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New Directions in Team Resilience

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New Directions in Team Resilience

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Author's Declaration

'Yr wyf drwy hyn yn datgan mai canlyniad fy ymchwil fy hun yw'r thesis hwn, ac eithrio lle nodir yn wahanol. Caiff ffynonellau eraill eu cydnabod gan droednodiadau yn rhoi cyfeiriadau eglur. Nid yw sylwedd y gwaith hwn wedi cael ei dderbyn o'r blaen ar gyfer unrhyw radd, ac nid yw'n cael ei gyflwyno ar yr un pryd mewn ymgeisiaeth am unrhyw radd oni bai ei fod, fel y cytunwyd gan y Brifysgol, am gymwysterau deuol cymeradwy.'

Rwy'n cadarnhau fy mod yn cyflwyno'r gwaith gyda chytundeb fy Ngrichwyliwr (Goruchwylwyr)'

'I hereby declare that this thesis is the results of my own investigations, except where otherwise stated. All other sources are acknowledged by bibliographic references. This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree unless, as agreed by the University, for approved dual awards.'

I confirm that I am submitting the work with the agreement of my Supervisor(s)'

Acknowledgements

To this day, I vividly remember my first weeks in my Ph.D. programme while searching for a house to rent in the beautiful and serene city of Bangor for my family and me. The years have swiftly passed by—four and a half years filled with cherished moments, such as the birth of my two sons, as well as difficult ones marked by the illness of dear ones due to the COVID virus. The quarantine kept us away from them, and I had to make tough decisions at the outset of my Ph.D. journey. As I put the final touches on my thesis, I am overwhelmed with happiness and a sense of accomplishment. Hence, I must extend my heartfelt gratitude to those who supported me throughout these years.

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To my wife and children, words cannot adequately express my gratitude for your unwavering support and encouragement during this journey. My wife, in particular, stood by me tirelessly, providing her unwavering support and enduring the distance from her family while we resided in Bangor.

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Thesis Summary

Team resilience, as a complex and multifaceted construct, has undergone a burgeoning examination that has demonstrated significant contributions across diverse performance domains, including the workplace, healthcare, education, and sports. However, in the specific context of sports, there remains a lack of comprehensive conceptualisations of team resilience, largely due to the absence of clear measurement frameworks for investigating team resilience in sports settings. Therefore, this thesis presents a comprehensive model of team resilience grounded in contemporary conceptualisations within the sports domain as well as empirical studies on team adversity, team stressors, and team resilience in sports. Additionally, a novel team resilience measure, the 20-item Team Resilient Behaviour Scale (TReBS) is developed, that focuses on four fundamental facets of resilience: anticipate, minimise, manage, and mend. TReBS has the potential to facilitate future research endeavours in exploring team resilience in sports settings.

The thesis comprises five chapters. Chapter 1 introduces the topic of team resilience and lays the foundation for the proposal of work completed in the PhD thesis, including a new measure.

Chapter 2 provides a systematic literature review on team resilience, covering performance domains like the workplace, healthcare, education, and sports. It identified 16 eligible studies, with the workplace and sports being most prolific. The review found 52 different correlates of team resilience, comprising motivational, behavioural, affectual, and group characteristics antecedents and outcomes, where behavioural factors represented the highest number of associations reported. It also highlighted the development of nine team resilience measures, with CREST having the most established psychometric properties. Overall, the review emphasises the need for more research on team resilience in the sports domain.

Chapter 3 details the motivation behind conducting three empirical studies on team adversity, team stressors, and team resilience in sports, culminating in the development of a new force model of team resilience. Three studies were conducted to investigate the interplay between team resilience, adversity, and team (and individual) outcomes. Study 1 examines the relationship between independent and/or interactive effects, team adversity and team resilience, which was found to support both interaction and independent-based hypotheses between adversity and team resilience. Through an inductive analysis of qualitative data, Study 2 identifies nine types of stressors experienced by sports teams, encompassing various challenges they encounter (e.g., weakened teams, challenging upcoming games, losing score lines, travel and transportation issues, fixture issues, interpersonal concerns, training issues, challenging playing conditions, and coach and team support issues). Study 3 establishes team resilience as a significant positive predictor of team cohesion and collective efficacy, irrespective of whether the stress experienced is acute or chronic. However, it is emphasised that examining these situations from a proactive or reactive perspective necessitates the development of a new measure of team resilience to understand its intricate role more comprehensively in the face of adversity.

Chapter 4 introduces the 20-item TReBS as a valid and reliable tool for assessing team resilience behaviours. The scale demonstrates robust factorial validity, internal consistency, construct validity, discriminant validity, and concurrent validity. It exhibits satisfactory internal consistency, effectively capturing different aspects of team resilience, and distinguishes itself from other constructs, thereby strengthening its validity for assessing team resilience behaviours. These findings enhance our understanding of team resilience and furnish researchers with a potentially reliable instrument to investigate and examine this construct in diverse contexts.

Finally, Chapter 5 serves as the concluding chapter, providing a comprehensive summary and discussion of the research findings. It offers insights into the implications of the findings from both theoretical and practical perspectives and sets forth potential directions for future research endeavours in the realm of team resilience.

CHAPTER 1: GENERAL INTRODUCTION

General Introduction

"The key word is resilience. It's the mark of a successful team, it's the mark of a successful person. How can you withstand the storms that life gives you?" – **David Shaw, football coach**

Resilience is a complex and multifaceted construct that has been extensively studied across various disciplines, including psychology, education, and sports (e.g., Fletcher & Sarkar, 2013; Morgan et al., 2013; Morgan et al., 2015). The concept of resilience has also been examined via individual and team perspectives and has been found to be associated with positive outcomes across performance domains such as academia, the workplace, and sport (Arantzazu et al., 2018; Morgan et al., 2013; Tugade & Fredrickson, 2004; Tugade et al., 2004). Various studies have explored the characteristics of resilient individuals and teams and identified factors that contribute to resilience. These contributing factors relate to mental toughness (Gucciardi et al., 2015), leadership (Morgan et al., 2013; 2015), and social support (Wagnild & Young, 1993). The importance of interventions and strategies that can foster resilience in individuals and teams has also been well documented (e.g., Bryan et al., 2019; Chapman et al., 2020; Morgan et al., 2015).

Defining and Conceptualising Individual Resilience

First it is important to differentiate between individual and team resilience. Individual resilience as a concept has been defined and studied in several ways. For example, Rutter (1985) identifies resilience as the factor that distinguishes individuals who are able to adapt and evolve after experiencing stressors from those who are not. Alternative definitions of resilience include "….the ability to bounce back from adversity, frustration, and misfortune" (Ledesma, 2014, p.1), "…the positive psychological capacity to rebound, to 'bounce back' from adversity, uncertainty, conflict, failure or even positive change, progress and increased responsibility" (Luthans, 2002, p.702), "…the stable trajectory of healthy functioning after a highly adverse event" (Southwick et al., 2014, p.2), and "…the capacity of a system to adapt

successfully to challenges that threaten the function, survival, or future development of the system" (Masten & Barnes, 2018, p.1). Resilient individuals who face risks and significant stress can still function positively, recover from setbacks (Rutter, 2012), or even flourish when challenged (Ryff & Singer, 2003). This latter view of resilience is in line with Manca et al.'s (2017) reflections, which view resilience not only as the ability to recover from shock but also as the ability to "bounce forward" and use challenges as opportunities for growth.

The research literature suggests that the ability of an individual to thrive despite difficulties is contingent upon both individual capacities and coping strategies related to the access and use of resources (Kent et al., 2018). According to Connor and Davidson (2003), individual capacities such as an easy temperament, good self-esteem, planning skills, and a supportive environment are crucial factors in promoting resilient behaviour. However, individuals are not passive recipients of their environment; instead, they interact dynamically and reciprocally with it, with social support and family congruence playing a significant role (Wagnild & Young, 1993). The nature of the adversity itself is also an important consideration, and individual reaction to such situations is the result of an interaction between inter- and intra-personal factors as well as the broader socio-economic environment (Tusaie & Dyer, 2004; Waugh & Koster, 2015). For example, when faced with a losing streak, athletes may experience frustration, disappointment, or even self-doubt. Their reaction depends on their individual characteristics, such as their resilience, mental toughness, and coping strategies. Additionally, the support they receive from their teammates, coaches, and support staff can greatly influence their response. A team with a positive and cohesive atmosphere, effective communication, and strong leadership is more likely to respond to adversity with resilience and determination.

Research has shown that individual resilience can be categorised into two primary processes, namely those involving proactive and reactive strategies (de la Fuente et al., 2022; Reid & Botterill, 2013). Proactive strategies involve developing coping strategies and

resources before challenges arise (Ramachandran, 2012). Whereas the more traditional take on resilience involves a reactive approach where the individual draws upon internal and external resources to manage and overcome difficult situations (D'Arcy-Jones, 2020). Both proactive and reactive resilience are important for individuals to thrive in the face of adversity, and developing these two types of resilience can help individuals successfully navigate life's challenges (Kegelaers & Wylleman, 2019). Although individual resilience has been examined in various contexts such as business, education, healthcare, and sports, the purpose of the present PhD mainly focusses upon resilience in the sports domain as this domain remains relatively understudied compared to the other spheres.

In sports, athlete resilience has been a topic of interest in the literature for over a decade, with researchers exploring underlying stressors and how resilience related protective factors can promote optimal sport performance (Sarkar & Fletcher, 2014). Individual resilience has been conceptualised as a dynamic process influenced by personal and sociocultural factors, with coping strategies as a central component (Secades et al., 2016). Relatively recently, the literature on resilience in the sports context has expanded to include not only the examination of resilience in coaches but also the exploration of how coaches can foster resilience in their athletes (Bryan et al., 2019; Galli & Gonzalez, 2015). This expansion reflects the recognition of coaches' crucial role in developing and promoting resilience among athletes. The quality of the coach-athlete relationship emerges as a pivotal factor in this process (Kegelaers & Wylleman, 2019). Coaches who exhibit resilience serve as role models and sources of support for athletes, aiding them in navigating adversity, cultivating coping skills, and enhancing their overall resilience. Establishing a positive and supportive coach-athlete relationship, characterised by trust, open communication, and mutual understanding, plays a fundamental role in fostering athlete resilience (Bryan et al., 2019; Galli & Gonzalez, 2015; Kegelaers & Wylleman, 2019).

Despite the growing literature on resilience in the sports context, there is a need to better understand the dynamic nature of resilience, the stressors and protective factors coaches, athletes, and of particular relevance for the current PhD, teams encounter.

Defining and Conceptualising Team Resilience

Although resilience has primarily been examined at the individual level, recently, researchers have turned their attention to team resilience (Kennedy et al., 2016). Team resilience involves managing pressure across and within the team to enhance their ability to cope with future challenges arising from adversity (Flint-Taylor & Cooper, 2017). However, the literature on team resilience is still in its early stages of development, leading to varying and somewhat unclear definitions. For instance, Morgan et al. (2013) define team resilience as "…a dynamic, psychosocial process which protects a group of individuals from the potential negative effects of stressors they collectively encounter" (p.552). Alternatively, Alliger et al. (2015) define team resilience as "…the capacity of a team to withstand and overcome stressors in a manner that enables sustained performance; it helps teams handle and bounce back from challenges that can endanger their cohesiveness and performance" (p.177). Based on their critique and appraisal of conceptualisations of team resilience available in the literature Chapman et al. (2020) conclude that team resilience refers to emphasising the ability to "bounce back" from adversity, promoting recovery, growth, and ongoing development until a specific goal is achieved. Therefore, team resilience encompasses groups of individuals who effectively recover from challenging situations and demonstrates motivation and determination across various areas of functioning. Although the above definitions highlight the multidimensional nature of team resilience and its importance for navigating and overcoming adversity in team settings, the underdevelopment of the research literature implies that future definitions of team resilience are likely to be more specific and focused. That said, team resilience is generally understood to refer to a group's ability to recover from challenges and

bounce back to optimal functioning (Alliger et al., 2015; Chapman et al., 2020; Morgan et al., 2013; Morgan et al., 2015).

Team resilience can be applied to various domains of functioning, such as education (e.g., Fan et al., 2021), sports (e.g., Morgan et al., 2013; 2015), business (e.g., Hartwig et al., 2020) and healthcare (e.g., Martinchek et al., 2017), where adverse events offer opportunities for teams to positively adapt. However, research on team resilience often lacks consistent conceptual and methodological approaches, and there is a need for continued investigation into how teams respond to adverse events in different environments. Additionally, there is conceptual overlap between team resilience and other team concepts, such as team potency and collective efficacy, although team resilience is unique in its focus on behaviour oriented around adverse triggering events (Carmeli et al., 2013). As such, a resilient team is likely able to stay focused, motivated, and positive even in the face of setbacks or unexpected challenges. This ability is critical for success in sports, where teams often face unexpected obstacles, setbacks, and degrees of adversity that must be overcome or recovered from quickly to maintain momentum towards their goals (Morgan et al., 2016).

The adversity that teams face can vary in novelty, duration, and criticality, which can impact team behaviours and performance outcomes in various ways (Morgeson et al., 2015). Such events may have a detrimental effect at the individual and team level, hindering performance and well-being. To respond to adverse events effectively, teams need mutual work goals and interdependence in performing tasks and achieving outcomes (Kozlowski & Ilgen, 2006). The work stress literature provides a theoretical foundation for studying team resilience and shows that adverse stressors can negatively impact team members' health and performance, thereby affecting the team's overall functioning (Dietz et al., 2017). However, as most of the stress and performance research focuses on individuals, more research is needed to understand how team resources explain effective team responses to adverse events in the workplace as

well as in sports. One way of investigating team resilience is through the administration of sound psychometric tools developed to assess the construct.

Measuring Team Resilience

The most prominent measure of team resilience in the research literature is the Characteristics of Resilience in Sports Teams Inventory (CREST; Decroos et al., 2017). Decroos et al. (2017) developed the CREST to conduct a series of studies on athletes from Belgium and the UK, showcasing the effectiveness of the measure in assessing the resilience teams. The researchers had three main aims; first, the authors wanted to validate an initial set of items for their measure. Second, to assess the factor structure of the CREST. Third, to provide evidence using their measure of teams' capacity to demonstrate resilient qualities and the vulnerabilities displayed under pressure. To achieve this, the researchers investigated and found support for the relevance of both resilient characteristics and vulnerability of the team level for group structure, mastery approaches towards adversities, social capital, and collective efficacy. Several studies have confirmed the effectiveness of the CREST to measure team performance in sports (Gorgulu et al., 2018; López-Gajardo et al., 2023; Yang et al., 2020).

