers might look to adjacent theoretical frameworks such as Ericsson et al.’s (1993) deliberate practice or Côté and Vierimaa’s (2014) Developmental Model of Sport Participation for further guidance. Additionally, I expand the existing theoretical framework through an emphasis on the role of social agents, such as coaches, parents, and peers, in shaping athletes’ understanding of success and failure in sport. Duckworth purposefully omitted the inclusion of social influences from her original theoretical framework of grit (“We also omit from our review situational factors and social and cultural variables that influence achievement”, 2007, p. 1008); however, it was clear from the participants in my third study, as well as evidence from the sport literature (e.g., Brustad, 1992; Côté, 1999; Partridge et al., 2008), that the coaches, parents, and peers of athletes likely play an integral role in the development of grit in sport.

**Contributions to Measurement**
In addition to providing strong support for the domain-specific conceptualization (and therefore measurement) of grit, my research also contributes novel insights to the ongoing critiques about the factor structure of the original and shortened grit questionnaires (Credé et al., 2017; Duckworth et al., 2021). More specifically, whether all facets of grit should be considered to be of equal importance in the measurement of the construct. From my interviews with athletes and sport support persons in Study 3, it appeared that athletes needed to simultaneously demonstrate high levels of both passion and perseverance in order to attain any of the outcomes suggested within the model. More specifically, athletes who were exceedingly perseverant but not passionate felt they could push themselves past short-term setbacks; however, they had difficulty staying in their sport because they did not have a specific endgame in mind (e.g., “I was like a warrior without a war” [Trent]). On the other hand, athletes who were exceptionally passionate but could not persevere past the challenges they experienced while training would fail to attain their long-term goals because they would quit. Although the requirement for an individual to be both passionate and perseverant to qualify as truly gritty is conceptually implied in Duckworth’s (2007) original theory (i.e., “perseverance and passion for long-term goals”, p. 1087, emphasis added), this is not reflected in its measurement. That is, an individual would still be considered to have an average composite grit score if they were to score highly on one subscale and low on the other. Supporting the findings from Study 3, one potential path forward comes from Credé (2018), who suggests that researchers use a person-centered approach (i.e., identifying subgroups of individuals based on their similarities as a means to study them together as an undivided whole; Bergman & Trost, 2006) when measuring grit by using latent class analysis (Dul, 2016). With this solution, individuals would be separated into ‘high grit’ and ‘low grit’ categories (amongst others), instead of scoring across a continuum (Morin et al., 2017). A
second resolution would be to continue the practice of separating the two grit subscales and make distinct inferences about athlete consistency of interests and perseverance of effort. This is becoming an increasingly popular practice in sport research (e.g., Dunn et al., 2021; Mosewich et al., 2021; Tedesqui & Young, 2018), as was indicated in Study 1.

Considering the critiques of grit in domains outside and within sport, my program of research suggests that the grit construct may have specific relevance in the context of competitive sport; offers predictive value for some athlete performance and well-being outcomes beyond other determinants of success; and offers a novel grounded theory that corroborates existing research in the field. These nuanced findings provide support for continued exploration of grit as a motivational disposition in sport, as long as these strides are taken with caution and an informed approach. Together, my series of three studies advance our understanding of grit in sport and offer valuable insights for researchers and practitioners seeking to enhance athlete grit.

**Implications for Practitioners**

Understanding how people think, feel, and behave in the achievement domain is crucial for practitioners working in applied settings. Coaches, talent identification scouts, mental performance consultants, and other sport support persons who work with athletes are likely interested in knowing how to best support adaptive psychological phenomena that underlie positive outcomes within the sport domain. Based upon the findings from the three studies included in my program of research, I offer some approaches that might help sport practitioners to better foster grit in competitive sport settings.

**Interventions for Grit in Sport**

As shown in Study 1, limited interventions meant to foster grit in the sport domain exist. Thus, it remains unclear when and how would be most effective for practitioners to intervene and
develop athlete grit, though the findings from this dissertation might lend some insights. From the interviews conducted in Studies 1 and 3, it appears that grit was developed in athletes much before they had begun competing in sport as adults. That is, it seems that both positive experiences and setbacks in sports contribute to the development of grit in athletes as they enter the world of sports and begin to specialize. To foster grit in athletes as they progress in their sport, sport support persons are advised to consider implementing interventions at the developmental level. While limited grit intervention research has been conducted with athletes participating at the grassroots level, theories and empirically-driven interventions concerning goal orientation (e.g., Duda, 1987, 1989) and mindsets (e.g., Dweck & Leggett, 1988; Haimovitz & Dweck, 2017) have been developed and might offer relevant insights. As such, it is likely that sport coaches and parents play a vital role in the development of grit in sport and are encouraged to provide their athletes with mastery-involving feedback (e.g., Donald et al., 2019; Moles et al., 2017).

Next, only one intervention has been shown to reliably increase and sustain athlete grit levels over time. Functional Imagery Training (FIT; Rhodes et al., 2018) aims to develop competency in imagery, goal setting, and self-awareness to augment mastery goal orientation (i.e., motivation towards self-improvement and exertion of maximum effort). After completing the 6-week FIT intervention the grit scores of professional soccer players were significantly increased and sustained when compared to a control group. While I strongly recommend following the protocols for Rhodes and colleagues’ (2018) verified intervention (for full intervention protocols see, Rhodes, 2020), other methods for fostering grit in sport might prove fruitful. Based upon the results of Study 3, practitioners should consider implementing a mastery-involving motivational climate, goal-setting skills, and self-compassion interventions.
that—while not yet empirically tested to improve the grit scores of athletes—should theoretically increase grit based on the categories identified within the grounded theory.

**Motivational Climate.** A mastery-involving motivational climate emphasizes the provision of feedback that focuses on individual effort, improvement, and progress; rather than outcomes (Ames, 1992). This creates a supportive environment where athletes feel free to take risks and experiment with their sport skills (Ames, 1992). The effects of motivational climate interventions have been studied extensively, and offer promising results (e.g., Hassan & Morgan, 2015; Smith et al., 2007; Smoll et al., 2007). The core principals of a mastery-involving motivational climate align with the conceptualizations of success and failure that were identified by athletes as essential to their process of developing their grit in sport, and therefore might offer an effective avenue of inquiry for sport support persons.

**Goal Setting.** Goal setting might be another potential method to increase athlete grit, and practitioners can draw on the extensive body of applied goal-setting literature (Jeong et al., 2021; Kingston & Wilson, 2009; Kyllo & Landers, 1995). Goals direct the performer’s attention and actions to important aspects of a task, which consequently increase immediate effort, persistence, and ultimately facilitate performance in sport (Locke & Latham, 1985, 2002; Locke et al., 1981). Athletes should be encouraged to set a variety of goals that are specific, measurable, achievable, relevant, and time-based (Locke & Latham, 2002); short-range and long-range in nature (Weinberg et al., 2001); process, performance, and outcome goals (Filby et al., 1999); and both daily practice and competition goals (Orlick & Partington, 1988).

**Self-Compassion.** Self-compassion—defined as the balanced awareness of one’s suffering and a desire to alleviate it through kindness and understanding (Neff, 2003)—has been shown to increase the perceived performance and reduce the self-criticism of NCAA athletes.
(Kuchar et al., 2023). Similarly, it has also been found to decrease rumination and concerns over mistakes in women varsity athletes (Mosewich et al., 2013). Previous research has established a significant positive correlation between grit and self-compassion. For instance, self-compassion positively predicts varsity athletes' perseverance of effort (Mosewich et al., 2021), and has been linked to the composite grit scores of Thai national-level athletes (Jarukasemthawee et al., 2021). Adopting self-compassion can be particularly beneficial for protecting the identities of athletes who are transitioning out of sport, as this worldview has been shown to mitigate negative emotions associated with identity-challenging life transitions in women exercisers (Kullman et al., 2021). Sport support persons should consider weaving self-compassion into their work to enhance the likelihood that athletes experience the positive outcomes of grit in sport (Mosewich et al., 2019; for a comprehensive scoping review of grit in sport see Cormier, Kowalski, et al., 2023).

**Awareness of the Dark Side of Grit**

Though the results from Studies 1 and 2 will likely spur sport support persons to hold positive associations of grit in sport, they should be wary about the potential negative outcomes that stem from the obsessive pursuit of one’s goals in sport. Participants included in Studies 1 and 3 commented on the possibility of being ‘too gritty’ as a harbinger of harm for athletes, including isolation from others, burnout, and long-term injury. This is reflected in sport research exploring the 'dark side' of other motivational dispositions that are otherwise positively linked with positive outcomes for athletes, including perfectionism (Flett & Hewitt, 2005) and passion (Vallerand et al., 2008). Research outside of sport has found some maladaptive outcomes from the dogged pursuit of goals (e.g., Anestis & Selby, 2015; Czerwiński et al., 2022; Houston et al., 2021; Khan et al., 2021). For instance, undergraduate students with higher levels of grit tended to
show a greater degree of ‘stubborn persistence’ than students with lower levels of grit when tasked with solving anagram puzzles (some of which were unsolvable; Lucas et al., 2015). Moreover, when the anagram-solving task was incentivized with monetary rewards (i.e., students were promised more money based on their ability to solve more puzzles), grittier students tended to spend more time on unsolvable anagrams rather than moving on to solve easier anagrams. Thus, researchers should be cognizant of the potential relationship between grit and maladaptive outcomes and encourage their athletes to maintain a balanced self-identity within and outside of sport.

**Methodological Reflections**

This dissertation is characterized by the methodological approaches that were used to inform my research purpose. In this section, I reflect upon the decisions I made in my overall study design. I also provide an appraisal of the aspects that I deem successful, in addition to highlighting those that could be improved in future research endeavours.