Gorgulu et al. (2018) and Yang et al. (2020) focused on assessing the reliability and validity of CREST in measuring team resilience, with Gorgulu et al. conducting studies in Turkish athletes and Yang et al. in Chinese athletes. Both studies concluded that the CREST is a sound tool for assessing team resilience in their respective populations. They both highlight the potential of the CREST in aiding sports psychologists in understanding team resilience, both in relation to resilient characteristics and vulnerabilities at the team level. Decroos et al. (2017) even suggested that future research could utilise the CREST as an effective measure to investigate team resilience in response to adverse events and its impact on sports teams' functioning. Based on this recommendation and by recognising the importance of considering

both individual and group-level perceptions, we were compelled to adopt the CREST measure, which is extensively utilised in Chapter 3.

Research on the Resilience of Sports Teams

The literature on resilience of sports teams is still emerging despite seminal works as early as 2013 (Morgan et al., 2013). Morgan et al. (2013) aimed to define and characterise team resilience in elite sport through qualitative focus groups. They identified four main resilient characteristics: group structure, mastery approaches, social capital, and collective efficacy. This study provided conceptual clarity on resilience at the team level. Similarly, Morgan et al. (2015) explored the psychosocial processes underlying team resilience in a case study of an England rugby union World Cup winning team. They identified transformational leadership, shared team leadership, team learning, social identity, and positive emotions as key processes. The study highlighted the positive impact of these characteristics on team resilience. Morgan et al. (2019) further investigated psychosocial enablers and strategies for team resilience development in a high-level sport team. Multiple data collection methods were used, revealing practical strategies such as inspiring team members, developing a team regulatory system, cultivating team identity and togetherness, exposing the team to challenges, and promoting enjoyment. These strategies contributed to the development of team resilience.

The team resilience literature in the sports context has identified specific resilient characteristics and psychosocial processes that contribute to team resilience (Morgan et al., 2013; Morgan et al., 2015). For example, Morgan et al. (2013, 2015) have made significant contributions to the understanding of team resilience in elite sport. Their research defines team resilience as a dynamic process and identifies specific characteristics and processes that contribute to resilience. Key findings highlight the importance of effective communication, continuous learning, strong relationships, utilising setbacks, transformational and shared leadership, team learning, social identity, and positive emotions. These studies provide

valuable insights into the nature and scope of team resilience, emphasising the underlying processes that enable teams to thrive. Overall, these studies offer a comprehensive understanding of team resilience and its essential components.

More recent studies, since the introduction of Decroos et al.'s (2017) CREST measure, collectively underscore the efficacy of the CREST measure as a robust approach for assessing team resilience (Gorgulu et al., 2018; Yang et al., 2020; López-Gajardo et al., 2023). Furthermore, these studies address the pragmatic ramifications of team resilience by employing the CREST measure within the specific domain of sports. These studies have reported positives association between team resilience, team cohesion, collective efficacy, and mastery approaches in various sports domains, ranging from rowing to field hockey, football, soccer, basketball, handball, futsal, and rugby. The findings of these studies served as the impetus for the authors' decision to embark on their own investigation in the sporting context. Consequently, the above findings reaffirm our rationale for incorporating CREST as a pivotal component within the thesis. This indicates the need to delve into recent scholarly works on team resilience, enabling us to determine how CREST can be integrated into our study at the team level.

A more recent study by Yang et al. (2020) conducted a psychometric evaluation of the CREST (developed by Decroos et al., 2017) with a Chinese sample of athletes. The Chinese version of CREST demonstrated reliability and validity, making it a useful tool for assessing team resilience in China. The study highlighted the positive relationships between resilient characteristics such as group structure, mastery of approaches toward adversity, social capital, and collective efficacy, as well as vulnerabilities under pressure, and team resilience. Similarly, López-Gajardo et al. (2023) conducted a study on Spanish soccer players using the CREST measure to investigate the relationship between team resilience, vulnerability under pressure, and performance outcomes. Their findings indicated that group cohesion and collective

efficacy were associated with subjective team performance. They also found that vulnerability under pressure had a negative impact on perceived team performance. Additionally, team-level resilience traits positively predicted team performance. This study offers important insights into the connection between team resilience and performance outcomes, highlighting the significance of team-level factors in achieving positive performance in soccer.

Overall, recent advancements in sport psychology have provided a more systematic understanding of team resilience. These studies have identified resilient characteristics and psychosocial processes that contribute to a team's ability to withstand stressors, overcome adversity, and achieve peak performance. The research emphasises the importance of effective communication, continuous learning, strong relationships, using setbacks as opportunities for growth, transformational and shared leadership, team learning, social identity, and positive emotions. Although not yet tested, coaches may be able to utilise these findings to build a culture of excellence within their teams and enhance their resilience in the face of challenges. The existing studies found in the research literature have led to the development of theories of team resilience in contemporary literature.

Team Resilience Theory

In the literature on team resilience, scholars such as Gucciardi et al. (2018) and Alliger et al. (2015) present their own models and taxonomies of team resilience. Gucciardi et al.'s (2018) model of team resilience focuses on the multilevel nature of resilience in teams, considering individual, team, and organisational factors. While individual factors refer to the personal attributes, skills, and characteristics of team members, such as psychological well-being, coping abilities, and individual resilience, team factors encompass group dynamics, communication patterns, and cohesion within teams, such as how well team members collaborate, communicate, and support each other, as well as the overall team climate. Organisational factors relate to the broader context in which the team operates, such

as organisational culture, leadership support, available resources, and the policies and practices that influence the team's functioning and resilience within the larger organisational framework. Hence, the model emphasises the interplay between personal characteristics, team processes, and organisational support in facilitating team resilience, and as a result, identifies key facilitators of team resilience, such as shared goals, clear communication, social support, effective leadership, and a positive team culture. In other words, the model provides a comprehensive framework for understanding the emergence of team resilience and highlights the importance of coordination across different organisational levels.

Understanding the development of team resilience lies in the dynamic processes among individual team members over time, considering task demands and adverse events. Gucciardi et al.'s (2018) innovative conceptual model differs from existing work by clearly defining inputs (human capital resources, leadership, norms, and mental models), processes (planning, reflection, and coordination), and outcomes (functioning trajectories, shared beliefs) within a unified framework (see Figure 1.1).

Propositions within the model highlight crucial aspects, such as the optimal mix of team members (strategically assembling a team with diverse skills and qualities that complement each other to enhance overall resilience), the role of adversity (a catalyst for the emergence of team resilience, presenting an opportunity for growth, learning, and coordinated efforts in the face of challenges), and the influence of human capital resources and leadership on coordination (effective leadership shapes the utilisation of human capital resources within a team, influencing coordinated efforts and contributing to overall team resilience). Hence, the model serves as a valuable guide for future research on team resilience, offering a basis for developing testable hypotheses.

Figure 1.1

Gucciardi et al.'s Conceptual Model of Team Resilience Emergence (Gucciardi et al., 2018, p.733)
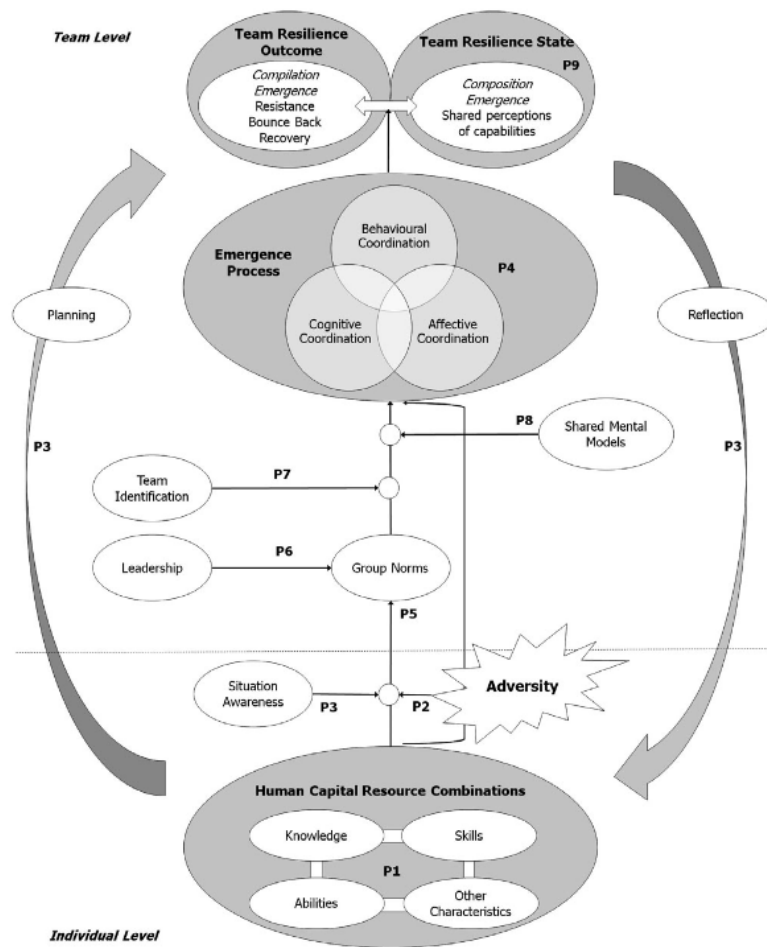
On the other hand, Alliger et al. (2015) introduced a taxonomy of team resilience that specifically addresses the actions and strategies teams can employ to effectively response to and recovery from adverse events. This taxonomy categorises these actions into several dimensions termed minimise, manage, and mend.

The minimise dimension places an emphasis on the responses teams can make in the face of upcoming threats. In other words, resilient teams focus on proactive planning and preparation for upcoming challenges or threats. Resilient teams employ proactive strategies to navigate challenges effectively. For instance, by identifying past and potential challenges through scenario discussions, similar to "iceberg" warning drills. Resilient teams also assess

their readiness by regularly monitoring individual and collective capacities, evaluating availability, resource status, and vulnerabilities. They are also vigilant for early warning signs; these teams openly communicate concerns, fostering quick recognition of emerging problems. According to Alliger et al. (2015) such teams prepare for adversity by documenting roles and establishing clear standard operating procedures (SOPs), ensuring the maintenance of critical processes during emergencies or high workloads. For example, NASA, develops and utilises SOPs based on diverse challenges to prepare their astronaut space crews for the unknown.

The manage dimension encompasses the behaviours and strategies that resilient teams exhibit while they are experiencing stress, enabling them to withstand and effectively navigate through difficult situations. Resilient teams exhibit several key behaviours to effectively navigate challenges. Resilient teams excel in swift and honest situational assessments, seamlessly transitioning between "normal" and "emergency" modes. They proactively address chronic stressors, recognising their impact on cohesion and overall team effectiveness. Prioritising mutual support, team members fill in for one another and offer assistance during adversity. Upholding basic processes under stress, such as a fine dining restaurant's kitchen crew managing routine tasks amid challenges, enabling the preservation of cognitive resources for problem-solving. Additionally, resilient team members actively seek guidance, valuing expertise over hierarchy and maintaining networks for effective decision-making.

Lastly, the mend dimension pertains to the actions taken by the team to aid recovery and learn from a stressful experience to adapt and better prepare for future adverse events. Resilient teams employ a series of effective practices to enhance their adaptability and performance in the face of challenges. Resilient teams prioritise quickly restoring situational awareness through open communication, transitioning out of crisis mode when appropriate. Debriefing is integral, with teams conducting after-action reviews to reflect on successes and failures, foster communication, and formulate action plans. Proactively addressing concerns

and making necessary adjustments refreshes resilience, repairs relationships, and resolves internal friction points. Expressing appreciation strengthens team bonds, incentivizes cooperation, and contributes to positive team norms. Recognising efforts, including temporary leadership roles, establishes a culture where "stepping up" is encouraged. Resilient teams extend gratitude to external contributors, fostering a supportive network for future endeavours and embodying a culture of swift adaptation, continuous improvement, and mutual appreciation.

In Table 1.1, Alliger et al. (2015) specify 40 specific behaviours categorised within their Minimise, Manage, and Mend framework. These behaviours exemplify the actions resilient teams undertake. The theming of these behaviours might better enables teams to reflect on and assess which ones they exhibited in the face of recent challenges.

Table 1.1

Team Resilience Behaviours (Alliger et al., 2015, p.181)

Dimension	Items
Minimise (Before)	1. Identify and mitigate past stressors to enhance future team resilience. 2. Anticipate and comprehend upcoming challenges to proactively address potential stressors for the team. 3. Recognise challenging scenarios for the team and strategize effective preparations for enhanced coping mechanisms. 4. Engage in proactive "what-if" discussions or drills to establish clear strategies for handling anticipated and critical team challenges. 5. Foresee potential risks to team cohesion and performance through proactive management. 6. Establish strategies to prevent surprises and ensure preparedness for sudden demands or crises within the team. 7. Regularly assess and monitor individual readiness to effectively meet both expected and unexpected challenges. 8. Maintain open communication to ensure awareness of each team member's current capacity level. 9. Proactively communicate early alerts of potential issues, providing "heads-ups" and flagging possible concerns. 10. Avoid premature dismissal of warnings about potential problems; give due consideration to early alerts. 11. Equip team members with the ability to identify signs of potential challenges or emerging problems for proactive response.