**Use of Mixed Methodologies**

A notable strength of my dissertation was the use and overall alignment of both quantitative and qualitative research methodologies to address my larger research purpose. I was able to use many means of deriving knowledge and understanding to answer my research questions (Creswell & Plano Clark, 2018; Tashakkori & Teddlie, 1998), and applied a multiphase mixed methods design to my dissertation research (Creswell & Plano Clark, 2011). The use of mixed methods is in agreement with my pragmatist worldview (i.e., a philosophical foundation where an emphasis is placed on practical solutions to real-world problems; Giacobbi et al., 2005; James, 1907). With respect to the alignment of the program, the ordering of each
research study was thoughtfully considered. I conducted my review of the extant body of literature first so that I could make informed steps forward. Major themes that influenced the conceptualization of Studies 2 and 3 were the pervasive nature of the critiques about whether grit made a unique contribution to the literature, evidence suggesting that there was added value in evaluating each grit facet separately, an absence of a sport-specific theoretical framework, and an overrepresentation of quantitative research. Though it was identified in Study 1 that there was a clear need to qualitatively understand the lived experience of grit from an athlete’s perspective, this was precluded by the general hesitance of sport researchers to fully embrace grit as a useful construct in sport psychology. As the pragmatist approach is primarily concerned with the usefulness of the research (Cornish & Gillespie, 2009; Fishman, 1999), it seemed clear that I should first ascertain whether grit added any predictive utility over and above other existing constructs before moving forward with the construction of a grounded theory of grit in competitive sport.

**Knowledge Translation**

Collaboration and engagement with knowledge users are other cornerstones of the pragmatic approach (Creswell & Plano Clark, 2018). Throughout this dissertation, I intentionally engaged with the community to disseminate my findings. My philosophy is influenced by the seminal work of Dr. Ian Graham and the Knowledge-to-Action Framework (Graham et al., 2006; Straus et al., 2009). I strived to ensure my role as a researcher did not become a transactional or one-sided relationship with knowledge users. Consequently, knowledge translation signifies a joint and reciprocal process between community members and myself (Graham et al., 2018). Rather than believing myself to be an ‘expert’ who has the authority to impose top-down changes, true engagement can only occur when knowledge keepers (i.e., researchers) and
knowledge users (e.g., policy, athletes, sport parents, coaches) consistently collaborate to bring about complementary knowledge and skills (Graham et al., 2018). Various approaches to knowledge transfer were taken throughout this program of research (e.g., Straus et al., 2009). First, coaches were interviewed for the scoping review described in chapter two. Each coach was given a summary of the grit in sport literature (for the scoping review summary given to coaches, see Appendix D) that included—amongst other things—a definition of the construct, promising grit interventions, and some of the most pervasive critiques of grit. Coaches were then asked to share their thoughts about the contents of the review and their perspectives on grit, both of which were included in the findings of Study 1. Second, findings from this dissertation were/will be presented at several conferences, including the North American Society for the Psychology of Sport and Physical Activity annual conference (i.e., NASPSPA; Cormier et al., 2021, Cormier, Ferguson, et al., 2023a, 2023b) and the Canadian Society for Psychomotor Learning annual conference (i.e., SCAPPS). Third, student-athletes who participated in Study 2 were offered a single 60-minute mental training session about grit in sport led by myself. The session provided participants with a summary of the existing grit in sport research, a demonstration of relevant and empirically informed tools shown to positively affect athlete grit, and time for discussion afterwards. Upon the eventual publication of Studies 2 and 3, I plan to disseminate these findings using text and visual imagery (i.e., graphs, images, and infographics) on various social media platforms (i.e., Twitter, LinkedIn, ResearchGate) using best practices (e.g., Barton & Merolli, 2019; Lu et al., 2020). These opportunities for knowledge translation were incredibly rewarding, and I look forward to engaging with knowledge users in the future.

**Homogeneity of the Sample**
The findings of my dissertation should be considered within the context of their limitations. A first potential weakness of my program of study lies in the homogeneity of the Study 2 and 3 samples; including the samples’ competitive level, highest level of competition, ethnicity, and nationality. As identified in Study 1, most studies exploring grit in sport have been conducted with collegiate-level athletes (57.7%). While the guiding purpose of my research was to understand the role of grit in competitive sport, most of my participants were varsity athletes (i.e., all of Study 2 participants, and 46.4% of the participants included in Study 3). Because the competitive level of an athlete greatly influences their needs and experiences (e.g., Baker et al., 2023; Wylleman & Reints, 2010), the high representation of varsity student-athletes in these studies limits the generalizability of my findings. Furthermore, the lack of variance in Study 2 participants’ highest level of competition may have affected study results, as the vast majority of these varsity athletes indicated that the highest level of competition they had ever competed at was the regional level (i.e., Competing against athletes from the Western provinces, such as in the CanWest). It is also important to recognize that many of our participants were White and resided in Westernized countries. The homogeneity in my sample was likely largely due to my decision to recruit sport participants from organizations where I already knew and understood the process for accessing these specialized populations (i.e., Western Canadian university varsity teams). Regardless, it is important to recognize that findings from general psychology suggest that grit manifests differently based upon the cultural and/or societal context wherein it is considered (Datu et al., 2017; 2021). And so, while the findings of this dissertation provide valuable insights into the role of grit in sport, the homogeneity of the collected samples limit the generalizability of the results and suggest the need for more diverse and representative research in the future.
**Cross-Sectional Designs**

Next, the strategies of inquiry used in Study 2 and (to an extent) 3 were cross-sectional, which poses certain restrictions on the interpretation of study conclusions. My decision to use cross-sectional research designs was largely based on the exploratory nature of my research, and I prioritized the importance of gaining preliminary evidence to lend insight into my various research questions before examining them over time. However, as found in Study 1, there is a clear overrepresentation of cross-sectional research in the grit in sport literature (83.3%). Cross-sectional research designs cannot offer insights into the temporal order of variables (Rindfleisch et al., 2008). Thus, while the presumption that grit is a precursor to success aligns with Duckworth’s theoretical understanding of grit (Duckworth et al., 2007), I was not able to verify the directionality of these variables in Study 2. Since the grounded theory constructed in Study 3 supposes that a certain level of positive experiences in sport (including success early in their careers) must be experienced before athletes commit to sport and become gritty, it is a strong possibility that significant bi-directional pathways exist between performance and grit. Second, cross-sectional designs hinder researchers from making any causal interpretations. Future implementation of longitudinal research methodologies will be critical in studying the role of grit in athletes, as these designs allow for the assessment of changes in grit over time. By tracking changes in grit alongside changes in athlete performance and well-being, researchers can gain a better understanding of the interplay between these factors and how passion and perseverance each contribute to athletic success. Additionally, longitudinal studies should be used to quantitatively test the grounded theory produced in Study 3, and further assess this theoretical framework of grit in relation to other personality traits, such as mental toughness,
conscientiousness, and self-control. In sum, longitudinal methodologies can, and should be, used to gain a fuller understanding of the role of grit in sport.

**Social Desirability Bias**

Another weakness of my research program is the potential presence of social desirability bias in the collected data. It was clear in interviews with sport participants and support persons that grit is a highly desirable trait for athletes to possess (which is also reflected within the extant literature; Poczwardowski et al., 2014; Tedesqui & Young, 2020). It is therefore highly likely that social desirability bias (i.e., construction of reality and the presentation of that reality to researchers; Goldfried et al., 1964) may have affected the data collected for this research program. While I did not use any measures to statistically detect or correct for social desirability bias in Study 2 (c.f., van de Mortel, 2008), I did take several other steps to attenuate the presence of participant bias. For instance, the data collection and generation locations chosen for Study 2 and 3 were private, outside of the view and earshot of others, and no coaching staff were present. In Study 3, I prioritized developing rapport with all participants, including the use of humour and self-disclosure (Brinkman & Kvale, 2014). Participants included in these studies were also given a clear explanation of the study purpose, how their data would be used, and confidentiality and anonymity procedures. Despite these measures to detect and limit social desirability bias, it is important to acknowledge that participant bias is likely an inherent and constant quality of both quantitative and qualitative research (Bergen & Labonté, 2020), and researchers should remain vigilant and considerate of its potential impact on study outcomes.

**Future Directions**

Based upon the findings from my program of study, I recommend support for researchers and practitioners alike to continue to examine and utilize grit within athletic settings. However, there
remain several relevant future directions deserving of further exploration. These include considerations for the measurement of grit in sport, examination of grit at the team level, and the exploration of the role that grit might play in athlete populations that compete outside of competitive sport.

**Improving the Measurement of Grit in Sport**

The first and perhaps most important next step for researchers to take will be to improve the measurement of grit in sport. There are several ways to go about this. First, the existing grit scales (i.e., Duckworth et al., 2007; Duckworth & Quinn, 2009) do not seem to fully capture athletes' sport-specific passion. At face value, the consistency of interests subscale appears to be measuring one's ability to focus on short-term interests and projects, rather than striving towards personally meaningful long-term goals (Datu, 2021). Thus, researchers should consider enhancing the construct validity of this subscale by creating new items for the consistency of interests subscale that accurately reflect the process of setting and achieving long-term goals. Researchers who plan to develop a novel measurement should follow established best practices, including the careful generation of items, evaluation by experts and/or target population, pilot testing, evaluation and confirmation of factor structure using factor analysis, and assessment of measure validity and reliability (c.f., Clark & Watson, 2019; Holmbeck & Devine, 2009; Irving et al., 2018).

Next, researchers should consider how Adaptability to Situations (AS) subscale items might be used to improve the measurement of grit in sport. Recall that the AS grit subscale was developed and validated as a part of Datu and colleagues’ (2017) Triarchic Model of Grit. As I had found evidence in Study 2 suggesting that the AS subscale offered some predictive utility over other determinants of success (predicting unique variance in subjective sport performance
perceptions and eudaimonic well-being), future researchers should consider further validating the AS subscale in other sport samples. Additionally—as interviews with participants included in Study 3 suggested that AS might be a facet of perseverance—research exploring the factor structure of the subscale in relation to the PE subscale of grit to determine if there is any overlap between the two subscales might be a fruitful area of inquiry.