	12. Identify and document backup responsibilities, determining who will step in or provide assistance in the event of specific occurrences. 13. Document standard operating procedures (SOPs) for reference and implementation as needed in various situations. 14. Proactively address known vulnerabilities, such as inadequate sleep or rest, distrust among team members, or shortages of resources or expertise. 15. Create a systematic process for assessing and communicating the nature and potential impact of developing situations or challenges within the team.
Manage (During)	16. Establish a process for assessing and communicating the nature and potential impact of a developing situation or challenge. 17. Swiftly and truthfully assess, communicate, and respond to challenges as they arise. 18. Conduct team huddles to diagnose unexpected challenges and actively generate alternative solutions. 19. Ensure all team members are informed when transitioning from "normal" to "emergency" mode. 20. Quickly identify and address ineffective approaches to managing challenging situations in real-time. 21. Identify chronic stressors and establish plans for managing them effectively. 22. Recognise when team members need assistance and provide backup or support. 23. Foster an environment where all team members feel comfortable speaking up when they require help. 24. Promptly seek assistance when facing challenges. 25. Provide timely, ongoing status updates to team members during the development of challenging situations. 26. Utilise standard operating procedures (SOPs) and known solutions to reduce stressors and address threats when appropriate. 27. Sustain constructive routines, such as regular meetings or communications, in the face of stress. 28. Defer to team members with the most relevant expertise and experience. 29. Reach out to external sources for assistance when needed, leveraging valuable knowledge and experience from others.
Mend (After)	30. Assess changes in our situation, mission, resources, and viability. 31. Conduct a quick post-event pulse check to identify areas where the team may need to recover. 32. Monitor individual team members for signs of post-event stress. 33. Perform a team debrief to extract lessons learned and establish collaborative norms for the future. 34. Confirm follow-up actions and responsibilities to address resource or health concerns, ensuring ongoing viability. 35. Support individual team members adversely affected by challenging events or stressors. 36. Resolve any friction points that may have emerged between team members due to the stressful experience.

	37. Re-establish relationships with those outside the team strained by the challenge.
	38. Make necessary adjustments to processes, procedures, and resources to feel prepared for future challenges.
	39. Express appreciation for helpful actions taken by team members during a stressful event.
	40. Thank individuals outside the team for their assistance and support.

While the existing literature on team resilience in sports underscores the importance of managing and mending in order to overcome adversity and cope with stress as prerequisites for sporting excellence (Morgan et al., 2013; 2015), there seems to be a notable lack of emphasis on proactively anticipating and minimising potential challenges and stressors before they actually occur. Therefore, Alliger et al.'s taxonomy offers a subtle shift in thinking that resilience processes can occur before a threatening event. Alliger et al.'s work also provides a practical framework to help teams successfully navigate adversity, highlighting the importance of both proactive preparation strategies and responsive adaptability. By delineating the specific actions and strategies associated with each dimension, this taxonomy provides teams with actionable guidance on how to effectively prepare for, respond to, and recover from adverse events.

In terms of theory linked to team resilience, while the Gucciardi et al. (2018) model highlights the factors and processes that contribute to team resilience, the Alliger et al. (2015) taxonomy provides a more action-oriented perspective by categorising the specific dimensions of team resilience. Both approaches offer valuable insights into team resilience, but they differ in their focus and level of detail. Hence, the Alliger et al.'s (2015) taxonomy may be preferred in certain contexts because it provides a clear and practical framework for teams to understand and address resilience processes. The taxonomy's emphasis on minimising, managing, and mending aligns with the practical needs of teams in preparing for and responding to adverse events. It provides a structured approach that teams can follow to enhance their resilience and recover from setbacks effectively. However, in order minimise threats and subsequently

manage and mend from them, teams have to first anticipate such threats, and thus we introduce

a new fourth dimension, anticipation, as a unique feature of our adapted taxonomy used in the

present PhD. The taxonomy's action-oriented nature makes it accessible and applicable in

various team settings (e.g., sport, workplace). Moreover, this taxonomy is particularly useful

when there is a specific interest in comprehending the actions and strategies that teams can

utilise to cultivate to sustain resilience. Therefore, it served as an inspiration for this thesis to

employ Alliger et al.'s model in the development of our own new measure of team resilience.

Purpose of Thesis

Given the constraints of existing research and the potential practical implications of

team resilience, the current PhD thesis endeavours to construct a novel framework for team

resilience that is centred on four essential facets: anticipate, minimise, manage, and mend. This

proposed model draws inspiration from the conceptualisation of team resilience put forth by

Alliger et al. (2015). The intention is to establish validity for this conceptualisation using

Alliger et al.'s (2015) taxonomy to develop this new measure of team resilience. To arrive at

the end goal, the thesis had several intermediate objectives. The first was to understand the

conceptualisation and operationalisation of team resilience in a way that brings together

previous literature by conducting a systematic review of the correlates of team resilience across

four different performance settings: the workplace, healthcare, sports, and education. Second,

to investigate the role of team resilience in the context of team adversity and stressors in a

sports setting. Third, to develop a new measure of team resilience based on the process-oriented

model that features the facets of anticipate, minimise, manage, and mend-oriented behaviours.

Within the PhD, a mixed-methods research design was adopted, collecting, and

analysing qualitative and quantitative data via open-ended survey, cross-sectional, and

experimental study designs. Building on the multilevel model of team resilience proposed by

Gucciardi et al. (2018), two different theoretical perspectives on the role of team resilience in

the context of team adversity were advanced and tested. In all, the PhD thesis proposes a novel conceptualisation and measure of team resilience, which aims to enrich the extant literature on team resilience in the sports setting.

Thesis Structure

After the present opening chapter, the remainder of the thesis comprises three empirical chapters. Chapter 2 comprises a systematic literature review; Chapter 3 relies on primary data and is comprised of three studies; Chapter 4 presents the beginning of the developmental process of a new measure of team resilience; and Chapter 5 is a general discussion. A more detailed breakdown of the thesis structure is as follows:

Chapter 2: This chapter provides a systematic literature review of team resilience across different performance settings: the workplace, healthcare, sports, and education. The review found few studies on team resilience in sports, but those that did exist found a positive correlation between team resilience and team cohesion, collective efficacy, and mastery approaches in various sports. As a result, we conducted further investigation in the sporting context.

Chapter 3: The findings from Chapter 2 inspired us to conduct three empirical studies on team adversity, stressors, and team resilience in sports. The first study examined the role of team adversity and team resilience on team and individual outcomes, while the second study identified different types of stressors experienced by teams. These stressors represented nine first-order themes and could be more broadly conceptualised into short- and long-term stressors. The third study built on the findings of Studies 1 and 2 to employ a vignette-based experimental design to explore how team resilience operates across differing (short- and long-term) stressful situations.

Chapter 4: Based on the results of the studies presented in Chapter 3, there was a need to develop a theoretically grounded measurement tool for team resilience using a sports sample.

To address this need, we proposed the "Team Resilient Behaviour Scale" (TReBS), which is based on an adapted variation of Alliger et al.'s conceptual framework, including anticipate, minimise, manage, and mend dimensions. This scale was compared to other measures of team resilience (e.g., CREST), as well as measures of the theoretically relevant constructs of transformational leadership, task cohesion, and collective efficacy (persistence and preparation subscales), to begin the validation process.

Chapter 5: The general discussion and the concluding chapter provide a summary of the findings presented throughout the entire thesis, followed by a discussion of the implications of the results in a broader context. The strengths and limitations of the study are also assessed, and potential avenues for future research are suggested.

The structure of the thesis adheres to university policy and is aimed at fulfilling the dual purposes of completing a thesis and learning to write empirical papers for publication. Consequently, some of the material from the introductions and discussions has been restated in abridged formats across the subsequent chapters to align with publication standards and serve as independent, multi-study papers. In accordance with the APA guidelines, the first-person singular pronoun 'I' is used where appropriate, although the study acknowledges its collaborative nature and incorporates the first-person plural pronoun 'we' when necessary. The appendices follow the chapters, and the tables and figures are numbered sequentially with respect to their corresponding chapters (e.g., Figure 2.1 implies that figure is the first to appear in Chapter 2).

**CHAPTER 2: A SYSTEMATIC REVIEW OF RESILIENT TEAMS ACROSS FOUR
PERFORMANCE CONTEXTS**

Abstract

Research on team resilience has increased in recent years; thus, a systematic review of this literature base is timely. Across four performance-oriented domains (workplace, healthcare, education, and sports), we first examined what characteristics or correlates were important for team resilience to flourish. Second, we reviewed how team resilience has been measured in existing literature. Using Pluye and Hong's (2014) seven-stage protocol, we identified 16 eligible studies from five electronic online databases. These studies met our inclusion criteria of peer-reviewed articles written in English that examine team resilience. Out of the 16 articles reviewed, most studies were conducted in the workplace ($n = 8$) or sport ($n = 6$). The 16 studies identified 52 different correlates which were themed by cognitive, motivational, behavioural, affectual, and group characteristics. Behavioural correlates represented the highest number of associations reported. We then coded whether the correlate represented an antecedent or outcome of team resilience. We found that 12 quantitative studies had led to the development of nine measures of team resilience with one, the CREST, having been translated to other languages; however, only two of these had an exclusive emphasis on measure development. Of the measures reviewed, the psychometric properties of the CREST were the most established. There is a tendency for measures to only be utilised within their home contexts (i.e., sport with sport), limiting the cross pollination of ideas and findings from outside of their respective domains. Future research might want to develop a measure with applicability across domains to aid the sharing of knowledge.

A systematic review of resilient teams across four performance contexts

Resilience is known as a psychological phenomenon that contributes to the positive development of people who overcome numerous types of difficulties throughout their lives (Masten & Wright, 2010). The concept has been defined as "a dynamic process encompassing positive adaptation within the context of significant adversity" (Luthar et al., 2000, p.435). In addition, the literature has identified two types of resilience: individual and team. Individual resilience according to Leipold and Greve (2009) refers to "an individual's stability or quick recovery (or even growth) under significant adverse conditions." While Bryan et al. (2019, p.77) define team resilience as "bouncing back" from the adversity groups of individuals experience. Although resilience at the individual level has received more theoretical and empirical consideration, team resilience has relatively recently emerged as an area of interest (Bowers et al., 2017). As a result, recent research literature has increased quite rapidly, however there has yet to be comprehensive review to consolidating current knowledge. For that reason, this review focuses on reliance at the team level.

Given its relative novelty, definitions of team resilience in the literature are somewhat hazy and ambiguous. For example, Morgan et al. (2013a) refers to team resilience as "a dynamic, psychosocial process which protects a group of individuals from the potential negative effects of stressors they collectively encounter" (p. 549). This definition, grounded in data gleaned from qualitative enquiry with athletes, embodies a robustness-oriented conceptualisation of team resilience. In contrast, Chapman et al. (2020, p.67) more recently defined team resilience by highlighting the inclusion of "bouncing back" from adversity representing an immediate or short-term return to optimal functioning promoting "recovery" and "growth", as well as a continued period of development until a certain goal is realised. Therefore, team resilience could be a term used to describe groups of individuals who cope

well in or recover from challenging or difficult situations across various domains of functioning (e.g., the workplace, sport).

Within the stress literature (e.g., Dietz et al. (2017) many adverse events refer to incidents beyond the control of the team that can potentially result in a loss or collapse of interdependent team processes. Morgeson et al. (2015) confirm that these events can differ depending on the degree of novelty, duration, criticality, and negative impact on team behaviours. Hence, team resilience reflects the idea that adverse events offer the opportunity for teams to positively adapt (e.g., increased creativity, strategic decision making, resourcefulness, and collective efficacy). As the literature on resilience heavily focuses on the individual level, there is a need for continued investigation of how teams respond to adverse events in different environments (e.g., sport, health care). Based on our conceptualisation of team resilience, the current review collates knowledge on team resilience placing an emphasis across various domains of functioning to inspire future research on this topic.

Even though team resilience research has recently gained traction, it often lacks consistent conceptual and measurement approaches. For that reason, we recognise two key conceptual concerns; (a) the divergent conceptualisations in the team resilience literature, and (b) the conceptual overlap between team resilience and other associated team concepts. For example, Carmeli et al. (2013) point out that despite team resilience being different from other team processes (i.e., team potency and collective efficacy), these concepts share common belief that team members will perform successfully within teams. However, research often fails to provide direct insight into successful team performance when responding to adverse events (a regular occurrence for teams operating in elite performance environments); instead, common outcomes investigated by team resilience researchers include team cohesion (Bowers et al., 2017) and collective efficacy (López-Gajardo et al., 2022). Other studies have focussed on

factors supporting or facilitating team resilience itself (Decroos et al., 2016; Gucciardi et al., 2018).

Rationale for our Systematic Review

While there is a plethora of critical reviews of the resilience literature (e.g., Čavrak et al., 2019; Koh et al., 2019; Vera et al., 2017; Zurita-Ortega et al., 2018), team resilience (across various settings such as the workplace, healthcare, sports, and education) has received comparatively less research attention. Since adversity, failure and recovery are common across different performance environments in which teams exist, we deemed it useful to extend this review to a range of team contexts. Although previously reported systematic reviews of team resilience has been conducted in the workplace/business setting (e.g., Hartwig et al., 2020), the concept of team resilience is not exclusive to one setting and as a result, it is important to review this research from broad area of performance domains where various and differing adversities exist. Such a review should be comprehensive and help to counter the fragmentation of the team resilience research literature, helping researchers in one domain to benefit from research conducted in another setting. It should also synthesise all existing and relevant literature on team resilience that might influence applied work and the next generation of research questions in this area. Consequently, our review pulls together primary research conducted in four performance domains (i.e., the workplace, healthcare, sports, and education) to address the following research questions:

> *RQ1: What are the characteristics of team resilience research conducted across the domains of functioning?*
>
> *RQ2: What are the antecedents and outcomes associated with team resilience?*
>
> *RQ3: How has team resilience been measured and how useful are these scales?*
>
> *RQ4: What is the research quality associated with team resilience studies conducted across the domains of functioning?*

Method

Research Approach

The present systematic review adopts the philosophical research approach outlined by Rousseau et al. (2008), who present a classification of research synthesis based on the nature of primary studies and the philosophical approach to their analysis. As such, the present review adopts what Rousseau et al. refer to as the positivist synthesis of quantitative primary studies or the "synthesis by aggregation," and the interpretivist synthesis of qualitative primary studies or the "synthesis by interpretation." Hence, this research synthesises both quantitative and qualitative natures of primary studies.