Last, to overcome the limitations of self-reported data, future researchers may consider using informant-report measures or other third-party observations to infer athletes' levels of grit. Objective behavioural or observational methods—such as tracking the amount of time participants spend training in and outside of structured practice environments—might provide more reliable data than self-reported questionnaires alone (Duckworth & Yeager, 2015). Further efforts can be made to refine these third-party measures by examining their inter-rater reliability estimates when compared to athletes’ self-reported grit scores. In summary, it will be of utmost importance for researchers to improve the measurement of grit in sport, if they wish to overcome the lasting critiques of the construct that were not addressed within this program of research.

**Team Level Grit in Sport**

A consistent theme throughout the interviews with athletes and sport support persons was the belief that grit could be fostered at a team level to create a ‘culture of grit’. Given that the grounded theory constructed in Study 3 recognized the particular importance of the social environment in enhancing athlete grit, future researchers might consider examining grit in sport at the team level. To the best of my knowledge sport researchers have exclusively examined grit at the individual level. However, based on the findings from my dissertation, it seems reasonable to suppose that grit also can be manifested at a collective level through team member interactions. While the investigation of team-level topics is underrepresented in sport psychology
(Kleinert et al., 2012), there have been some fruitful investigations focused on the assessment of group-level resilience (Morgan et al., 2017) and thriving (McGuire et al., 2023). Novel directions for grit researchers include the implementation and testing of team-level grit interventions (e.g., Eubank et al., 2017); the use of qualitative approaches, such as ethnography to explore the shared values, behaviours, and beliefs of grit in culture-sharing groups (Creswell & Poth, 2018); and the application of appropriate statistical analyses to assess group-level effects in grit amongst team members (e.g., Krull & MacKinnon, 2001; Moritz & Watson, 1998).

**The Role of Grit for Athletes Outside of Competitive Sport**

This dissertation explored the role of grit in competitive athletes; however, more work can be done to fully understand the function of grit from the perspective of athletes outside of the elite sport environment. First, researchers could explore how grit might help recreational athletes persist in sport engagement. Research with recreational athletes could be used to further understand how grit affects recreational athletes’ motivation, self-efficacy, and achievement of long-term goals. Next, most of the grit in sport research has been conducted with non-disabled athletes, with one exception. Martin and colleagues (2015, 2020, 2022) conducted an excellent series of replication studies examining grit with athletes with a disability. Their findings suggest that grit was a significant positive predictor of sport engagement for wheelchair basketball athletes (Martin et al., 2015) and wheelchair rugby athletes (Atkinson & Martin, 2020), but not for Czech parasport ice-hockey or wheelchair rugby athletes (Martin et al., 2022). Based on their life experiences, athletes with disabilities competing in competitive sport might have differing conceptualizations of grit than the perspectives of the non-disabled athletes that were presented in this program of research. Next, another proportionally underrepresented group within the larger body of research is masters athletes. Masters athletes—who are typically over the age of
35, compete in sport at a high level and train for competition regularly (Makepeace et al., 2021)—are often touted as ideals of successful aging (Geard et al., 2017). As continued involvement in sport has the potential to provide desirable outcomes throughout one’s lifespan (Baker et al., 2010), it is important to understand the driving forces behind masters athletes’ motivation to compete. Research on grit in this population could explore how masters athletes with higher levels of grit are able to adapt to the physical and cognitive changes associated with aging and continue to compete at a high level.

**Talent Identification**

Lastly, future researchers should consider quantifying the role that grit might play in the talent identification and expertise development of athletes, as well as incorporating grit into applied talent development procedures. As was stated in the first chapter of my dissertation, sport expertise is understood to be obtained through a constellation of domain-specific physiological and cognitive mechanisms developed through prolonged practice (Baker & Farrow, 2015). As such, grit cannot be the “whole answer” (Collins et al., 2019, p. 343) and can ultimately only represent one thread within the overall tapestry woven to produce athlete achievement. Based on the findings of my program of research, grit seems—and not surprisingly—to be able to explain only a portion of relevant sport outcomes. The limited explanatory power of the grit measurement is reflected in the talent identification literature, which finds that psychological factors tend to have only a modest role in predicting actual performance (Mann et al., 2017). Regardless, other researchers have expressed their opinion that grit significantly affects the development of sport expertise (e.g., Larkin et al., 2015; Tedesqui & Young, 2018) and should be assessed in talent identification testing batteries (Hamidi & Wazir, 2022). Thus, researchers might consider integrating the grit subscales into future formative assessment tools to improve
the measurement of the psychological characteristics that underlie expertise development (e.g., Hill et al., 2018; MacNamara & Collins, 2015). Additionally, athletes might benefit from being taught the ‘gritty’ skills so that they are prepared to face the wide variety of setbacks and challenges that must be overcome in sport. Developing and adding mental performance skills that might foster grit within existing skill development frameworks (e.g., MacNamara et al., 2010) might enhance an athlete’s overall likelihood of achieving expertise in sport.

Conclusion

In conclusion, competitive athletes face a unique set of challenges that can hinder their progress toward their long-term goals in sport. However, my dissertation has shown that grit is an effective psychological construct to assist athletes in overcoming setbacks and achieving desirable outcomes. Using quantitative and qualitative methodologies, I aimed to add to the ongoing conversation sport researchers have been having about grit over the past ~20 years, by better understanding the role that grit plays in sport. My research objective was achieved through a comprehensive scoping review of the extant grit in sport literature, an assessment of the predictive utility of the construct, and the construction of a grounded theory. In sum, future efforts to understand the role of passion and perseverance in sport is a worthwhile goal. Researchers should continue to focus their efforts on elucidating the psychological constructs that optimize athletes’ development of expertise, preserve their well-being during and after sport involvement, and facilitate their journey toward achieving personally meaningful goals.
References


Barton, C. J., & Merolli, M. A. (2019). It is time to replace publish or perish with get visible or vanish: Opportunities where digital and social media can reshape knowledge translation.
Bergen, N., & Labonté, R. (2020). “Everything is perfect, and we have no problems”: Detecting and limiting social desirability bias in qualitative research. *Qualitative Health Research, 30*(5), 783–792. https://doi.org/10.1177/1049732319889354


https://doi.org/10.1123/jsep.2023-0077

https://doi.org/10.1080/1750984x.2022.2161064

https://doi.org/10.1177/1359105309338974


https://doi.org/10.1016/j.scispo.2014.08.133

https://doi.org/10.1249/01.mss.0000671452.21466.62

https://doi.org/10.3102/0013189X18801322


Doorley, J. D. (2020). Exploring self-compassion, positive and negative emotion regulation, sport performance, and daily resilience among college athletes (Publication No. 27995803)


226


interdependent sport. *International Review of Sport and Exercise Psychology*. Advance online publication. https://doi.org/10.1080/1750984x.2023.2204320


https://doi.org/10.1016/j.copsyc.2017.05.013


https://doi.org/10.1007/s10869-016-9448-7


233


## Table 5.1

Summary of the Individual Studies’ Research Questions, Hypotheses, Methodologies, and Results

<table>
<thead>
<tr>
<th>Research Questions:</th>
<th>Hypothesis:</th>
<th>Methodologies</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What literature exists that examines the construct of grit in sport?</td>
<td>N/A</td>
<td>• Arksey &amp; O’Malley’s (2005) scoping review protocol was used. &lt;br&gt;• Ninety unique studies were deemed to have met the inclusion criteria. &lt;br&gt;• Six collegiate-level coaches were interviewed.</td>
<td>• Relationships between grit and athletic performance, motivation, mindfulness, self-compassion, deliberate practice, and other determinants of success (i.e., hardiness, resilience, mental toughness, self-control, &amp; conscientiousness) in sport contexts were identified. &lt;br&gt;• There were inconsistencies in the measurement of grit in the existing sport-specific literature. &lt;br&gt;• Implications for interventions aimed at increasing athlete grit levels and directions for future research were discussed.</td>
</tr>
<tr>
<td>Study 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the sport-specific grit subscales (i.e., perseverance of effort, adaptability to situations, and consistency of interests) empirically distinct from existing measures of mental toughness, self-control, and conscientiousness when predicting performance in varsity athletes?</td>
<td>Sport-specific perseverance of effort and adaptability to situations would explain a significant amount of variance beyond self-control, conscientiousness, and mental toughness when predicting various measures of well-being, while sport-specific consistency of interests would not.</td>
<td>• Descriptive statistics. &lt;br&gt;• Hierarchical regression predicting: o Affect Balance Scale—Sport o Satisfaction with Sport Scale o Eudaimonic Well-Being in Sport Scale &lt;br&gt;• Data from 214 varsity student-athletes was analysed.</td>
<td>• The perseverance of effort and adaptability to situations grit subscales were positively correlated to each of our three chosen measures of well-being, while consistency of interests was only positively correlated with the Eudaimonic Well-Being in Sport scale. &lt;br&gt;• Perseverance of effort was a significant and positive predictor of the Eudaimonic Well-Being in Sport Scale and Satisfaction in Sport Scale. &lt;br&gt;• Adaptability to situations was a significant and positive predictor of the Eudaimonic Well-Being in Sport Scale. &lt;br&gt;• Consistency of interests did not significantly add to any regression model.</td>
</tr>
<tr>
<td>Study 3</td>
<td>N/A</td>
<td>• Charmaz’s (2006) constructivist grounded theory.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>What are the processes by which adult competitive athletes suggest they have acquired grit in the sport domain, the behaviors and cognitions they experienced while striving towards their long-term goals, and the by-products of being gritty in sport?</td>
<td></td>
<td>• Twenty-eight participants (15 women, 13 men)—including 22 athletes, five coaches, and one sport parent—completed semi-structured interviews.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Grit is a malleable dispositional tendency that forms over time through athletes’ accumulated sport experiences.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• With support from others, athletes adopt adaptive cognitions about success and failure that leads to a propensity to identify and strive towards long-term goals in sport.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Grit in competitive sport can result in several outcomes, including sport-specific goal achievement, thriving, and languishing.</td>
<td></td>
</tr>
</tbody>
</table>

Are the sport-specific grit subscales (i.e., **perseverance of effort**, adaptability to situations, and **consistency of interests**) empirically distinct from existing measures of mental toughness, self-control, and conscientiousness when predicting well-being in varsity athletes?

Sport-specific **perseverance of effort** and adaptability to situations would explain a significant amount of variance beyond self-control, conscientiousness, and mental toughness when predicting various measures of sport performance, while sport-specific **consistency of interests** would not.

- **Descriptive statistics.**
- **Hierarchical regression**
  - Highest level of competition
  - Sport Performance Perceptions Scale
  - Subjective Sport Performance single-item measure
- Data from 214 varsity student-athletes was analysed.

The **perseverance of effort** and adaptability to situations subscales were positively correlated to the Sport Performance Perceptions Scale and Subjective Sport Performance.

**Perseverance of effort** did not significantly add to any regression model.

**Adaptability to situations** was a significant and positive predictor of the Sport Performance Perceptions Scale.

**Consistency of interests** did not significantly add to any regression model.
APPENDICES
Appendix A

Study 1 - Communication with Athletics Department and Coaches

Communication with Athletics Department

Hello ______,

My name is Danielle Cormier and I am currently recruiting coaches for research related to my Ph.D. dissertation. I am a student in the College of Kinesiology working in the area of sport psychology—more specifically—grit in the context of sport.

I am contacting you to request that you pass the email below onto all the coaches of both team and individual sports at the university.

Thank you for your time. Please feel free to contact me for further information or any questions you might have.

Danielle Cormier

Communication with Coaches

Hello ______,

My name is Danielle Cormier and I am currently recruiting coaches for research related to my Ph.D. dissertation. I am a student in the College of Kinesiology working in the area of sport psychology—more specifically—grit in the context of sport.

As per university policy, I am contacting you through the Athletics Department.

I am hoping to interview 6-8 varsity-level coaches (head or assistant) with respect to the results found in a recent literature review regarding grit in sport. This review would be greatly improved with your input. Coaches will be given a brief summary of the results of this review, and then will be asked about its meaning in relation to athletes. These interviews will take no longer than 30 minutes to complete and will provide all participants with an up-to-date and comprehensive understanding of the grit literature currently published in the domain of sport.

The criteria for participation are:

- Current member of the coaching staff of a University of Saskatchewan varsity-level team

If you think you may be interested in participating, please contact me for more information at danielle.cormier@usask.ca. I am also more than happy to sit down with you directly and answer any questions you might have.

Thank you very much for your time and consideration,

Danielle Cormier
Appendix B

Study 1 - Coach Consultation Participant Consent Form

You are invited to participate in a research study entitled: Grit in sport: A scoping review

Principal Investigator: Dr. Kent Kowalski, Professor, College of Kinesiology, University of Saskatchewan, 306-966-1079. kent.kowalski@usask.ca

Student researcher: Danielle Cormier, Graduate Student, College of Kinesiology, University of Saskatchewan, danielle.cormier@usask.ca

Other Research Team Members:

Dr. Leah Ferguson, Assistant Professor, College of Kinesiology, University of Saskatchewan, 306-966-1093. leah.ferguson@usask.ca

Dr. Nancy Gyurcsik, Professor, College of Kinesiology, University of Saskatchewan, 306-966-1075, nancy.gyurcsik@usask.ca

Dr. Jennifer Briere, Assistant Professor, St. Thomas More College, University of Saskatchewan, 306-966-4174. jennifer.briere@usask.ca

Dr. John Dunn, Professor, Faculty of Kinesiology, Sport, and Recreation, University of Alberta, 780-492-2831. j.dunn@ualberta.ca

Purpose(s) and Objective(s) of the Research:

Grit is defined as a person’s dispositional tendency towards passion and perseverance for long-term goals. As such, gritty people are characterized by their capacity to strive and achieve goals over long periods of time despite setbacks, failures, boredom, or plateaus in goal progress. Interestingly, nothing has been done to collate sport-specific literature. This is an important gap; as such, a summary would be invaluable for researchers in determining current trends/gaps in the literature, and would inform stakeholders of the value of assessing and/or fostering grit in athletic contexts. Therefore, the purpose of this research is to examine what is known about grit in athletes. The first part involved a review of sport literature. You are being invited to participate in the second part — interviews with 4-8 USport Huskie coaches.

Procedures:

Participation in this research project will include a one-on-one interview, which will be approximately 30 minutes long. The interview will take place at the University of Saskatchewan, in the PAC or Merlis Belsher Place at a time that is convenient for you. Before the interview, you will be provided with a summary of the literature review. The interview will ask you about your experiences with grit within your sport and the impact it has on athletes. The interview will be audio-recorded and later transcribed (i.e., typed out word-for-word) for analysis, by the graduate researcher. You will have the opportunity to review the final transcript, and will be requested to sign a transcript release form to acknowledge that what is expressed in the transcript accurately reflects your experience. You will be asked to return the signed transcript release form within two weeks after the transcript has been returned to you. If you do not indicate any concerns with your transcript or do not return the form, it will be assumed you agree the interview data can be used in this project in its original state. During the interview itself, you
may decide not to answer any questions you find uncomfortable and you may also request to turn the recorder off at any time without giving a reason. Please feel free to ask any questions regarding the procedures and goals of the study or your role.

**Potential Risks:**

The risks associated with participating in this research are minimal. However, due to the nature of the construct of grit—particularly the component of perseverance—there is a chance that you may experience emotional or psychological discomfort. If you find yourself experiencing emotional and psychological discomfort, you can call Canada Crisis Services (1-833-456-4566). In Saskatoon, you can contact Saskatoon Mobile Crisis (306-933-6200).

**Potential Benefits:**

You may or may not benefit directly from your participation in this study. In sport contexts, identifying and understanding the characteristics that facilitate or hinder an athlete’s long-term success is of great interest to various stakeholders, including coaches. Given that high-level competitive sport is rife with moments where athletes experience personal failure, slumps in performance, and stressors in both practice and competition, the knowledge gained from this research project may elucidate motivational dispositions that facilitate sustained engagement in achievement domains and increase the individual likelihood of long-term success for athletes. You and Huskie Athletics will be provided with a summary of study results for possible use in your coaching practices.

**Confidentiality:**

Your confidentiality will be protected using a false name, chosen by you, to attach to your data. Any information that may lead to identification (e.g., mention of sport coached), will not be included in study findings. Your name and e-mail address will not appear together on any documents. Whether you choose to participate or not in this research study will have no effect on you or how you will be treated by peers, professors, etc.

**Storage of Data:**

During the data collection and analysis, the computer data will be stored with the principal investigator, Dr. Kowalski, in a password protected computer, with identifying information stored separate from data. During this time, hard-copies of information will be stored in a secure drawer, with identifying information stored separately from data. Data will be stored for a minimum of five years according to USask policy and then the data will be destroyed.

**Right to Withdraw:**

Your participation is voluntary, and you can answer only those questions that you are comfortable with. You may withdraw from the research project for any reason, at any time without explanation or penalty of any sort. Whether you choose to participate or not will have no effect on your position in Huskie Athletics or how you will be treated by the researchers. Should you wish to withdraw, your data will be destroyed and not used in analysis. Your right to withdraw data from the study will apply until February
1st, 2020. After this time, it is possible that some form of research dissemination will have already occurred, and it may not be possible to withdraw your data.

**Questions or Concerns:**

If you have any questions or concerns, please contact Danielle Cormier by email at danielle.cormier@usask.ca, or her supervisor, Dr. Kent Kowalski, by email at kent.kowalski@usask.ca.

This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board. Any questions regarding your rights as a participant may be addressed to that committee through the Research Ethics Office ethics.office@usask.ca (306) 966-2975. Out of town participants may call toll free (888) 966-2975.

**Consent**

My signature below indicate I have read and understand the description provided. I have had an opportunity to ask questions and my questions have been answered. I consent to participate in the research project. I understand a copy of this Consent Form will be given to me for my records.

_________________________  ___________________________  ___________________________
Name of Participant                Signature                             Date

_________________________  ___________________________
Researcher’s Signature          Date

*A copy of this consent will be left with you, and a copy will be taken by the researcher.*
Appendix C

Study 1 - Coach Consultation Interview Guide

Introductions:
- Build rapport prior to starting interview:
  “My name is Danielle and I am a Ph.D. student here at the university. I am in the second year of my program and have been studying grit in the context of athletes for a few years now. I started this project because I wanted to find out what sport researchers have discovered about grit, and what this might mean for athletes.”
  “I appreciate your participation in this phase of my scoping review. Your time and experience are very valuable in me completing this project, so I appreciate your participation.”

Consent:
- Gain consent prior to, and prepare the participant for the interview
  o Did you read the consent form I emailed you?
  o Do you have any questions about the consent form?
    ▪ Have them read and sign a consent form
    ▪ Signed consent forms are collected for research records
  o Do you have any questions before we start?
  o Is there a specific pseudonym you would like to use for the interview?
  o Is it alright that I record our interview today?
    ▪ Is it alright that I start the recorder now? (If yes, start recording using both a recording device and a personal phone as a back-up)

Demographics:
- To start, can you tell me a little bit about your history as a coach
  o You are a coach at the University of Saskatchewan. What is the official title of your role?
  o What sport do you coach at the University of Saskatchewan?
  o How long have you coached [sport] at the University of Saskatchewan?
  o How long have you coached [sport] at any level?

Grit-Specific Questions:
- Are any of the findings presented of particular interest to you and/or your work as a coach? If so, please summarize which result(s) were remarkable and why.
- Are any of the findings presented confusing or unclear to you and/or your work as a coach? If so, please summarize which result(s) were ambiguous and why?
- Are any of the findings presented unhelpful to you and/or your work as a coach? If so, please summarize which result(s) were impractical and why.
- Can you identify or think of any gaps in the knowledge related to grit in sport that might not summarized in the findings?
Additional comments:
- The purpose of this section is to provide the participant with the opportunity to address other items they feel are important to the research.
- Before I wrap up:
  - Do you have any additional comments?
  - Is there something else that you feel would be important to add to this research?
  - Do you have any further questions?