Our research approach is further inspired by the Pluye and Hong's (2014) seven-stage model of conducting a systematic literature review (see Figure 2.1). The initial phase entails formulating research questions for the review. Subsequently, the second stage involves a comprehensive literature search, applying eligibility criteria based on language, nature (e.g., peer-reviewed), context (e.g., team resilience), and type (qualitative and quantitative) to refine the selection of studies. Following this, a search strategy is defined, specifying sources (e.g., ProQuest, MEDLINE/PubMed, Science Direct, Emerald Insight) and keywords (e.g., team resilience). The subsequent step encompasses gathering, analysing, and synthesising the selected studies, involving the meticulous elimination of duplicates, screening potentially eligible papers, and finalising the papers for inclusion. To validate relevance, a quality appraisal, utilising the QATSDD tool for qualitative and quantitative studies, is conducted. Lastly, the included papers undergo synthesis, summarising key points and examining relationships, differences, and similarities. More details about these processes are discussed throughout the chapter.

Search Strategy

A search of the literature in various electronic online databases (i.e., ProQuest, MEDLINE/PubMed, Science Direct [Elsevier] and Emerald Insight) was conducted between

September 2019 and December 2020. Additional published works were searched for on Google Scholar and ETHOS online databases and using reference lists and citation searching.

The decision to primarily use the keyword "*team resilience*" in the literature searches was based on several justifications. Firstly, "*team resilience*" is a well-established and widely recognised term within the literature, ensuring a targeted and comprehensive search related to the specific concept of interest. Secondly, employing alternative words might introduce ambiguity or variability in the search results, potentially diluting the focus on team resilience as a distinct phenomenon. Thirdly, the chosen keyword reflects the terminology commonly used in the field, aligning with existing research and facilitating a more coherent and relevant set of results. While additional keywords, such as "*team resilience AND sports*," were included to capture specific sub-domains, the primary emphasis on "*team resilience*" served to maintain precision and consistency throughout the literature search process.

Moreover, the studies were stored on a digital cloud such as Dropbox for easier management and sorting. Figure 2.1 illustrates the process of obtaining the studies which was adapted from the seven-stage model developed by Pluye and Hong (2014), while Table 2.1 summarises the included studies in the systematic review.

Selection Criteria

The reason for selecting the seven-stage approach is that it provides a typology for reviewing both quantitative and qualitative investigations. Studies were included if they were (a) original, peer-reviewed papers, (b) written in the English language, (c) full text (not conference proceedings), (d) specifically based on team resilience, (e) either quantitative, qualitative, or mixed method in study design, and (f) conducted on adult aged participants (e.g., employees, higher education students, athletes). For nearly all the selected studies, team resilience was the primary variable of interest.

Selection of Papers for Inclusion

Broad inclusion criteria were used to screen the titles and abstracts of the retrieved papers. The criteria from the seven-stage model were then used to screen the studies to identify eligible papers. Criteria include: (a) writing a review question (qualitative or quantitative questions); (b) defining eligibility criteria; (c) applying an extensive search strategy in multiple information sources; (d) identifying potentially relevant studies (led by the author and supported by their supervisors, screening titles and abstracts); (e) selecting relevant studies (based on full text); (f) appraising the quality of included studies (using tools such as QATSDD); and (g) synthesising the included studies (Pluye & Hong, 2014, p.36). Since only a small number of papers (16) were yielded from the screening process, we did not employ methodological exclusion criteria and thus selection was open to either quantitative, qualitative, or mixed-method enquiry.

In the initial round of literature searches, 423 studies were identified across the three databases, adhering to the defined inclusion criteria, which focused on the key term "team resilience." Following a screening process that involved scanning titles and abstracts for key terms and referring to the inclusion criteria (see Table 2.1), the number of studies was reduced to 73. Subsequently, an additional 5 studies were included from other sources, such as the supervisor and rerunning the literature search. After a thorough analysis of the full papers, involving a rigorous process of reading each paper in its entirety and assessing its relevance to team resilience, 16 studies were deemed suitable for quality appraisal. The exclusion of studies in the final screening was based on their minimal coverage of team resilience, as the criteria aimed to identify papers exclusively investigating team resilience rather than merely mentioning the term.

In the subsequent screening stages, where the number of studies was narrowed down from 73 to 16, the involvement of the supervisor played a crucial role. The supervisor provided

valuable input and support by offering advice and actively participating in checking the eligibility of the included papers. This collaborative effort aimed to ensure an unbiased selection process and validate the studies chosen for inclusion in the final selection of 16 relevant studies. The supervisor's expertise and guidance added an additional layer of assurance to the robustness of the screening and selection process.

Quality Appraisal

We used the 16-item quality assessment tool (QATSDD) to assess reliability and validity of the included studies in our systematic analysis (see Tables 2.2 and 2.6). The tool was developed to support quality analysis where studies use different designs, including qualitative, quantitative, and mixed methods (Sirriyeh et al., 2012) and has been utilised in reviews pertaining to health services (Hardy et al., 2016), , sports research (Jackman et al., 2019), and youth justice settings (Hodgkinson et al., 2020). We also ensured that we could adapt the format of the tool to our studies and offered the required degree of flexibility to apply the tool to both qualitative and quantitative research designs employed in the studies. Furthermore, as a component of our collaborative efforts, the supervisors played a supportive role during the quality appraisal process. This involved jointly navigating Sirriyeh et al.'s (2012) quality assessment table and contributing initially independent appraisals of each paper. The final appraisals and scores were reached through consensus, enabling an agreed position to be reached that synthesised both our inputs and the supervisors' best assessments. This collaborative approach not only ensured a comprehensive evaluation but also benefited from the collective insights and perspectives of both the research and his supervisors.

The studies were scored based on the 4-point scale used in the QATSDD tool. For example, 0 refers to a particular criterion not present in the study, 1 refers to slightly present, 2 refers to moderately present, and 3 refers to completely present. In addition, the mean percentage scores of the items are categorised as 75%+ (high), 50-74% (good), 25-49%

(moderate), and < 24% (poor; Augestad & Jiang, 2015). Table 2.1 summarises the inclusion

and exclusion criteria.

Table 2.1

Inclusion and Exclusion Criteria

Inclusion	Exclusion
English language papers	Non-English language paper
Peer-reviewed articles	Non-peer-reviewed papers from journals
Studies examining team resilience at individual level	Studies examining personal resilience and non-team related resilience
Qualitative and quantitative studies where team or group resilience is the key area of discussion	Papers with no empirical evidence

Figure 2.1

Search Strategy Flow Diagram

Stage 1: Research Question
RQ1: What are the key characteristics of resilience research at the team level?
RQ2: What are the antecedents and outcomes associated with resilience at the team level?
RQ3: How has resilience been measured at the team level?
RQ4: What is the extent of quality in resilience research at team level?

Stage 2: Eligibility Criteria
a) English language papers
b) Peer-reviewed articles
c) Studies examining team or group resilience at individual level
d) Qualitative and quantitative studies where team or group resilience is the key area of discussion

Stage 3: Search Strategy
Electronic online databases: ProQuest, MEDLINE/PubMed, Science Direct (Elsevier), Emerald Insight

Keyword combinations: Team resilience AND work; Team resilience AND industry; Team resilience AND business; Team resilience AND healthcare; Team resilience AND military; Team resilience AND sport; Team resilience AND education; Team resilience AND construction; team resilience AND emergency services

Stage 4: Potentially Relevant Studies
Total number of papers identified by literature searches
(n = 423)
Number of papers included after title/abstract
(n = 60)

Additional papers identified through other sources
(n = 5)

Stage 5: Relevant Studies
Papers included from title/abstract
(n = 73)
Papers included from full paper review and analysis
(n = 16)

Stage 6: Quality Appraisal
Studies appraised based on the QATSDD tool and scoring criteria of qualitative and quantitative primary studies

Stage 7: Synthesize Studies
Total papers included meeting full inclusion and exclusion criteria
(n = 16)

Table 2.2

Summary of Included Studies, Including Quality Measurements

Author(s)	Title	Journal	Purpose	Design/method/ approach	Findings	Correlates	Relationship	Quality
				Workplace				
Bennett et al. (2018)	Team Resilience Training in the Workplace: E-Learning Adaptation, Measurement Model, and Two Pilot Studies	Jmir Mental Health	The objective of our work was to address three shortcomings in the study of workplace resilience interventions: lack of interventions focusing on group-level or team resilience, the need for brief interventions, and the need for more theoretical precision in intervention studies	Quantitative Evidence-based program and working model for brief intervention evaluation. A total of 7 hypotheses tested the model and program efficacy within engineering firms	Findings support the model and program efficacy. For example, workplace resilience was greater in the intervention group than in the control group. Other findings suggest social dissemination effects, equal outcomes for employees at different stress levels, and greater benefit for females	• Workplace resilience • inner resources • dispositional resilience • perceived improvement	Positive relationship between all correlates and team resilience	67.8%
Blatt (2009)	Resilience in Entrepreneurial Teams: Developing the Capacity to Pull Through	Frontiers of Entrepreneurship Research	To develop and test hypotheses about the antecedents and mechanisms for resilience in entrepreneurial teams	Quantitative 7-point Likert scale/ questionnaire 122 entrepreneurial teams from USA	The findings support the idea that members of resilient entrepreneurial teams' care about one another and value relationships for their own sake rather than only as a means to reach desired goals	• Creativity • Communal schemas • Contracting practise	Positive relationship between all correlates and team resilience	50%
Carmeli et al. (2013)	Cultivating a resilient top management team: The importance of relational connections and strategic decision comprehensiveness	Safety Science	To examine whether and why relational connections marked by connectivity facilitate strategic decision comprehensiveness, and cultivate two forms of top management teams (TMT) resilience that capture both efficacious beliefs and adaptive capacity	Quantitative 74 top management teams 5-point Likert scale/ questionnaire	Strategic decision comprehensiveness is positively associated with both forms of TMT resilience, and connectivity is indirectly, through strategic decision comprehensiveness, related to both forms of TMT resilience–efficacious beliefs and TMT resilience–adaptive capacity	• Strategic decision comprehensiveness • Connectivity • Efficacious beliefs • Adaptive capacity	Positive relationship between strategic decision comprehensiveness and team resilience Indirect relation between strategic decision comprehensiveness and team resilience in terms of connectivity, efficacious beliefs, and adaptive capacity	75.2%

McEwen and Boyd (2018)	A Measure of Team Resilience Developing the Resilience at Work Team Scale	American College of Occupational and Environmental Medicine	This study develops, and initial evaluates, a new measure of team-based resilience for use in research and practice.	Quantitative Preliminary analyses, based on a cross-sectional sample of 344 employees nested within 31 teams.	Multilevel analyses showed that team resilience predicted self-rated team performance	• Resourcefulness • Robustness • Culture of self-care • Alignment • Capability • Connectedness • Perseverance	Positive relationships among all correlates on team resilience	76.2%
Meneghel (2016)	Job-related antecedents of team resilience and improved team performance	Personnel Review	To investigate the potential role of team resilience as the psychological mechanism that explains how job demands and job social resources are related to and enhance team performance.	Quantitative 1633 Self-reported questionnaires were distributed to employees, nested in 275 teams from 52 Spanish small and medium enterprises. Aggregated scores were employed for a team-level structural equation modelling analysis	Results support a partial mediation model in which job social resources affect team resilience, and in turn impact team performance	• Job social resources • Job demands	No significant effects were found for job demands affecting team resilience Demands × resources interaction positively influences team resilience	67.8%
Meneghel et al. (2016)	Feeling Good Makes Us Stronger: How Team Resilience Mediates the Effect of Positive Emotions on Team Performance	Journal of Happiness Studies	Investigating the relationship between collective positive emotions at work and team resilience	Quantitative Structural equation modelling Through the aggregate scores of 1,076 employees (61 % men), grouped into 216 teams and belonging to 40 companies, five collective positive emotions were evaluated against team resilience	The results highlight the importance of developing collective positive emotions to help teams to foster team resilience	• Enthusiasm • Optimism • Satisfaction • Comfort • Relaxation	Team resilience mediates the relationship between all collective positive emotions	67.8%
Sharma and Sharma (2016)	Team Resilience: Scale Development and Validation	Vision	Design and develop a reliable and valid measure to assess the resilience capacity of the teams	Quantitative Psychometric evaluation and validation using 160 responses from 12 IT companies located in India for identifying team resilience capacity	Findings of the study reveal that team resilience is a hierarchical and multidimensional scale comprising of four primary dimensions along with 10 sub-dimensions.	• Mastery approaches • Group structure • Social capital • Collective efficacy	Positive relationship between all correlates and team resilience	70%
Stephens et al. (2013)	Relationship Quality and Virtuousness:	The Journal of Applied	To focus on emotional carrying capacity (ECC), wherein relationship	Quantitative	Study 1 findings reveal that ECC is positively related to individual resilience and that	• ECC	Positive relationship between ECC and team resilience	66.6%