Conclusion:
- The purpose of this is to wrap up the interview.
- Again, I really appreciate your willingness to share your opinion. Without is, the research wouldn’t be possible.
- Feel free to contact me if you have any questions or concerns.
  - Stop tape recording
- Email exit package within 24 hours of interview completion
Appendix D

Study 1 - Scoping Review Summary for Coach Consultation

What is Grit?

- *Grit* is defined as a person’s dispositional tendency towards passion and perseverance for long-term goals. As such, gritty people are characterized by their capacity to strive and achieve goals over long periods of time despite setbacks, failures, boredom, or plateaus in goal progress.
- Grit is measured as a construct comprised of two lower-order dimensions, labelled *consistency of interests* and *perseverance of effort*:
  - Individuals who score high in consistency of interests are those who diligently work towards a single focused life-long passion, rather than following a series of different superordinate goals over a short period of time.
  - Perseverance of effort represents the great amount of determination and effort needed over the course of many years to attain that same life-long goal.
- In sport contexts, identifying and understanding the characteristics which facilitate or hinder an athlete’s long-term success is of great interest to various stakeholders. Given that high-level competitive sport is full of moments where athletes experience personal failure, slumps in performance, and stressors in both practice and competition, psychological factors which facilitate sustained engagement may be a helpful factor in creating success. As grit represents an individual’s propensity for commitment in particular pursuits over long periods of time, it may offer a desirable character strength that would likely facilitate the magnitude of determination needed to attain athletic achievement.

What is a Scoping Review?

- The purpose of this review was to broadly examine what is known in the sport literature about grit in athletes.
- The scoping review is an endeavour to: “…map the literature on a particular topic or research area and provide an opportunity to identify key concepts, gaps in the research; and types and sources of evidence to inform practice, policymaking, and research” (Daudt, van Mossel, Scott, 2013, p. 8).

Characteristics of Included Studies

- 64 unique studies were determined to have met each of the specified inclusion criteria and were included in this scoping review.
- The publication year of the articles spanned 11 years from 2009 to 2020.
- Almost all research was accomplished using athletes competing in Westernized countries.
- The majority of the studies were conducted using collegiate athletes.

Grit and Athletic Skill

- Of 19 articles, 14 found that higher levels of grit were positively correlated with increased levels of skill group membership.
- Six studies examined the relationship between grit and performance outcomes—four found that grit levels were positively correlated with performance while two did not.
Adaptive Traits Related to Grit in Sport

- Constructs which were often assessed in tandem with grit were motivation, mindfulness, and deliberate practice:
  - Research examining motivation as it related to grit was rather positive and consistent. Consistent significant positive relationships were found between grit and intrinsic motivation, which is known as “the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn”. Conversely, extrinsic motivation was inversely related to grit. Both mastery goal orientations, and mastery-involving feedback were positively correlated with grit.
  - Research probing the relationship between grit and mindfulness was mixed. Results of three studies indicated that grit had not been affected by multi-week mindfulness interventions.
  - Five studies included in this review sampled athletes of various skill levels to explore the relationship between deliberate practice and grit. In four cases, grit levels were found to be significantly correlated with hours spent in deliberate practice.

Can Athletes Be Too Gritty?

- Some sport researchers have suggested that grit may be associated with a number of less adaptive psychological/behavioural correlates:
  - For example, high altitude doctors speculated that it was the grittier mountaineers which “…were more rigid, stubborn, and inflexible” when compared to their peers, and were often those who chose to persist despite dangerous weather, causing them to lose fingers and toes to frostbite as a consequence (Crust, Swann, & Allen-Collinson, 2016, p. 607)
  - Similarly, gritty runners were shown to have difficulty disengaging in unachievable personal goals, and higher grit scores were significantly related to a greater number of accumulated injuries in youth downhill skiers.
  - For athletes who had recently left their collegiate team or been cut, grit was significantly and negatively correlated to tension reduction, keeping to oneself, and detachment—all maladaptive coping strategies.

- Stakeholders should consider exploring whether circumstances exist where grit simply is not enough to persist through difficult sport experiences and the strategies which could be relied upon by athletes in these times of need.
  - Self-compassion is a possible tool that could be relied upon, and two sources included in this review suggest that self-compassion is a significant predictor of grit in athletes.

How is Grit Grown?

- Of the four studies which examined changes in grit over multi-week interventions, only one was found to significantly improve passion and perseverance. Rhodes et al. (2018) used Functional Imaging Training—which aims to develop competency in goal setting, self-awareness, and positive/motivational imagery—all as a means to increase grit levels.
- One novel avenue for future research wishing to explore how grit might be grown may be through the encouragement of a growth mindset in athletes. Growth mindset references
the belief that ability can be improved through hard work, while those with a fixed mindset hold that ability remains static regardless of effort.

**Critiques of Grit**

- One of the most pervasive critiques of grit is its similarities with pre-existing concepts. Constructs which have conceptual ties to grit include hardiness, resilience, mental toughness, self-control, and conscientiousness.
- There are very few empirical studies in the area of sport which examine how exactly grit levels can be improved in athletes.
Appendix E

Study 2 - Communication with Athletics Department, Coaches, and Recruitment Poster

Communication with Athletics Department

Hello _______.

My name is Danielle Cormier and I am currently recruiting athletes for research related to my sport psychology Ph.D. dissertation at the University of Saskatchewan in the College of Kinesiology. Specifically, I am interested in examining grit in the context of varsity sport, and am hoping to recruit varsity athletes to participate in a study titled: “Examining the Factors that Determine Long-Term Success in Varsity Athletes”. This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board on February 22nd, 2022 (Beh-REB#: 3136), the University of Alberta Research Ethics Board on April 20th, 2022 (Study ID: Pro00119685).

I am contacting you to ask that you pass the recruitment information attached (i.e., poster and study consent form) to all the coaches of both team and individual varsity sports at the university. I am also hoping that I could join an upcoming coaches meeting to further inform the coaches about my study, and answer any questions they may have.

Please feel free to contact me for further information or any questions you might have. If I haven’t heard back from you by next week, I will send a friendly follow-up reminder to confirm your support.

Thank you for your time and consideration.
Danielle Cormier

Communication with Coaches

Hello _______.

My name is Danielle Cormier, and I am a fourth-year Ph.D. candidate in the College of Kinesiology at the University of Saskatchewan working under the supervision of Dr. Kent Kowalski in the area of sport psychology. I am reaching out to you today to ask for your permission to meet with your athletes, where I would ask them to fill out a questionnaire package on one occasion that should take them no more than 30-45 minutes to complete.

These questionnaires will be used to assess the utility of grit (which reflects the degree to which people pursue long term goals) in the context of sport. The results of this study will help determine whether or not sport researchers should continue examining grit in athletes, opposed to other determinants of success (i.e., mental toughness, self-control, and conscientiousness). Attached below is a participant consent form that provides you with the specific details of the study, as well as the questionnaire package that would be given to your athletes. All of the data collected from the study will be completely confidential, no personally identifying information
will be linked to the data, and the graduate student researcher will not know who has participated in the research. The study has received approval from the USask Research Ethics Board (on February 22\textsuperscript{nd}, 2022; Beh-REB#3136) and the University of Alberta Research Ethics Board( on April 20th, 2022; Study ID: Pro00119685). I have also received permission to conduct the study from the Athletics Office (USask: Adrienne Healey [Associate Athletics Officer] and Shannon Chinn [Chief Athletics Officer]; UAlberta: Dr. Ian Reade [Director of Athletics]).

The criteria for athlete participation are:

- Currently a member of an individual or team varsity team (i.e., both rostered and ‘red shirt’ athletes)

I plan to follow up this e-mail with a phone call in the next few days to further explain the research, the time commitment for your athletes, and address any questions/concerns you might have. I am also more than happy to sit down/meet over Zoom with you directly and address any questions or concerns you might have. I will make the effort to contact you, but in the event that you wish to speak to me, I can be reached 306-900-5963.

Thank you very much for your time and consideration. I look forward to speaking with you soon.

Sincerely,
Danielle
Athletes Needed for Research in KINESIOLOGY
You are invited to participate in a research study entitled: *Examining the Factors that Determine Long-Term Success in Varsity Athletes* that will examine how grit is related to athlete success over and above other psychological constructs.

You are eligible to participate in this study, if:
- You are currently a varsity athlete on a University team

If you choose to participate:
- You will be one of 210-260 participants to complete a single online/pen and paper questionnaire package that will take approximately 20-30 minutes to complete. You will be asked to complete some questions about your persistence in sport, personality traits, and demographic information.

For more information and/or to participate in this study, contact
Danielle Cormier, Ph.D. Candidate
College of Kinesiology, University of Saskatchewan
Email: danielle.cormier@usask.ca  Phone: 306-900-5963

You may also contact the Principal Investigator of the research:
**Dr. Kent Kowalski**, Professor
College of Kinesiology, University of Saskatchewan
Email: kent.kowalski@usask.ca  Phone: 306-966-1079

You may also contact the UAlberta faculty member associated with this project:
**Dr. Amber Mosewich**, Associate Professor
Faculty of Kinesiology, Sport, and Recreation, University of Alberta
Email: amber.mosewich@ualberta.ca  Phone: 780-491-1002

This study has been reviewed by, and received ethics clearance through the University of Saskatchewan Research Ethics Office on February 22nd, 2022 (Beh-REB# 3136), and the University of Alberta Research Ethics Board on April 20th, 2022 (Study ID: Pro00119685). All of the data collected from the study will be completely confidential, and no personally identifying information will be linked to the data.
Appendix F

Study 2 - Participant Consent Form

You are invited to participate in a research study entitled: Examining the Factors that Determine Long-Term Success in Varsity Athletes

**Researcher**, Danielle Cormier, Graduate Student, College of Kinesiology, University of Saskatchewan, danielle.cormier@usask.ca, 306-900-5963.