	Emotional Carrying Capacity as a Source of Individual and Team Resilience	Behavioural Science	partners express more of their emotions, express both positive and negative emotions, and do so constructively, as a source of resilience in individuals and in teams	82 top management teams from Israeli industry 7-point Likert scale/ Quantitative questionnaire across two studies	ECC mediates the link between relationship closeness and individual resilience. Study 2 findings indicate that ECC is positively related to team resilience and mediates the connection between trust and team resilience			
Education								
West et al. (2009)	Team level positivity: investigating positive psychological capacities and team level outcomes	Journal of Organisational Behaviour	Examines the emergence of team level positive psychological capacities and their relationship with team outcomes (e.g., cohesion, cooperation, coordination, and conflict and team satisfaction) during two team sessions	Quantitative Sample of 50.8 percent male and primarily white (87.8 per cent) students with an average age of 23 years old. Data was collected from a total of 308 students from various upper-level management courses at a large Midwestern University using an alternative assignment instead of completing the research surveys	Results suggest that team resilience and team efficacy show greater explanatory power after several team interactions	• Cohesion • Cooperation • Coordination • Conflict • Team satisfaction	Positive relationship between all correlates and team resilience	58.2%
Healthcare								
McCray et al. (2016)	Building resilience in health and social care teams	Personnel Review	To capture the views of managers in H&SC to explore the making of resilient teams, identify factors that influence team performance and inform organisational workforce development strategy	Qualitative General inductive approach (Silverman, 2011) Five focus groups were facilitated (n=40) each with eight participants all of whom were leaders and managers of teams in H&SC, working in the integrated care context in the UK	Findings indicate that further investment in strategies and resources to sustain and educate employees who work in teams and further research into how organisational systems can facilitate this learning positively may contribute to resilient teams and performance improvement	• Sustaining effort • Team learning • Teamwork	Resolve to strive to perform in difficult situations improves team resilience Learning about how the team and team members work together improves team resilience Teamwork activity to enable effective interaction	58.2%

							for performance improves team resilience	
Sport								
Decroos et al. (2017)	Development and Validation of the Characteristics of Resilience in Sports Teams Inventory	Sport, Exercise, and Performance Psychology	Reports the development and initial validation of an inventory for the Characteristics of Resilience in Sports Teams (CREST)	Quantitative 1,225 athletes from Belgium and the United Kingdom Study 1 provided content validity for an initial item set; study 2 explored the factor structure of the CREST; studies 3 and 4 provided evidence for a 2-factor measure, reflecting the team's ability to display resilient characteristics and vulnerabilities being displayed under pressure	The CREST was shown to be reliable between players and the between-teams level, as well as over time	• Team dynamics • Pressure • Protective factors • Stress	Positive relationship across all correlates on team resilience	84.5%
Gorgulu et al. (2018)	An Adaptation Study of Measurement Properties for The Characteristics of Resilience in Sports Team Inventory	Education sciences	This multi-study paper reports the translation process and the validity and reliability analysis of the Characteristics of Resilience in Sports Teams Inventory (CREST) for the use of Turkish population	Quantitative 414 team sports athletes from Turkey were sampled. Beaton et al.'s (2000) methodology was adopted for the translation of self-report measures for cross-cultural adaption studies	Study 1 revealed that the items were understood by the participants and ready for application for the general Turkish population. Study 2 revealed that the CREST had two sub-dimensions as it was in the original inventory. The Cronbach's alpha values for the dimensions of demonstrating resilience characteristics and vulnerabilities shown under pressure were 0.94 and 0.90, respectively. The Kaiser-Meyer-Olkin value was 0.94. The third study showed that the structure of the inventory was confirmed in another sports context	• Sports team inventory • Participation • Group structure	Positive relationship across all correlates on team resilience	65.4%

Morgan et al. (2013)	Defining and characterising team resilience in elite sport	Psychology of Sport and Exercise	The objectives of this study were to develop a definition of team resilience and to identify the resilient characteristics of elite sport teams	Qualitative Focus groups consisting of a total of 31 participants were conducted with five elite teams from a range of sports. An interpretive thematic analysis using inductive and deductive reasoning was employed to analyse the data	Findings revealed four main resilient characteristics of elite sport teams: group structure, mastery approaches, social capital, and collective efficacy. This study extends resilience research in sport psychology by providing greater conceptual clarity of resilience at a team level	• Group structure • Mastery approaches • Social capital • Collective efficacy	Despite the positive impact of the characteristics on team resilience, individual resilience does not necessarily guarantee resilience at the group level	73%
Morgan et al. (2015)	Understanding team resilience in the world's best athletes: A case study of a rugby union World Cup winning team	Psychology of Sport and Exercise	The objective of this study, therefore, was to explore the psychosocial processes underpinning team resilience in elite sport	Qualitative Narrative inquiry was employed to better understand team resilience. The sample consisted of eight members of the 2003 England rugby union World Cup winning team.	Findings revealed five main psychosocial processes underpinning team resilience: transformational leadership, shared team leadership, team learning, social identity, and positive emotions. An examination of narrative structure within the autobiographies revealed a progressive narrative form characterised by a collective positive evaluation of setbacks	• Transformational leadership • Shared team leadership • Team learning • Social identity • Positive emotions	Positive impact of all characteristics on team resilience	65.4%
Morgan et al. (2019)	Developing team resilience: A season-long study of psychosocial enablers and strategies in a high-level sports team	Psychology of Sport & Exercise	The purpose of this study, therefore, is to explore the psychosocial enablers and strategies that promote the development of team resilience within a high-level sport team.	Qualitative Multiple data collection methods were employed (i.e., observation, interviewing, field notes, reflexive diary) as part of a holistic ethnographic approach An iterative process of content data analysis was employed to identify key themes	Findings revealed five categories comprising multiple practical strategies, actions, and enablers for team resilience development: Inspiring, motivating, and challenging team members to achieve performance excellence; developing a team regulatory system based on ownership and responsibility; cultivating a team identity and togetherness based on a selfless culture; exposing the team to challenging training and unexpected/difficult situations; and promoting enjoyment and keeping a	• Inspiring, motivating, and challenging team members to achieve performance excellence • Developing a team regulatory system based on ownership and responsibility • Cultivating a team identity and togetherness based on a selfless culture • Exposing the team to challenging training and	Positive impact of all characteristics on team resilience	89%

					positive outlook during stressors	unexpected/difficult situations • Promoting enjoyment and keeping a positive outlook during stressors		
Yang et al. (2020)	Psychometric evaluation of the characteristics of resilience in sports team inventory in China	Plos One	This study examines the reliability and validity of the Characteristics of Resilience in Sports Teams Inventory (CREST) in Chinese team athletes.	Quantitative 659 team sports athletes from China were sampled. the Chinese version was developed using forward and back translation procedures by two independent translators, proficient in Chinese and English, and familiar with resilience, before measurements were taken and applied	Chinese version of CREST can be used as a valid and reliable tool to assess team resilience in China and can be helpful and applicable in helping sports psychologists understand team resilience	• Demonstrate resilient characteristics (DRC) • Vulnerabilities under pressure (VNP)	Positive relationship between (VNP) (DRC),and team resilience	56.2%

Results

The screening process yielded 16 studies from the business (n = 8; 50%), education (n = 1; 6%), healthcare (n = 1; 6%), and sports (n = 6; 38%) contexts that were eligible for review. These studies also had varying methods of conducting empirical research, with some studies opting for a quantitative approach (n = 12; 75%), while others utilising a qualitative approach (n = 4; 25%). Nevertheless, most studies were quantitative in nature (n = 12; 75%), with these studies assessing the relationship between team resilience and potential correlates, which cannot be achieved through qualitative enquiry (n = 4; 25%). We start with a description of the research conducted on team resilience, followed by an appraisal of the a priori antecedents and outcomes of team resilience investigated across the four contexts.

Descriptive Characteristics

Our analysis provides insight into the types of samples researchers have employed in the investigations. Conclusion from our review is based on eligible research grounded in the data from 6844 participants across the 16 studies where 3326 participants were male, 2906 were female and 613 were not specified. In addition, 4065 of the participants come from 803 teams although for 2779 participants this data was not stated. Table 2.2 reveals that most of the studies used a combination of male and female participants (n = 11; 69%). Employers/managers as team leaders were recruited most frequently (n = 9; 56%) although just over one third of the studies report findings gleaned from athletes (n = 6; 38%). On a contextual level, most of the research was conducted within the business setting (n = 8; 50%) using cross-sectional quantitative designs (n = 11; 69%). Studies in the sports setting represented 38% (n = 6) of the research, and 6% (n = 1) originated from the healthcare and education settings, respectively. Other notable results were that only one qualitative study employed a longitudinal approach (6%; Morgan et al., 2013), while the qualitative approaches relating to interviews, focus groups, ethnography, and biographical studies were more equally represented.

Table 2.3

Sampled Participants and Characteristics

Characteristics	Studies	Characteristics	Studies
Sample Size		Context	
< 20	1	Sport	6
20 – 99	4	Work/Business	8
100 – 499	7	Healthcare	1
1000 +	3	Education	1
Gender		Quantitative	
Male only	1	Longitudinal	1
Female only	0	Cross-sectional	11
Combined	11		
Not stated	4		
Role of participants		Qualitative	
Students	1	Interview	1
Players/ athletes	6	Focus group	1
Employers/managers	9	Ethnography	1
		Biographical	1

In terms of the work/business domain, studies were conducted in private organisational settings (i.e., excluding the public sector) in which team resilience research has taken place. In contrast to the sports setting, none of the work/business-oriented studies were qualitative in nature. In terms of quantitative studies, questionnaires were utilised in three of the studies (Blatt, 2009; Carmeli et al., 2013; Stephens et al., 2013) to measure team resilience in the workplace (n = 3; 19%); see Table 2.3. The six studies ($n = 6$; 38%) conducted in the context of sport had recruited athletes from various sports (e.g., rowing, field hockey, football, soccer, basketball, handball, futsal, and rugby). Both quantitative and qualitative study designs were equally represented. All three quantitative investigations had utilised the Characteristics of Resilience in Sports Teams inventory (CREST) to measure team resilience. A single study has been conducted in the education and healthcare settings, respectively. In the education setting, team resilience data were collected at the (higher education) student level and concerned students participating in group projects in a management course. Investigation of team resilience in the healthcare context examined medical leaders who are part of health and social

care teams. Despite the prevalence of teams and adversity in the healthcare environment only a single qualitative study was found for our analysis. Due the very number of studies conducted in the education and healthcare settings, we decided that it would be more meaningful to collapse across these contexts when reporting on the correlates of team resilience.

Purported Antecedents and Outcomes of Team Resilience

Together the 16 studies reviewed has examined 52 different correlates of team resilience. By adopting a qualitative and inductive content analysis approach, we were able not only to identify the team resilience correlates but also to categorise them into five major themes: cognitive, motivational, behavioural, affectual and group characteristics. Given the lack of causally strong study designs present in the literature and the relative lack of team resilience research that was firmly grounded in any one theory, an inductive analysis also enabled us to initially parcel the correlates into two overarching antecedents ($k = 33$) and outcomes ($k = 21$) categories. Such decisions were guided by our interpretation of authors' conceptualisations (e.g., stated independent or dependent variables) within the research question being investigated. It was believed that an understanding of the conceptualised antecedents and outcomes of team resilience would generate useful knowledge for the construction of effective team resilience interventions. Table 2.4 summarises the reported relationships for the correlates of team resilience.

Table 2.4

Correlates of Team Resilience

			Antecedents (*k*)			Outcomes (*k*)		
Category	Studies (*n*)	Number of correlates examined (*k*)	Positive	Negative	Null	Positive	Negative	Null
Cognitive	8	13	8	0	1	4	0	0
Motivational	8	12	7	0	0	5	0	0
Behavioural	10	17	9	0	0	8	0	0
Affectual	5	7	6	0	0	1	0	0
Group Chars.	3	4	1	0	0	3	0	0
			32	0	1	21	0	0

Antecedents

In all, eight studies have examined 13 cognitive correlates ($k = 13$) of team resilience. These included mostly individual level/oriented constructs (e.g., creativity, efficacious beliefs, resourcefulness, mastery approaches, job demands, and social identity) although some group level correlates were apparent (e.g., collective efficacy, strategic decision comprehensiveness, communal schemas, connectivity, and culture of self-care). Of these 13 correlates, eight were conceptualised and evaluated as beneficial antecedents ($k = 8$) of team resilience (e.g., creativity, strategic decision comprehensiveness, connectivity, mastery approaches, collective efficacy, social identity, communal schemas, and efficacious beliefs). For instance, Blatt (2009) identified creativity and communal schemas as positive cognitive antecedents. Carmeli et al. (2013) highlighted strategic decision comprehensiveness and efficacious beliefs, whereas Morgan et al. (2013; 2015) emphasised mastery approaches, collective efficacy, and social identity. Conversely, Meneghel et al. (2016) found job demands to have no significant effect as an antecedent.

Regarding the eight studies that examined the motivational correlates of team resilience ($k = 12$), six antecedents ($k = 6$) were identified (e.g., enthusiasm, motivation, optimism, social capital, and team learning). Across five studies (McCray et al., 2016; Meneghel, 2016; P. B. C. Morgan et al., 2015; Morgan et al., 2019; P. B. C. Morgan et al., 2013) that assessed these antecedents, all reported significant associations with team resilience.

Regarding the behavioural correlates of team resilience, these were the most frequently examined with 17 correlates, 9 of which have been conceptualised as antecedents (e.g., adaptive capacity, challenging team members, contracting practices, develop a team-regulatory, job social resources, shared team leadership, sustaining effort, teamwork, and transformational leadership). Given that behaviours are malleable and can be trained, from an intervention perspective, it is useful to know that the seven studies (Blatt, 2009; Carmeli et al., 2013; Čavrak

et al., 2019; McCray et al., 2016; Meneghel, 2016; Morgan et al., 2015; Morgan et al., 2019) investigating these antecedents provided consistent support that they have a positive influence on team resilience.

In terms of affect based antecedents of team resilience, six were identified within the existing literature (e.g., comfort, emotional carrying capacity, positive emotions, relaxation, and satisfaction). As revealed in the aforementioned categories, all four studies (Meneghel, 2016; Meneghel et al., 2016; Morgan et al., 2019; Stephens et al., 2013) that had examined these affect-oriented sources of team resilience offer consistent evidence of their positive impact.

Finally, one study (Morgan et al., 2013) included one group characteristic-oriented correlate in their design, where group structure was only conceptualised as an antecedent of team resilience. Morgan et al. (2013) confirmed that group structure involves conventions that significantly influence the establishment of group norms and roles. Their research highlights how formal arrangements, shared norms, and communication channels collectively shape the dynamics and functioning of groups, hence group characteristic-oriented themes. This implies that the internal scaffold of a group significantly impacts its ability to develop team resilience. A well-defined and flexible group structure, with clear communication channels and shared norms, can positively influence the team's ability to withstand and overcome challenges, ultimately enhancing team resilience.

Outcomes

In terms of cognitively oriented proposed outcomes of team resilience, four outcomes were identified examined across two studies (McEwen & Boyd, 2018; Sharma & Sharma, 2016). All the four identified outcomes were positive. Although there was not one particular cognitive outcome that had been extensively researched, mastery approaches and collective

efficacy had each been investigated twice revealing consistent positive associations (P. B. C. Morgan et al., 2013; Sharma & Sharma, 2016).

With respect to proposed motivational consequences of team resilience, five outcomes were identified: perseverance, robustness, connectedness, cohesion, and social capital. Of the twelve motivational correlates ($k = 12$) observed, across three studies (McEwen & Boyd, 2018; Sharma & Sharma, 2016; West et al., 2009), all of the five identified outcomes were reported to have been positively influenced by team resilience.

As with the purported antecedents of team resilience, researchers to date examined behavioural outcome of team resilience most commonly across five studies (George M Alliger et al., 2015; Bennett et al., 2018; McEwen & Boyd, 2018; Meneghel, 2016; West et al., 2009), yielding eight potential outcomes ($k = 8$). These behaviours ranged from cooperation to conflict. However, irrespective of the specific nature of the outcome, a consistent pattern in the data emerged, all the findings were supportive of a positive impact of team resilience on them. In contrast, regarding affectual oriented effects of team resilience, only a single outcome, team satisfaction, was identified and this was found to be positively associated with team resilience in workplace/organisational settings (West et al., 2009).

Team resilience researchers also reported three group characteristics-oriented outcomes associated with team resilience across three studies (Bennett et al., 2018; Morgan et al., 2013; Sharma & Sharma, 2016). These outcomes include group structure (an internal scaffold that shapes the conventions and patterns that influence group norms and roles, and how members relate to one another over time) (Morgan et al., 2013; Sharma & Sharma, 2016), workplace resilience (solving problems, facing challenges, and recovering from mistakes) and inner resources (a mental resource or one's individual abilities) (Bennett et al., 2018). Group structure was identified as both an antecedent (Morgan et al., 2013) and outcome (Sharma & Sharma, 2016) of team resilience. This dual role in relation to group structures of team resilience could

be attributed to being a contributing factor that influences the development of team resilience (antecedent), meaning certain aspects of the group's structure can positively impact their ability to withstand and overcome challenges. Furthermore, team resilience itself can also influence and shape the group's structure over time (outcome), as resilient teams may adapt and modify their structure to better address future adversities and enhance their performance. For example, resilient teams might identify areas where better coordination, communication, or role allocation is required to enhance their ability to address future adversities effectively.

Measurement of Team Resilience

As highlighted in the preceding section on the antecedents and outcomes of team resilience, the majority (75%) of the research conducted to date has been quantitative in design (n = 12). Inevitably to conduct such research, measures of our central construct need to have been administered. We found that the twelve quantitative studies had led to the development of nine original measures of team resilience with one measure having been translated to other languages (Gorgulu et al., 2018). The first of these measures was published nearly 15 years ago in 2009 and has a sizable footprint within the team resilience literature, having been cited over 300 times (Google Scholar, December 2020). Of note, only two of the twelve studies reviewed had an exclusive emphasis on measure development. When reviewing the nine published measures of team resilience (see Table 2.5), we report on four main issues; social-cultural context, dimensionality, psychometric properties, and conceptual suitability.

Social-cultural context: To date studies that have incorporated the development of instruments designed to measure team resilience have almost exclusively been conducted in Western cultures (e.g., in North American and European countries). Apart from Yang et al.'s (2020) translation study (into Chinese), there is one noticeable exception to this; Sharma and Sharma (2016) developed their measure based on data collected in India. That said, the model they employed to guide their project represented a Western perspective of team resilience

having been based on earlier work by Morgan et al. (2015). This is not a concern, but the lack of cross-cultural research on team resilience precludes a firm understanding of how other cultures conceptualise team resilience.

Results in Table 2.5 reveal that team resilience studies from the workplace (n = 8) and sports (n = 6) contexts are dominant in their efforts to construct inventories. There is also a tendency in the literature for measures to only be used in their respective contexts, limiting the ability for researchers to learn from their colleagues outside of their own domain. Furthermore, none of the currently available measures was explicitly designed for use across settings.

Dimensionality: The development of multi-dimensionally structured questionnaires is apparent in both business/industry and sports settings (see Table 2.5 dimensions column). Of the nine measures reviewed, four are unidimensional (Blatt, 2009; Meneghel et al. 2014; 2016; Stephens et al., 2013; West et al., 2009) and five are multi-dimensional instruments (Carmeli et al., 2013; Decroos et al., 2017; Gorgulu et al., 2018; McEwen et al., 2018; Sharma & Sharma, 2016; Yang et al. 2020). Given the early stage of development of the team resilience literature, it is perhaps unsurprising that as the knowledge base increases, a more nuanced (and multifaceted) understanding is sought. Because of this, in relatively recent studies researchers have employed structural equation modelling and confirmatory factor analysis (CFA) techniques, with Decroos et al. utilising advanced approaches (e.g., bi-factor analysis) in their investigation. This is a trend that will likely not disappear in future efforts to assess team resilience.

Psychometric properties: A breakdown of our understanding of the team resilience inventories' reliability and validity is also provided in Table 2.5. To date firmest understanding regarding the measurement of team resilience surrounds the sport-based CREST inventory. This and all other remaining measures appear reliable, and there is supportive evidence for the CREST's content, concurrent, discriminant, predictive, and factorial validity. Of note, Decroos

et al. (2017) also investigated the CREST's (5-week) test-retest reliability, reporting satisfactory coefficients. This remains to be the only published test of this form of reliability for a team resilience measure with the results suggestive that as a construct it is not so state-like as to compromise the stability of data collected from a paper and pencil questionnaire. Reassuringly, when developing team resilience questionnaires, the most common form of validity reported on is content validity; there is evidence that for seven of the eight the questionnaires reviewed, their items are relevant and understandable.

Conceptual suitability: While most of the measures used in the studies showed supportive data concerning content validity, it was noted that some of the questionnaires were based on dated conceptualisations of team resilience, given that they were at least a decade old. To assess the alignment between the scales' items and the corresponding conceptual grounding provided by authors in their respective papers, a comparative analysis was conducted. In several studies, the items and dimensions of the questionnaires were found to somewhat reflect the definitions of team resilience (West et al., 2009; Decroos et al., 2017). These Items and dimensions included varied aspects like pulling through difficult team situations, team confidence, agreeing with team values and principles, shared vision, and collaborative efforts to overcome team pressures. As such, it is apparent that some researchers have been more successful than others when operationalising team resilience in their studies.

For instance, Decroos et al. (2017, p. 163) was inspired by the definition of team resilience by Morgan et al. (2013, p.558) in which it was defined as a "…dynamic, psychosocial process which protects a group of individuals from the potential negative effect of the stressors they collectively encounter." Based on this definition, the Decroos et al. (2017) assessed whether teams were able to focus on what was important or started to communicate negatively with each other. However, Sharma and Sharma (2016, p.37) referred to their own definition of team resilience: "…the ability of the teams/groups to bounce back and sustain in the facade of

adverse conditions" but then reported on factors, such as teammates are truthful and honest, teams are larger than need be, and standards for members' behaviour in teams are vague and unclear, which appear to be much less closely linked to their constituent definition.

When considering the appropriateness of the measures in relation to how team resilience was defined, it is also worth examining the content of the items on the questionnaires; doing so revealed some interesting findings. To illustrate while Decroos et al.'s (2017) items appear to capture the team resilience definition, they do not fit well with the measured dimensions. This could be down to the authors' definition not being articulated properly when giving their definition. On the other hand, we found two studies in which half of the items and dimensions align with the definition of team resilience (Blatt, 2009; Stephens et al., 2013), as well as include items that moderately aligned with the conceptualised definition of team resilience, such as learning from mistakes, dealing with challenging situations and looking for ways to overcome challenges. Several studies also reported having items and dimensions that had very little to no relation to the team resilience definitions (Carmeli et al., 2013; Sharma & Sharma, 2016). Items and dimensions include working well in the event of absent team members, team support, sufficient team resources, team flexibility, network ties, trust, shared language, team design, team composition, group norms and perceived efficacy of team members and collective team action.

Table 2.5

Summary of Included Studies with Psychometric Properties

Authors	Definition of team resilience	Dimensions, items, scoring	Participants	Psychometric properties					
				Reliability	Content validity	Concurrent validity	Predictive validity	Discriminant validity	Factorial validity
Blatt (2009)	"the capacity to rebound from adversity strengthened and more resourceful"	6 items; modified from the ''Safety Organising Survey'' (Vogus & Sutcliffe, 2007) and the Brief Resilient Coping Scale (Sinclair & Wallston, 2004). 7-point Likert (anchors not reported)	122 entrepreneurial teams from U.S	Author stated high reliability although no statistics reported	Entrepreneur, a venture capitalist, and two non-entrepreneurs evaluated ease of understanding	Unknown	Unknown	Creativity positively mediated the relationship between contracting practices and resilience, and the relationship between communal schemas and team resilience.	Unknown
West et al. (2009)	"...team resilience serves to provide teams with the capacity to bounce back from failure, setbacks, conflicts, or any other threat to well-being that a team may experience"	6 items, e.g., "Our team usually manages difficulties one way or another when working" 1 (strongly disagree) to 6 (strongly agree)	308 students' university randomly assigned to 101 teams, from U.S	α = .76	Items adapted from the PsyCap questionnaire (PCQ; Luthans et al., 2007)	Moderately strong correlations with cohesion, co-operation, co-ordination, conflict, & team satisfaction	Team resilience positively predicted cohesion and cooperation.	Not formally tested but demonstrated different predictive capabilities as compared to team efficacy and team optimism.	Unknown

Stephens et al. (2013)	"...the ability of individuals, groups, and organisations to absorb the stress that arises from these challenges and to not only recover functioning back to a "normal" level but also learn and grow from the adversity to emerge stronger than before"	3 items, e.g., This top management team knows how to cope with challenges. (Study 2) 1 (not at all) and 7 (a very large extent)	82 top management teams from Israeli industry	α = .92	Unknown	Unknown	Unknown	emotional carrying capacity (ECC) mediates the relationship between intra-team trust and team resilience	EFA, one factor solution with an eigenvalue of 5.68, accounting =63.09% factor loadings ranging from .65 to .86
Carmeli et al.2013	ability of individuals, groups, or organisations to absorb strain, preserve and improve functioning while encountering both external and internal forms of adversity, and at the same time recover from untoward events and	6 items: 2 dimensions; general self-efficacy and adaptive capacity 1 (not at all) and 5 (a large extent).	74 top management teams	α = .82, .88	25 senior executives were asked to review the items	Unknown	Unknown	Unknown	Unknown

	become more strengthened								
Sharma & Sharma (2016)	"…the ability of the teams/ groups to bounce back and sustain in the facade of adverse conditions"	50 items: 10 dimensions; task design, team composition, group norms, team learning orientation, team flexibility, network ties, shared language, trust, perceived efficacy of team members and perceived efficacy for collective team action 1 (strongly disagree) and 5 (strongly agree)	152 executives including team leader and project managers from India.	α = .72 - .88; Composite reliability = .86 - .95	Reviewed by the industry experts and academics to check whether the tool measures what it purports to measure	Unknown	Unknown	Maximum shared variance (MSV) < average variance extracted (AVE) and average shared variance (ASV) < average variance extracted (AVE)	10 factor CFA: RMSEA = 0.05, SRMR = 0.06, TLI = 0.92, CFI = 0.93.
Meneghel et al. (2014 and 2016)	"the capacity to bounce back from failure, setbacks, conflicts, or any other threat to well-being that they may experience"	7 items, for example "In difficult situations, my team tries to look for the positive side." 0 (never/ completely disagree) and 6 (Always/completely agree).	2014 data: 1076 employees nested in 216 teams from 40 companies in Spain 2016 data: 1633 employees, nested 275 teams from 52	α = .87 (2014) α = .83 (2016)	Each item based on one of Mallak's (1998) principle of implementing resilience	Unknown	2014 data: team resilience mediates the relationship between collective positive emotions and team performance 2016 data: team resilience	2014 study involved collective positive emotions and team resilience; CFA revealed poor fit for one-factor model. Two factor model: RMSEA = .11, TLI = .91, CFI = .92	Unknown

			Spanish small and medium Enterprises					positively related with job social resources and team performance		
Decroos et al. (2017) Characteristics of Resilience in Sports Teams (CREST)	"dynamic, psychosocial process that protects a group of individuals from the potential negative effects of stressors they collectively encounter	20 items: 2 dimensions: "demonstrating resilience characteristics (DRC)" & "vulnerabilities shown under pressure (VSP) 1 (strongly disagree) and 7 (strongly agree	389 players from Belgium (Study 2) 357 players from UK (Study 3) 473 players, 34 coaches from Belgium (Study 4)	Within-team level ω = .90, between-team level ω =. 99 (Study 4) **Test-retest:** 3–5-week test-retest reliability coefficients of .69 and .70 (Study 4)	15 academic experts asked to improve the face and content validity of the initial items	CREST correlated with measures of, effort, mastery climate (Study 2), intrateam conflict (Study 3 & 4), and collective efficacy (Studies 2, 3, & 4)	Unknown	CREST only mildly related to individual resilience, CD-RISC (Studies 2, 3, & 4)	Factor structure invariant across sex, age, and competitive level. Multilevel CFA; CFI = .91, TLI = .90, RMSEA = .045, and SRMR (within) = .045, SRMR (between) = .13. (Study 4)
Gorgulu et al. (2018) Characteristics of Resilience in Sports Teams Inventory (CREST) – Turkish	"dynamic, psychological process that protects a group of individuals from the potential negative effects of stressors they collectively encounter"	20 items: 2 dimensions: "demonstrating resilience characteristics (DRC)" & "vulnerabilities shown under pressure (VSP) 1 (strongly disagree) and 5 (strongly agree)	184 Turkish athletes (Study 2) 200 Turkish athletes (Study 3)	α = .90 - .94 (Study 2) Composite reliability = .89 - .92 (Study 3)	6 experts from sport sciences rated the relevance of each item (Study 1)	CREST correlated with cohesion and negative affect in the manner expected (Study 2), and correlated appropriately with collective efficacy (Study 3)	CREST predicted team resilience; DRC & VSP predicted 44% of team resilience's variance (Study 2)	Not explicitly examined although interfactor correlation (with error modelled) = .90 (Study 3)	Two factor CFA; RMSEA =.07, SRMR = .05, TLI = 0.91, CFI = 0.92.