**Supervisor**, Dr. Kent Kowalski, Professor, College of Kinesiology, University of Saskatchewan, kent.kowalski@usask.ca, 306-966-1079.

**Purpose and Objectives of the Research.** Grit is defined as a person’s dispositional tendency towards passion and perseverance for long-term goals. As such, gritty people are characterized by their capacity to strive and achieve goals over long periods of time despite setbacks, failures, boredom, or plateaus in goal progress. What is not known is if grit is a better predictor of important athlete outcomes above and beyond other psychological constructs. This is an important gap; as knowing which psychological constructs best predict athlete success would inform stakeholders (i.e., athletes, coaches, athletic directors, sport researchers, etc.) of the value of assessing and/or fostering grit in athletic contexts. Therefore, the purpose of this research is to examine if sport-specific grit is empirically distinct from measures of mental toughness, self-control, and conscientiousness when predicting performance and well-being in athletes.

**Procedures.** This research requires you to complete a survey package that will take approximately 20-40 minutes to complete. Please feel free to ask any questions regarding the procedures and goals of the study or your role.

**Funding.** This research is funded by a Social Sciences Humanities Research Council (SSHRC) Doctoral Fellowship awarded to the research supervisor, Dr. Kent Kowalski.

**Potential Risks.** Participation in this study involves no known risks beyond those encountered in everyday life. Due to the nature of questions in the survey, and having you reflect on your personal performance and abilities, you may experience emotional or psychological discomfort. To address this risk, contact information for multiple resources is provided. If you come to find yourself experiencing emotional and psychological discomfort, you can call Canada Crisis Services (1-833-456-4566).

**Potential Benefits.** There may be no personal benefits from participating in this research. The benefits of taking part in this research project are that we (e.g., researchers, coaches, medical professionals) will gain a better understanding of the constellation of psychological skills that best predict athlete success. The knowledge gained from this research project may lead to the creation of mental training workshops that improve sport performance and athlete well-being. It is also our hope that all participants will find their participation in this novel contribution to sport psychology research informative and interesting.

**Compensation.** All interested participants will be entered to win one of four $50 Amazon.ca gift certificates. You will have the opportunity to supply your email upon questionnaire completion for a chance to win. After completing the survey, you will be offered to write down your email on a separate sheet of paper (i.e., not stapled/attached in any way to the questionnaire package) to opt into the random draw. The information collected to contact draw winners will be in no way associated with survey response data.

Information collected to contact draw winners is in no way associated with survey response data.
**Anonymity & Confidentiality.** Your confidentiality will be protected as you will not be asked to supply the researchers with identifying information. Please do not put your name or any identifying information on your survey questionnaire package. The anonymous responses that you provide will be stored in a password protected data file or locked cabinets that will only be accessible to the researcher and research supervisor. Data that is backed-up on an external hard drive will be kept secure (password protected) in a locked drawer when not in use. If participants choose to contact the researcher or research supervisor by email or telephone, anonymity may be lost, but confidentiality will be ensured. The data collected during this research study will be presented within the graduate researcher’s doctoral dissertation, at conferences, and in scientific publications, however all data will be reported in aggregate form so that it will not be possible to identify individuals.

**Storage of Data.** All research material will be securely stored and only accessible to the student investigator and research supervisor. Physical data will be stored in a locked cabinet only accessible to the student investigator before it is inputted into a statistical software program and stored on their USask OneDrive account and shared with the research supervisor. This computer is a password-protected dedicated research device, to which only the student researcher has access. Once analysed, the digital data will be passed onto the principal investigator on an external drive, and both the digital and physical data will be stored in a locked cabinet. The digital data will be backed up on the Principal Investigator’s USask OneDrive. Upon publication of the study, all data will be stored in the encrypted password protected file/locked cabinet for 5 years post-publication, before being confidentially destroyed beyond recovery.

**Right to Withdraw.** Your participation is voluntary, and you may answer only those questions that you are comfortable with. You may decline to participate from the research project for any reason, and at any time during data collection without explanation or penalty of any sort. Whether you choose to participate or not will have no effect on your athletic or academic standing or how you will be treated by coaches, peers, professors, etc., or your permission to participate in the incentive draw. Should you wish to withdraw at any point during survey completion, you may simply indicate verbally/in writing at any time to a member of the research team that you have chosen to withdraw, or you can choose not to hand in the questionnaire. Any data that you may have contributed until the point of withdrawal will be destroyed. Your right to withdraw your data from the study will apply until you have turned in your survey responses. After this point, the data may be pooled and it will not be possible to link particular responses to you individually.

**COVID-19 Protocols.** All in-person research will be conducted within University buildings, under the jurisdiction of the provincial public health bodies. We are taking all safety precautions to reduce the risk of spread of COVID-19 and expect you to follow public health directives as well. If you feel that you are from a vulnerable group with respect to COVID-19 effects (e.g., immuno-compromised), please discuss your participation with the research team before consenting. You are under no obligation to participate and nothing bad will happen if you change your mind about participating in the research. The following safety protocols must be followed:

- Screening for symptoms. Please speak with the researcher if any of these symptoms/parameters apply to you.
  - Do you have any of the following new or worsening symptoms or signs?
    - New or worsening cough
    - Shortness of breath, sore throat, runny nose or nasal congestion, hoarse voice, difficulty swallowing
    - New smell or taste disorders
    - Nausea, vomiting, diarrhea, abdominal pain
- Unexplained fatigue
- Chills or headache
- Fever
  - Have you travelled outside Canada or had close contact with anyone who has travelled outside Canada in the past 14 days?
  - Have you had close contact with anyone with respiratory illness or a confirmed or probable case of COVID-19?

☐ Take appropriate precautions (e.g. face covering) if taking public transportation and entering public indoor spaces.
☐ Wash your hands upon coming onto campus. Hand sanitizer will be made available to you.
☐ Physical distancing will be maintained at all times. A single use triple-ply mask must also be worn at all times. We will provide you with PPE if necessary.
☐ If you develop symptoms after participating in in-person data collection, please contact the research team. This can be done in two ways: either email the research team using the contact information below, or ask your coach to communicate with the researcher. If you do reach out to the research team, we cannot guarantee anonymity as the personal contact information identifies you as a participant. The research team will contact your coach if we develop symptoms, who will then share this information with the team.

**Questions or Concerns, & Follow Up.** If you have any questions or concerns, or to request a copy of the final research report, contact the graduate student Danielle Cormier by email at danielle.cormier@usask.ca. You may also contact the supervisor, Dr. Kent Kowalski, by email at kent.kowalski@usask.ca. The results of this research study will be available in Spring, 2022.

This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board on February 22nd, 2022 (Beh-REB#: 3136). Any questions regarding your rights as a participant may be addressed to that committee through the Research Ethics Office: ethics.office@usask.ca, 1-306-966-2975. Out of town participants may call toll free: 1-888-966-2975.

**Consent to Participate.** Your signature below indicates that you are eligible to participate in this research (i.e., are currently a member of a varsity sport team), and that you understand the above conditions of participation in the study.

<table>
<thead>
<tr>
<th>Name of Participant</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>
Appendix G

Study 3 - Communication with Athletics Department, Coaches, and Recruitment Poster

Communication with Athletics Department

Hello __________,

My name is Danielle Cormier and I am currently recruiting athletes for research related to my sport psychology Ph.D. dissertation at the University of Saskatchewan in the College of Kinesiology. Specifically, I am interested in examining grit (i.e., passion and perseverance over long terms) in the context of varsity sport, and am hoping to recruit varsity athletes to participate in a qualitative study titled: “A Grounded Theory of Grit in Sport.” This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board on September 26th, 2022 (BEH ID#: 3622).

I am contacting you to ask that you post the recruitment information attached (i.e., poster and study consent form) onto PAWS bulletins targeting all varsity athletes at the university. I am also hoping that I could join an upcoming coaches’ meeting to further inform the coaches about my study, and answer any questions they may have.

Please feel free to contact me for further information or any questions you might have. If I haven’t heard back from you by next week, I will send a friendly follow-up reminder to confirm your support.

Thank you for your time and consideration.
Danielle Cormier

________________________________________________________

General Team Recruitment Email

Hello __________,

My name is Danielle Cormier and I am a fifth year Ph.D. student at the University of Saskatchewan in the College of Kinesiology, specializing in sport psychology. I am reaching out to you today as I am currently recruiting high performance athletes and other sport stakeholders (e.g., coaches, sport parents, athlete support staff) for the final study of my dissertation. Specifically, I am interested in examining grit (i.e., passion and perseverance over long terms) in the context of sport, and am hoping to understand how grit is developed in the sport. This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board on September 26th, 2022 (BEH ID#: 3622).
To help us achieve our goals, we request that you contact your athletes and pass along the attached recruitment poster. Please also inform athletes who have any questions about participating in the study to contact the student investigator, Danielle Cormier, via email at danielle.cormier@usask.ca. Interested individuals will be asked to complete a brief online demographics questionnaire, and then will meet with me for a one-on-one interview (lasting ~30-60 minutes), and may be invited to a brief follow-up interview (lasting ~15-30 minutes). Participants will be given an incentive (see attached consent form) upon completion of the interviews as a thank you for their time. It should also be noted that participants’ identities will be kept confidential throughout the research process, including potential publication or conference presentation(s) and we are happy to provide research results to you and the athletes who participate in our study.

Please feel free to contact me for further information or any questions you might have. If I haven’t heard back from you by next week, I will send a friendly follow-up reminder to confirm your support.

Thank you for your time and consideration.

Sincerely,
Danielle Cormier

________________________________________

Social Media Recruitment

*Twitter post by student investigator:* “Are you a high performance athlete who considers themselves to be gritty in sport? We are exploring how grit (i.e., passion and perseverance over long terms) develops in the sport environment, as well as the outcomes of being gritty. We are currently interviewing athletes and other stakeholders via Zoom. You will be compensated for your time. Please see the poster below and/or click on the link to begin.” (link below)
You are invited to participate in a research study entitled: “A Grounded Theory of Grit in Sport” that will examine how grit (i.e., passion and perseverance over long terms) is developed in high-performance sport environments, and the outcomes of being gritty.