McEwen et al. (2018)	"the capacity of a group of employees within a team to manage the everyday pressure of work and remain healthy, to adapt to change, and to be proactive in positioning for future work challenges"	42 items: 7 dimensions; resourcefulness, robustness, self-capability, connectedness, & perseverance 1 (strongly disagree) and 7 (strongly agree)	345 employees nested within 31 teams, across several work sites	α = .81 - .93	Two organisational psychologists reviewed items for relevance based on their experience	Team resilience positively correlated with team performance, work engagement, and negatively correlated with exhaustion	Team resilience predicted self-rated team performance	Team resilience positively associated with work engagement and self-perceived team performance, over and above the effects of individual resilience	Unknown
Yang et al. (2020)	dynamic, psychosocial process that protects a group of individuals from the potential negative effects of stressors they collectively encounter	20 items: 2 dimensions: "demonstrating resilience characteristics (DRC)" & "vulnerabilities shown under pressure (VSP) 1 (strongly disagree) to 7 (strongly agree)	659 athletes was recruited from Chinese national, provincial, and university teams.	α = 0.842	The Chinese version was developed using forward and back translation procedures by two independent translators, proficient in Chinese and English, and familiar with resilience.	Demonstrate resilient characteristics(DRC) and vulnerabilities under pressure (VNP) have significant correlation with CREST	Team resilience predicted satisfying basic psychological needs	Unknown	CFI and TLI > .90, RMSEA and SRMR < .08 (CFI and TLI > .95, RMSEA and SRMR < .06) represent a good model fit

Quality Assessment of the Research

The overall quality of the published team resilience literature is good (*Moverall* = 69%) with some varied scores (*Moverall* = 50-91%) (see Table 2.6). Both quantitative and qualitative studies were quality checked and to gain further insight, we compared the quality of team resilience studies both within and across each performance domain. The largest cluster of studies originates from the workplace setting (*n* = 8) with an overall setting score of 67%, reflecting a good overall quality. Collectively, researchers in the work/business setting presented the results of their investigations well (*Moverall* = 82%) although seem to have struggled to translate these findings into fully developed discussions (*Moverall* = 53%).

The overall quality of research within the sports setting is comparable to that produced using organisational samples. There were also similarities across the two settings regarding a high standard when reporting results, and the potential to strengthen the methodology and discussion sections. When narrowing focus on to the sports oriented quantitative literature, again the overall standard of these studies and their organisational counterparts were similar. Nevertheless, a couple of noteworthy differences emerged. First, compared to the business context research emerging from the sports setting had particularly high scoring introduction related criteria. Second, the sports setting's qualitative research was, overall, superior to the quantitative research conducted in the business setting (*Moverall* = 77% vs. *Moverall* = 68%). This difference can be attributed to the strong introduction and results sections of these qualitative studies (cf. Morgan et al., 2019). Consequently, there are examples of good practice within both contexts that can be incorporated into future research. For example, should organisational and educational researchers opt to employ qualitative methods then borrowing some the good practice evident in the sports setting ought to be fruitful. Conversely, when quantitative sports researchers decide to investigate research questions beyond measure development then there several organisational studies they might draw from.

Studies conducted in sports settings (72% mean overall total score) showed similar results to the work/business studies (67% mean overall total score), although the results related scores were much higher, with the Morgan et al. (2019) study scoring the highest overall total (91%). This could be attributed to the strong contributions and strong methodological rigour, namely conducing a qualitative study of the psychosocial enablers related to team resilience in the context of high-level sports teams, which the other studies have not previously pursued. Morgan et al. also achieved a perfect score of 100% in terms of introductory related elements reflecting the strong ideas and unique contributions to knowledge presented in the paper. Furthermore, like the work/business studies, the sports studies reported the highest setting average in the presentation of results (79%; high) and the lowest setting average in the discussion (57%; good). This may also indicate that despite the strong presentation of results, the critical reporting of these findings considering the ideas and current literature presented in the papers could be strengthened.

Table 2.6

Quality Assessment Scores

Study	Research Type	Intro Criteria	Method Criteria	Results Criteria	Discussion Criteria	Overall Total
Work/Business						
Bennett et al. (2018)	Quantitative	Score: 8/9 Percentage Score: 89% High	Score: 12.5/21 Percentage Score: 52% Good	Score: 4/6 Percentage Score: 67% Good	Score: 4/6 Percentage Score: 67% Good	28.5/42 68% Good
Blatt (2009)	Quantitative	Score: 5/9 Percentage Score: 56% Good	Score: 10.5/21 Percentage Score: 50% Good	Score: 3.5/6 Percentage Score: 58% Good	Score: 2/6 Percentage Score: 33% Moderate	21/42 50% Good
Carmeli et al. (2013)	Quantitative	Score: 7.5/9 Percentage Score: 83% High	Score: 13.5/21 Percentage Score: 64% Good	Score: 5.5/6 Percentage Score: 92% High	Score: 4.5/6 Percentage Score: 75% High	31/42 74% Good
McEwen and Boyd (2018)	Quantitative	Score: 8/9 Percentage Score: 89% High	Score: 15/21 Percentage Score: 71% Good	Score: 5.5/6 Percentage Score: 92% High	Score: 3.5/6 Percentage Score: 58% Good	32/42 76% High
Meneghel (2016)	Quantitative	Score: 7.5/9 Percentage Score: 83% High	Score: 13/21 Percentage Score: 62% Good	Score: 5.5/6 Percentage Score: 92% High	Score: 2.5/6 Percentage Score: 42% Moderate	28.5/42 68% Good
Meneghel et al. (2016)	Quantitative	Score: 7/9 Percentage Score: 78% High	Score: 14/21 Percentage Score: 67% Good	Score: 5.5/6 Percentage Score: 92% High	Score: 2/6 Percentage Score: 33% Moderate	28.5/42 68% Good
Sharma and Sharma (2016)	Quantitative	Score: 7.5/9 Percentage Score: 83% High	Score: 13.5/21 Percentage Score: 64% Good	Score: 5.5/6 Percentage Score: 92% High	Score: 4.5/6 Percentage Score: 75% High	31/42 74% Good
Stephens et al. (2013)	Quantitative	Score: 6.5/9 Percentage Score: 72% Good	Score: 12.5/21 Percentage Score: 60% Good	Score: 4.5/6 Percentage Score: 75% High	Score: 2.5/6 Percentage Score: 42% Moderate	26/42 62% Good
-		**Setting Average**: 51.5/72 (72% Good)	**Setting Average**: 104.5/168 (62% Good)	**Setting Average**: 39.5/48(82% High)	**Setting Average**: 25.5/48 (53% Good)	226.5/336 67% Good

Education					
West et al. (2009)	Quantitative	Score: 8.5/9 Percentage Score: 92% High	Score: 13.5/21 Percentage Score: 64% Good	Score: 3.5/6 Percentage Score: 58% Good	Score: 2.5/6 Percentage Score: 42% Moderate	28/42 67% Good
Healthcare					
McCray et al. (2016)	Qualitative	Score: 6/9 Percentage Score: 67% Good	Score: 11/18 Percentage Score: 61% Good	Score: 5/9 Percentage Score: 56% Good	Score: 2.5/6 Percentage Score: 42% Moderate	24.5/42 60% Good
Sports					
Decroos et al. (2017)	Quantitative	Score: 7/9 Percentage Score: 79% High	Score: 18.5/21 Percentage Score: 88% High	Score: 5.5/6 Percentage Score: 92% High	Score: 5/6 Percentage Score: 83% High	36/42 86% High
Gorgulu et al. (2018)	Quantitative	Score: 7/9 Percentage Score: 79% High	Score: 13/21 Percentage Score: 62% Good	Score: 4/6 Percentage Score: 67% Good	Score: 3.5/6 Percentage Score: 58% Good	27.5/42 65% Good
Morgan et al. (2013)	Qualitative	Score: 7/9 Percentage Score: 79% High	Score: 14.5/18 Percentage Score: 81% High	Score: 6.5/9 Percentage Score: 72% Good	Score: 2.5/6 Percentage Score: 42% Moderate	30/42 74% Good
Morgan et al. (2015)	Qualitative	Score: 7.5/9 Percentage Score: 83% High	Score: 9/18 Percentage Score: 50% Good	Score: 7.5/9 Percentage Score: 83% High	Score: 2.5/6 Percentage Score: 42% Moderate	26.5/42 65% Good
Morgan et al. (2019)	Qualitative	Score: 9/9 Percentage Score: 100% High	Score: 15/18 Percentage Score: 83% High	Score: 8.5/9 Percentage Score: 92% High	Score: 5/6 Percentage Score: 83% High	37.5/42 91% High
Yang et al. (2020)	Quantitative	Score: 7.5/9 Percentage Score: 83% High	Score: 11/21 Percentage Score: 52% Good	Score: 3.5/6 Percentage Score: 58% Good	Score: 2/6 Percentage Score: 33% Moderate	23.5/42 56% Good
-	-	**Setting Average**: 45/154 (83% High)	**Setting Average**: 81/117 (69% Good)	**Setting Average**: 35.5/45(79% High)	**Setting Average**: 20.5/36 (57% Good)	181/252 72% Good
					Total Overall: 460.5/668 (69% Good)

Discussion

The purpose of this chapter was to conduct a systematic review of the quantitative and qualitative research surrounding team resilience that had been conducted across four contexts: business, sport, education, and healthcare. We discuss the research and applied implication of the key findings that emerged in relation to our four objectives.

Key characteristics of team resilience research

The concept of team resilience has attracted increasing attention from scholars. To the best of our knowledge, our systematic review is the first to examine the team resilience across different performance domains. The results of our search strategy highlighted 16 relevant studies regarding the correlates of team resilience with the bulk of the research being quantitative and completed the workplace ($n = 8$) setting. Echoing this general statement, when considering contextually specific "hot spots" or clusters of empirical activity, the largest cluster of investigation utilised business samples and quantitative cross-sectional techniques. Despite the attractiveness of team resilience for coaches, applied psychologists, and management consultants, the propensity for studies to be cross-sectional in nature has implications for causal interpretation of team resilience findings.

First, the relatively small sample sizes ($n = 16$) present in the literature raise some concerns about the generalisability of the findings. Second, given the presence of sex differences within the wider group dynamics literature (Bennett et al., 2018; Morgan et al., 2013; Sharma & Sharma, 2016), the lack of studies examining team resilience through an exclusive female lens precludes a firm appreciation of how females view, experience, and respond to team adversity. Third, the eligible studies did not investigate any adverse situations, as we primarily reported positive antecedents and outcomes, with only a few null or unclear ones. Given the definition of team resilience is usually taken as the ability to collaboratively bounce back from adverse circumstances, as well as dealing with adversity in the moment, we

would argue that accurate measures of team resilience should require significant challenge or threat to teams to occurring during the timeframe of an investigation and/or for this be integrated into future study designs. If acted upon, when confronted with such adversity, the quality of adaptation and/or bounce back would be more accurately assessed. Furthermore, this approach could be feasible across various performance domains (e.g., healthcare, military, workplace, education, and sport) that regularly encounter challenging circumstances given the nature of their daily work. It can enable a deeper understanding of resilience and identify improvement areas, making it a valuable approach across these domains that regularly encounter challenging circumstances. For example, in their study about building resilience in health and social care teams, McCray et al. (2016) state that dealing with pressure in the moment can be achieved by investing in strategies and resources that can educate young health workers about working under adversity. The authors found that such interventions can lead to better individual performance and build health workers' confidence to work in more resilient teams.

A suggested approach could involve combining established team resilience measures with measures of individual functioning, such as player performance and physiological indicators like scoring efficiency, passing accuracy, and tackling success rate, along with physiological indicators such as sprint speed, endurance, and recovery time, to assess a team's capacity to manage adverse circumstances. For example, in a sports team like soccer, researchers would use surveys or questionnaires to assess the team's resilience factors like teamwork and communication, as well as monitor individual player performance and physiological responses during simulated adverse situations, such as challenging matches (e.g., Morgan et al., 2016). This comprehensive evaluation provides valuable insights for sports coaches and team management to identify areas for improvement in team dynamics, training,

and player support systems to enhance overall team resilience and performance in the face of challenges, and thus could be replicated in future studies.

Antecedents and outcomes of team resilience

Using authors' reported theorising it was also possible to cluster the correlates into antecedents ($k = 31$) and outcomes ($k = 21$) of team resilience. Joyce et al. (2018) supports the claim that "there is growing consensus that resilience is a malleable characteristic, wherein an individual's ability to adapt and 'bounce-back' effectively from adversity can be developed and enhanced" (p.7). To a degree the currently available supportive findings regarding the antecedents of team resilience reinforce this sentiment by suggesting that certain factors can be cultivated and nurtured to enhance the overall resilience of a team. In other words, the research indicates that teams can work on specific aspects or conditions that contribute to resilience, making it a characteristic that can be developed and strengthened over time. Moreover, a good example of these aspects or conditions can be the motivationally oriented antecedents (e.g., perseverance, enthusiasm, optimism, inspiring, motivating and cohesion) that offer preliminary guidance for how enhanced team resilience might be achieved. Morgan (2019) in their season long rugby study also confirm motivationally oriented antecedents such as inspiring and motivating.

Team resilience in sports literature is associated with numerous positive outcomes across cognitive, motivational, behavioural, and group characteristics-oriented categories. Understanding these outcomes is essential for fostering a resilient team environment and optimising performance in sports and other team-based settings (Alliger et al., 2015; Bennett et al., 2018; McEwen & Boyd, 2018; Meneghel, 2016; P. B. C. Morgan et al., 2013; Sharma & Sharma, 2016; West et al., 2009). Coaches, athletes, and sports organisations can benefit from this knowledge to develop strategies that enhance team resilience and support their ability to overcome challenges and achieve success. However, the scarcity of research on team resilience

in relation to performance in sports literature is noteworthy and may be attributed to several factors. One possible reason is the challenge of measuring performance outcomes in sports is that concept of team resilience is relatively new in sports research (López-Gajardo et al., 2023; Morgan et al., 2019; Yang et al., 2020), leading researchers to focus on exploring its foundational aspects, such as antecedents and immediate outcomes, before delving into its direct influence on performance. However, there is a growing consensus that resilience is a malleable characteristic, and preliminary findings suggest that team resilience outcomes can be cultivated to enhance a team's overall resilience (Bowers et al., 2017; Hartwig et al., 2020). To bridge this gap, future studies could adopt longitudinal and intervention-based approaches, use advanced statistical techniques, consider context-specific implications, and explore the subject through qualitative research methods. These efforts would contribute to a more comprehensive understanding of the relationship between team resilience and performance, offering valuable insights into how teams can develop resilience to achieve better results in sports.