You are eligible to participate in this study, if you are currently a high-performance athlete or sport support person (e.g., coach, athletic director, athletic trainer, sport parent).

If you choose to participate, you will be asked to complete a demographic questionnaire followed by a one-on-one interview (~30-60 minutes). Some participants may be asked to complete a follow-up interview (~15-30 minutes) to elaborate on their answers.

For more information and/or to participate in this study, please contact:

Danielle Cormier, Ph.D. Candidate
College of Kinesiology, USask
Email : danielle.cormier@usask.ca
Phone : 306-900-5963

Dr. Kent Kowalski, Professor
College of Kinesiology, USask
Email : kent.kowalski@usask.ca
Phone : 306-966-1079

Or access the link to the study consent form using the QR code below:

This study has been reviewed by and received ethics clearance through the Research Ethics Office on DATE (Beh-REB# XXXX), University of Saskatchewan. All of the data collected from the study will be completely confidential and no personally identifying information will be associated with the final presentation of the data.
Appendix H

Study 3 - Participant Consent Form

You are invited to participate in a research study entitled: A Grounded Theory of Grit in Sport

**Student Researcher:** Danielle Cormier, Graduate Student, College of Kinesiology, University of Saskatchewan, 306-900-5963, danielle.cormier@usask.ca

**Supervisor:** Dr. Kent Kowalski, Professor, College of Kinesiology, University of Saskatchewan, 306-966-1079, kent.kowalski@usask.ca

**Purpose(s) and Objective(s) of the Research.** Grit is defined as a person’s dispositional tendency towards passion and perseverance for long-term goals. As such, gritty people are characterized by their capacity to strive and achieve goals over long periods of time despite setbacks, failures, boredom, or plateaus in goal progress. What is not known is the processes by which grit is developed in sport. This is an important gap; knowing how grit develops in sport will allow sport researchers to identify other social and psychological factors which catalyze grit, and create specific interventions or policies that may contribute to the development of grit in sport settings. Therefore, the purpose of this study will be to understand the processes by which grit is developed in athletes, as well as the outcomes of being gritty in the domain of sport. Final products will include the generation of a substantive high-performance sport-specific theory, and this final theory will be diagrammed.

**Procedures.** This research will require you to complete a brief demographic questionnaire hosted by Survey Monkey (please see the following for more information on the Survey Monkey Privacy Policy) followed by a 60-90 minute one-on-one interview with the student researcher either in person or over Zoom (please see the following for more information on the Zoom Privacy Policy, and note that their servers are stored in Canada). Participants can ask for the recordings to be turned off at any point without giving a reason, and that for video interviews over Zoom participants may turn off their camera at any point without giving a reason. You may also be asked to participate in a short follow-up interview (30 minutes) to clarify what was discussed in your initial interview. After your interview(s), and prior to the data being included in the final report, you will be given the opportunity to review your transcription and to add, alter, or delete information from it as you choose. Transcripts will be sent to you via the email provided on the demographics questionnaire within three weeks of your interview. If the student researcher is unable to transcribe your interview within this time frame you will be notified via email. We ask that you return any transcript revisions and a signed transcript release form within two weeks of receipt, otherwise the interview transcript will be used as they are. Please feel free to ask any questions regarding the procedures and goals of the study or your role.

**Funded by:** This research is funded by a Social Sciences Humanities Research Council (SSHRC) Doctoral Fellowship awarded to the research supervisor, Dr. Kent Kowalski.
Potential Risks. Participation in this study involves no known risks beyond those encountered in everyday life. Due to the nature of questions in the survey, and having you reflect on your personal performance and abilities, you may experience emotional or psychological discomfort. To address this risk, contact information for multiple resources is provided. If you come to find yourself experiencing emotional and psychological discomfort, you can call Crisis Services Canada (1-833-456-4566). University of Saskatchewan students members may also contact the Student Affairs and Outreach Team (306-966-5757).

Potential Benefits. There may be no personal benefits from participating in this research. The benefits of taking part in this research project are that we (e.g., researchers, coaches, medical professionals) will gain a better understanding of the constellation of psychological skills that best create athlete success. The knowledge gained from this research project may lead to the creation of mental training workshops that improve sport performance and athlete well-being. It is also our hope that all participants will find their participation this novel contribution to sport psychology research informative and interesting.

Compensation. All interested participants will be sent a $75.00 Amazon.ca gift certificate to the email provided in their demographics questionnaire upon completion of the interview as a thank you for your time. Compensation will not be dependent on completion of the project. Any personal information collected as a record of honorarium payment will be stored separately from the data by the PI and may be kept for 7 years in case the University of Saskatchewan is subjected to a financial audit.

Anonymity & Confidentiality. If you opt to complete the interview online via Zoom, then please note that although we will make every effort to safeguard your data, we cannot guarantee the privacy of your data, due to the technical vulnerabilities inherent to all online video conferencing platforms. The student researcher will conduct the videoconference in a private area of your home or office that will not be accessible by individuals outside of the research team during the data collection. We recommend that all participants do likewise. The data from the study will be kept completely confidential and will be used as part of the student researcher’s program, to produce a dissertation document towards the completion of the researcher’s Ph.D. degree, and to produce a manuscript in hopes of publishing in a scholarly journal and/or being presented at a conference. However, your identity will be kept confidential. The research team will do our best to guarantee confidentiality, but anonymity cannot be guaranteed. Although we might report direct quotations from the interviews, you will be asked to choose a pseudonym (made up name) and all identifying information (name, coach, school, etc.) will be removed from our report. Please note that procedures for recruiting and/or selecting participants may compromise the anonymity of those participants that are referred to the study by a person(s) outside the research team.

You will be asked to provide some demographic information using a survey hosted by Survey Monkey. Your data will be stored in facilities hosted in Canada. Please see the following for more information on the Survey Monkey Privacy Policy. You will be asked to provide your email address, but it will only be used to schedule interviews and send you a $75.00 Amazon.ca gift certificate. After all data has been collected (including
information from both the demographics survey and the interview), your email address will be removed from the data file and replaced with your pseudonym. Consent forms will always be stored separately from other data. As we might be inviting some participants for follow-up interviews so that they can elaborate on some of the themes that were brought up in their initial interviews, a master-list which links the pseudonym to the participant’s identity will be maintained. This master list will be stored in a password protected file in a member of the research team’s password-protected research-specific laptop behind locked doors, and will be destroyed once the data collection phase of the research has been completed (approximately March 2024). Also, it is important that you are aware that there are certain types of information that the researchers may be obliged to report to relevant authorities (e.g., child abuse, intent to do violence, etc.).

Please put a check mark on the corresponding line(s) to grant or deny your permission:

- [ ] I grant permission to be audio recorded (using an audio recorder)
- [ ] I grant permission to be video and audio recorded on Zoom

**Storage of Data.** All research material will be securely stored and only accessible to the student investigator and research supervisor. Physical data will be stored in a locked cabinet in a locked office only accessible to the student investigator before it is inputted into a statistical software program on the student researcher’s computer and stored on their USask OneDrive account and shared with the research supervisor. This computer is a password-protected dedicated research device to which only the student researcher has access. Once analyzed, the digital data will be passed onto the principal investigator on an external drive and will be stored in a locked cabinet in a locked office. The digital data will be backed up on the Principal Investigator’s USask OneDrive for long term storage. Upon publication of the study, all data will be stored in the encrypted password protected file/locked cabinet for 5 years post-publication, before being confidentially destroyed beyond recovery. All identifying information, (e.g., consent forms, demographic questionnaire) will be stored separately from the data collected.

**Right to Withdraw.** Your participation is voluntary, and you may answer only those questions that you are comfortable with. You may decline to participate from the research project for any reason, and at any time during data collection without explanation or penalty of any sort (including study compensation). Whether you choose to participate or not will have no effect on your athletic or academic standing or how you will be treated by coaches, peers, professors, etc. At the start of any interview, you will be reminded that your consent can be withdrawn at any time during the research process up until the point that you have had an opportunity to add, alter, and delete information from you interview transcripts and signed a transcript release form (likely three weeks after your interview). After this point it may not be possible to link individuals to specific responses, and it may not be possible to withdraw your data. Should you wish to withdraw at any point during the interview, you may simply indicate verbally at any time to a member of the research team that you have chosen to withdraw. Any data that you may have contributed until the point of withdrawal will be destroyed beyond recovery. You may choose to omit any questions you are not
comfortable answering without penalty of any sort. You will be advised of any new information that may have a bearing on your decision to participate. Prior to the interview, you will be asked if you still wish to participate.

**COVID-19 Protocols.** All participants will have a choice to participate remotely over Zoom or in-person at the University of Saskatchewan (in PAC 351). All in-person research will be conducted within University buildings, under the jurisdiction of the provincial public health bodies. We are taking all safety precautions to reduce the risk of spread of COVID-19 and expect you to follow public health directives as well. If you feel that you are from a vulnerable group with respect to COVID-19 effects (e.g., immuno-compromised), please discuss your participation with the research team before consenting. You are under no obligation to participate. The following safety protocols must be followed:

- Screening for symptoms. Please speak with the researcher if any of these symptoms/parameters apply to you.
  - Do you have any of the following new or worsening symptoms or signs?
    - New or worsening cough
    - Shortness of breath, sore throat, runny nose or nasal congestion, hoarse voice, difficulty swallowing
    - New smell or taste disorders
    - Nausea, vomiting, diarrhea, abdominal pain
    - Unexplained fatigue
    - Chills or headache
    - Fever
  - Have you travelled outside Canada (or insert the country where research is being conducted) or had close contact with anyone who has travelled outside Canada (or insert country where research is being conducted) in the past 14 days? Or to a community under a public health advisory.
  - Have you had close contact with anyone with respiratory illness or a confirmed or probable case of COVID-19?
- Take appropriate precautions (e.g. face covering) if taking public transportation and entering public indoor spaces.
- Wash your hands upon coming onto campus. Hand sanitizer will be made available to you.
- Physical distancing will be maintained at all times. Wearing single use triple-ply mask is encouraged. We will provide you with PPE if necessary.
- If you develop symptoms after participating in in-person data collection, please contact the research team. The research team will contact you directly if we develop symptoms.

**Questions or Concerns, & Follow Up.** If you have any questions or concerns, or to request a copy of the final research report, contact the student researcher Danielle Cormier by email at danielle.cormier@usask.ca. You may also contact the supervisor, Dr. Kent Kowalski, by email at kent.kowalski@usask.ca. The results of this research study will be available in Spring, 2023.

This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board on September 26th (Beh-REB#: 3622). Any
questions regarding your rights as a participant may be addressed to these committees through either the University of Saskatchewan Research Ethics Office: ethics.office@usask.ca, 1-306-966-2975, or 1-888-966-2975 (toll free).

**Consent to Participate.** By completing and submitting the consent form and demographics questionnaire, **YOUR FREE AND INFORMED CONSENT IS IMPLIED** and indicates that you understand the above conditions of participation in the study. The research team will review consent at the time of the interview to ensure you are still interested in participating. You may print this screen if you wish to have a copy of the consent form for your records.
Appendix I

Study 3 - Interview Guides

Introductions:
The goal is to begin our formal communications in the interview setting.

- Introduce myself and talk about my program of study.
- Thank them for taking the time to come participate in the interview and that I really appreciate their participation.

Discuss the context of the interview:
The goal is to make sure that participants consent to participate and to prepare them for the discussions (pseudonym and audio recording).

- Review consent
- Remind participants of their right to withdraw at any time without penalty for any reason until all data is collected and analyzed.
- Remind participants of the right to not answer any question. Also remind participants that there are no right or wrong answers, I really want to hear about their experiences. Inform participants that they do not need to feel rushed, silence or quiet time is okay, feel free to take their time to think, reflect, and collect their thoughts when answering questions.
- I will be using this guide to help me remember what questions to ask. I will be taking some notes as we discuss, and I will also audio record our conversation so that I am not spending a lot of our time writing down your answers.
- Audio recorder: I will now turn on the audio recorder.

Gaining rapport:
The goal is to work toward a comfortable environment for the participants to share their sport experiences.

1. Tell me a bit about yourself. (Cross-reference results from demographics questionnaire)
   a. Tell me about some of your past experiences in sport.
      i. Describe your sport involvement.
      ii. What sports have you participated in?
      iii. When did you start?
      iv. How did you choose to participate in sport?
      v. At what levels have you competed?
      vi. Tell me one thing I cannot tell just by looking at you.
         1. This is important for me to know because…

Play a game of “Shining moment”.

Introduce Grit:
The goal is to introduce grit to the participants.
• Have you heard of the concept of grit before?
  *Probe: What do you think being gritty looks like?
• Grit can be understood as having passion for a particular goal and large amounts of perseverance to accomplish that goal over long periods of time. (show TedTalk video of leading researcher Dr. Angela Duckworth explaining grit explaining self-compassion; https://www.ted.com/talks/angela_lee_duckworth_grit_the_power_of_passion_and_perseverance?language=en).
• What questions do you have about grit?

ATHLETE INTERVIEW PROMPTS

Experiences of Grit in Sport for Athletes
The goal is to delve deeper into experiences/observations of grit in sport.

1. What do you think being gritty in sport means?
   a. *Probe: Can you think of a story that illustrates this trait?
   b. *Probe: Can you think of an athlete that illustrates this trait?
   c. *Probe: Do you think grit is something that is encouraged in your sport environment? That is, do your coaches, teammates, or parents praise people who seem to have passion and perseverance?
   d. *Probe: What do you think are the outcomes of being gritty in sport?

2. As an athletes in a competitive sporting environment, I’m curious if you’ve ever felt particularly passionate about a specific sport goal and had to persevere through setbacks over long periods of time. Can you tell me about such an experience?
   a. *Probe: What was your goal that you were striving towards? Were you successful in achieving it or not?
   b. *Probe: What did you have to persevere through?
   c. *Probe: When did this happen?
   d. *Probe: Why did you chose to share this particular experience?
   e. *Probe: Would you have defined yourself as gritty at the time that this happened? Why or why not?
   f. *Probe: In what ways did this experience affect your future sport performance/training?
   g. *Probe: Were there ever times in sport where you didn’t act with grit? Why? What happened?
   h. *Probe: If the individual does not say they’ve been gritty in sport in the past—Have you ever seen anyone (maybe another teammate) who’s behaved in such a way? Can you tell me more about them?

3. Can you tell me how or where you might have learned to be gritty?
   a. *Probe: Do you think you were born with this trait, or were you taught it?
   b. *Probe: Was there a series of life experiences that you had that led you to behave this way?
   c. *Probe: Was there anyone in your life that encouraged you to be passionate or persevere through setbacks? Someone you know, or a celebrity or fictional character? What did they do to encourage this?
d. **Probe:** Was there anything in your particular sport environment that encouraged grit? (e.g., training schedule, sport culture/norms, policies, etc.)

4. What do you think athletes can do to grow their grit in sport?
   a. **Probe:** Was there anything purposefully that you’ve done to increase your levels of passion and perseverance?
   b. **Probe:** Have your teammates or anyone you know done anything to become grittier?
   c. **Probe:** Are there any experiences or environments that other athletes should seek out to become grittier?
   d. **Probe:** Should the goal for other athletes be to become grittier? Or is there a better goal?

5. What do you think being gritty in sport leads to? Are there any outcomes or consequences of grit?
   a. **Probe:** Has being gritty lead to positive outcomes for you? Can you think of a time that being gritty led to something negative?
   b. **Probe:** Based on your experiences, how is it that grit leads to these outcomes? How are they related?

6. This is my final question. You may have noticed throughout this interview that I was asking you lots of questions about what made you gritty, as well as the outcomes from having that grittiness in sport. I’m curious—what do you think the precursors and outcomes of grit are?
   a. **Probe:** Was there anything that we didn’t already discuss that might answer these two questions?

7. We have come to the end of this conversation. What else might you like to add? Is there anything I’ve missed?

**PARENT & SUPPORT PERSONS INTERVIEW PROMPTS**

**Experiences of Grit in Sport for Sport Parents & Sport Support Persons**

The goal is to delve deeper into experiences/observations of grit in sport.

1. What do you think being gritty in sport means?
   a. **Probe:** Can you think of a story that illustrates this trait?
   b. **Probe:** Can you think of an athlete that illustrates this trait?
   c. **Probe:** Do you think grit is something that is encouraged by the sport environment? That is, do the athletes, coaches, parents, or other sport support persons praise people who seem to have passion and perseverance?
   d. **Probe:** What do you think are the outcomes of being gritty in sport?

2. As someone who supports athletes in a competitive sporting environment, I’m curious if you’ve met an athlete or athletes who is/are passionate about a specific sport goal and had to persevere through setbacks over long periods of time. Can you tell me about their
story? Please note, that I do not expect you to share any identifying information about this individual.

a. *Probe:* What do you think was the goal that they were striving towards? Do you think they successful in achieving it or not?

b. *Probe:* From your perspective, what did they have to persevere through?

c. *Probe:* When did this happen?

d. *Probe:* Why did you chose to share this particular story?

e. *Probe:* Do you think that individual would have defined themselves as gritty at the time that this happened? Why or why not?

f. *Probe:* In what ways do you think this experience affected their future sport performance/training?

g. *Probe:* Were there ever times in sport where you think they didn’t act with grit? Why? What happened?

3. Can you tell me how or where you think this individual might have learned to be gritty?

a. *Probe:* Do you think they were born with this trait, or were they taught it?

b. *Probe:* Did you do anything to help encourage this individual to be passionate or persevere through setbacks? What did you do to encourage this?

c. *Probe:* Was there anything in their particular sport environment that encouraged grit? (e.g., training schedule, sport culture/norms, policies, etc.)

4. What do you think athletes can do to grow their grit in sport?

a. *Probe:* Was there anything purposefully that you’ve done to increase the levels of passion and perseverance in the athletes that you parent/work with?

b. *Probe:* Do you know of any athletes that have purposefully worked on their own to become grittier? What did they do?

c. *Probe:* Are there any experiences or environments that athletes should seek out to become grittier?

d. *Probe:* Should the goal for athletes be to become grittier? Or is there a better goal?

5. What do you think being gritty in sport leads to? Are there any outcomes or consequences of grit?

a. *Probe:* Has being gritty lead to positive outcomes for the athletes that you parent/work with? Can you think of a time that being gritty led to something negative?

b. *Probe:* Based on your experiences, how is it that grit leads to these outcomes? How are they related?

6. This is my final question. You may have noticed throughout this interview that I was asking you lots of questions about what made athletes gritty, as well as the outcomes from having that grittiness in sport. I’m curious—what do you think the precursors and outcomes of grit are?

a. *Probe:* Was there anything that we didn’t already discuss that might answer these two questions?
7. We have come to the end of this conversation. What else might you like to add? Is there anything I’ve missed?

**Conclusion:**
The goal is to wrap up the interview.
- I want to take the time to thank you for your participation in this interview today. Without your time and willingness to chat with me this research would not be possible, so thank you very much for your time and sharing your stories.
- I may contact you in the future for a follow up interview, to clarify anything that you’ve said or to ask you further questions about some of your answers based on what I’m finding in this and other interviews. Would it be okay for me to contact you again?
- For this research project to be successful, I need to continue interviewing other sport participants/support persons who might be able to speak to grit in sport. Can you think of anyone that would be a good candidate (bring up examples of teammates, support people mentioned by the participants in the interview)? Would you be willing to share my email address with them for them to contact me?
- If you have any questions or concerns, please feel free to contact me. All the information that you will need is in this package.
- Give the participant their exit package.
- Stop the audio recording.
- Go through the exit package with the participants.