Lastly, drawing from more recent theorising surrounding team resilience (e.g., the multilevel conceptual model of facilitating factors by Gucciardi et al. (2018)) would also steer future intervention work. However, the development of theoretically ground measures of team resilience would be an important initial step towards the integration of theory with the empirical literature.

Measurement issues

In this review of the currently available measures of team resilience we examined both validity and reliability issues as well as conceptual alignment. Twelve studies have led to the development of nine original measures of team resilience among the measures examined, two demonstrated a high level of alignment with the definition of team resilience, with most of their items and dimensions closely capturing the essence of resilience. However, the remaining

measures were found to be less effective in capturing the full scope of team resilience. Consequently, some researchers may consider using the CREST measure as their preferred assessment tool for team resilience, as demonstrated by the reliability of its measures to predict team resilience (Decroos et al., 2017; Gorgulu et al., 2018; Yang et al., 2020). Nevertheless, as emphasised earlier, we recommend that a robust measurement of team resilience be firmly grounded in theoretical frameworks.

One such behaviourally oriented perspective was forwarded by Alliger et al. (2015) who were able to provide insight into what resilient teams do or look like. Their taxonomy of the typical behaviours of resilient teams was grounded in extensive experience working with NASA's astronauts who train to achieve effective team functioning and deal with extreme/stressful situations. Resilient team behaviours were classified into three categories that coincide with classic episodic cycles experienced by teams (Marks et al., 2001). According to Alliger et al. *minimising* behaviours refer to the processes that occurs before a threat has arisen and primarily focuses on early threat detection and planning for challenging events (e.g., anticipate challenges and plan contingencies, identify early warning signs, and prepare to handle stressors). *Managing* behaviours help resilient teams to withstand stress while they are experiencing it (e.g., assess challenges quickly and accurately, maintain processes under stress and address chronic stressors). Lastly, *mending* behaviours purports that resilient teams recover well from a stressful experience, while learning and adapting in preparation of future adverse events (e.g., regain situation awareness, address concerns or risk points and express appreciation). We believe that this sort of theoretical perspective offers a solid platform for future measurement development that homes in on the nature of team resilience as opposed to characteristics of the construct that might represent what it is, its sources, and/or its consequences. A behaviourally oriented measure of team resilience,

especially an informant rated instrument, would likely avoid social desirability biased data, and awaits development.

In summary, the current study contributes to the team resilience literature by taking a comprehensive approach to evaluating available measures, identifying effective assessment tools, emphasising theoretical grounding, and introducing the actions of resilient teams. These contributions set the study apart from previous research that solely addressed measurement issues in team resilience literature.

Research quality

By using the QATSDD (Sirriyeh et al., 2012), we were able to provide an overview of the quality of research examining team resilience which emerged as being to a "good" standard. Studies in different areas such as psychological resilience in youth offenders (Hodgkinson et al., 2020) reported similar scores within the 50 and 70 percentile range. So there appears to be a similar degree of quality across different areas of resilience-based research.

While workplace/business studies received stronger scores on the results criteria, they fell short in presenting clear discussion of their findings with only a moderate score (57% average), whereas sports studies tended to have stronger introduction and results sections. This indicated that despite the strong presentation of results, there is a need to strengthen the critical reporting of the findings in the studies. Future researchers should aim to provide a comprehensive and insightful discussion of their findings, explaining the implications, limitations, and practical applications of their results. This may involve delving deeper into the underlying factors that influenced the results and acknowledging any potential biases or shortcomings in the study design. Additionally, future researchers should consider drawing comparisons to existing literature and theory to provide a broader context for their findings. Moving forward, all team resilience researchers should therefore ensure that they pay particular

attention to the discussion elements of the research to ensure a more critical and nuanced reporting of the findings to enhance the overall quality and impact of the research.

Lastly, a particular highlight of the sports literature was the strength of qualitative research investigations which ought to be useful resources for qualitative researchers from other domains interested in further studying team resilience.

Limitations

Despite the key strengths of the present review, including the detailed systematic search strategy, the inclusion of relatively recently published data, and the quality assessment of each study's rigour, we did not publish an apriori protocol outlining our full search and data extraction processes. Also, as with any review, there is a risk of publication biases, and the exclusion of non-English articles may have introduced additional bias to our search. Nevertheless, shortcomings identified in the literature on team resilience provide opportunities for future research to address them.

The exclusion of grey literature was identified as another potential limitation. By not considering unpublished or non-peer-reviewed materials, the review might be susceptible to the effects of publication bias, leading to an incomplete representation of evidence and the potential overlooking of relevant studies. To enhance the review's comprehensiveness and credibility, future research could consider incorporating relevant grey literature.

The existing literature on team resilience also lacks reported negative antecedents or outcomes, potentially due to a focus on understanding positive aspects and promoting high team performance. Publication bias may also play a role, with studies reporting positive findings more likely to be published. However, it is essential to acknowledge the potential dark side of team resilience, similar to individual resilience. This includes risks such as overconfidence, emotional suppression, resistance to change and complacency. To gain a comprehensive understanding, future research should actively investigate and address potential

negative consequences and challenges associated with team resilience, fostering a balanced approach to resilience, and supporting teams' long-term well-being and effectiveness in the face of adversity.

Conclusion

In conclusion, this systematic review examined team resilience research across various performance domains (e.g., business, healthcare, education, and sports), highlighting key characteristics of the research, as well as the purported antecedents and outcomes of team resilience. The research quality was generally rated as "good," with a similar degree of quality observed across the different settings . However, several limitations were identified, including the non-investigation of negative antecedents and outcomes of team resilience, as well as small sample sizes and incomplete sample descriptions, which may impact the generalisability of the findings. The exclusion of grey literature and conceptual suitability issues with certain measures were also acknowledged as potential biases. Despite these limitations, this review provides valuable insights and opportunities for future research to address these concerns and further explore team resilience in diverse settings. Overall, the study contributes to the understanding of team resilience and its implications for coaches, applied psychologists, and management consultants, thereby inspiring us to conduct a study on the role of team resilience in the context of team stressors and adversity experienced by sports teams.

CHAPTER 3: TEAM ADVERSITY, STRESSORS, AND RESILIENCE IN SPORT:
INDEPENDENT OR INTERACTIVE EFFECTS?

Abstract

This multi-study chapter investigates the role of team resilience in the context of team stressors and adversity experienced by sports teams. To understanding this, a forces-oriented conceptual model of emergent states and goal progression is initially presented. Study 1 tests the model by examining the interplay (i.e., independent and/or interactive effects) between team adversity and team resilience, while Study 2 categorises various types of team stressors present in sport via a qualitative data analysis. Study 3 utilises an experimental study design to build off the findings of Studies 1 and 2 to investigate the (independent and/or interactive) role of team resilience under two common—acute versus chronic—team stressors. Although the regression findings of Studies 1 and 3 provide support for the independent effects of team resilience and team adversity on both team cohesion, and collective efficacy, only inconsistent support was generated for the interactive (buffering) effect of team resilience on team adversity. The impact of contextual factors, data collection methods, and sample differences across Studies 1 and 3 are discussed. Overall, team resilience appears to play a role in mitigating stress and fostering positive team outcomes, and thus warrants further investigation.

Team adversity, stressors, and resilience in sport: Independent or interactive effects?

As a psychological construct, resilience is well-known for its protective factors for individuals who encounter various challenges in their lives (Masten & Wright, 2010). As a concept, resilience has been defined as a dynamic process encompassing positive adaptation in the face of significant adversity (Luthar et al., 2000). Therefore, a prominent feature of resilience is an individual's stability, rapid recovery, or even growth, in the face of adverse conditions (Leipold & Greve, 2009). Even though individual resilience has received substantial theoretical and empirical attention from researchers, *team resilience* has recently emerged as a topic of study (Alligers et al., 2015; Bowers et al., 2017; Morgan et al., 2015; Morgan et al., 2013; Sharma & Sharma, 2016). Alligers et al. (2015) defines team resilience as the "capacity of a team to withstand and overcome stressors in a manner that enables sustained performance; it helps teams handle and bounce back from challenges that can endanger their cohesiveness and performance" (p.177). Similarly, Bryan et al. (2019) defined team resilience as "recovering" from the difficulties that groups face. Although under-researched, a resilient sports team should be able to deal with, and recover from stressors that threaten their locomotion (e.g., team effectiveness) and maintenance (e.g., team cohesion). The present chapter is chiefly concerned with team-level resilience although acknowledges (i.e., controls for) the role of individual resilience.

Emerging Sports Literature on Team Resilience

According to early attempts to study team resilience, Morgan et al. (2013) reported that athletes viewed team resilience as a "…dynamic, psychosocial process that protects members of a group from the negative effects of stressors they collectively encounter" (p. 552). This lay definition embodies a robust-oriented conceptualisation of team resilience that enables a team to be protected from or withstand collective stressors. This is in contrast with Chapman et al.'s (2020) view of team resilience that aligns with common conceptualisations of individual

resilience. That is, Chapman et al.'s perspective highlights the role of bouncing back from adversity, referring to both an immediate or speedy return to optimal functioning and a period of development until homeostasis has returned.

In Chapter 2, we conducted a systematic review of the literature and identified six studies that had investigated team resilience in the sports setting (Decroos et al., 2017; Gorgulu et al., 2018; Morgan et al., 2013; Morgan et al., 2015; Morgan et al., 2019; Yang et al., 2020). These studies recruited athletes from a variety of team sports (e.g., rowing, field hockey, football, soccer, basketball, handball, futsal, and rugby) and when adopting a quantitative research approach, assessed team resilience via the Characteristics of Resilience in Sports Teams inventory (CREST; Decroos et al., 2017) (see Appendix B). These studies report positive correlations between team resilience and team cohesion (Morgan et al., 2013; Shmidt et al., 2009; Weaver et al., 2011), collective efficacy (Morgan et al., 2013), and mastery approaches (promoting team improvement through shared attitudes and behaviours) (Morgan et al., 2013; Yang et al., 2020).

Within the sports literature, researchers have concentrated their efforts on the characteristics of team resilience, its assessment, and the mechanisms by which it can be developed (Gorgulu et al., 2018; Morgan et al., 2013, 2015, 2019). A noteworthy feature is the insight gained from, and the calibre of, previously conducted qualitative investigations. Unfortunately, due to the prevalence of qualitative study designs, there is a need to know more about the outcomes of team resilience and how exactly team resilience works or protects within pressurised situations (i.e., when experiencing team stressors). Given the respective strengths (and limitations) associated with quantitative and qualitative data, both perspectives are utilised in the present chapter.

Conceptual Frameworks and the role of Team Adversity

Through a multilevel examination of contemporary theoretical approaches to team resilience, theory can contribute to closing the gaps in our empirical understanding. The present investigation of team (and to a less degree individual) level outcomes was guided by Gucciardi et al. (2018) recent theorising on team resilience. Gucciardi et al. proposed a multilevel model of team resilience that begins with individual team members' resources and progresses to team resilience being a team-level construct. This conceptual model serves as a foundation for future team resilience research, as it underscores the importance of inputs, processes, emergent states, and outcomes in relation to task demands, objectives, and adverse events over time. Because the current study examines adversity in sports teams, the theory presented by Gucciardi et al. fits well with the project's novel emphasis on team adversity and team stressors. Although adversity and team stressors are included in Gucciardi et al.'s theorising, they are referred to in rather abstract terms. In contrast, the present study investigates specific types of team stressors and attempts to better understand the interplay between team adversity and team resilience. Hence, our research helps to further develop Gucciardi et al.'s theoretical perspective.

A common theme across multiple perspectives of team resilience is the buffering effects that team resilience has against the negative effects of adversity (e.g., stress, pressure, or threat). Nevertheless, explicit examination of the role of team resilience within the context of stressors is surprisingly absent. This chapter reports on three studies (using both quantitative and qualitative research designs) that examine the beneficial role of team resilience in conjunction with team adversity brought about by relevant collective stressors. The studies provide insight into the protective effects of team resilience in countering the deleterious effects of stress on team (and individual) outcomes.

To achieve this overarching aim, the current investigation further considers the interplay between team adversity (i.e., team stressors) and team resilience. Figure 3.1 outlines two different theoretical conceptualisations of the role of team resilience when considered in the context of team adversity. Both perspectives represent more micro-level situations (e.g., the pressure and challenge associated with losing an important match) within the macro-level context of working towards the team's long-term goals (or applying classic group dynamics terminology, the team's locomotion; Lewin, 1947). This is represented by the upper large horizontal (left to right) arrow. Panel A of Figure 3.1 refers to an *independent effects* perspective of team adversity and team resilience. Here a team might endeavour to progress (left to right) towards their goal(s), with team adversity representing a potential barrier that distracts and disrupts the team from achieving its goals (illustrated by the opposing direction right to left arrow). In contrast and facilitating team locomotion, team resilience can counter the effects of team adversity (hence its left to right arrow). For progress to be realised towards their goal(s) and to aid maintenance of teams, the positive direction of team resilience needs to outweigh and overcome the adversity faced (represented by the opposing preventative directional force). In the event of team resilience outweighing team adversity, homeostasis of the team's emergent states (see the bottom box in the panel), is achieved.

Panel B of Figure 3.1 illustrates the alternative *interactive effect*s theorising. Again, team adversity presents a disruption, hampering goal pursuit (represented by the right to left arrow). However, when looked at through an interactive lens the advantages of team resilience operate in a different manner; it moderates the disruptive effect of adversity (minimising and/or diluting its influence; see the vertical arrow cross-sectioning with team adversity). In this interactive perspective team resilience does not necessarily correlate with the team's emergent states (e.g., cohesion). In both perspectives, homeostasis following team stressors is sought and

team resilience is key for teams' locomotion, disrupting the effects of team adversity albeit acting in two different ways, namely repelling, or diluting its effects.

Figure 3.1

Team Resilience and Team Adversity: Forces-oriented schematic
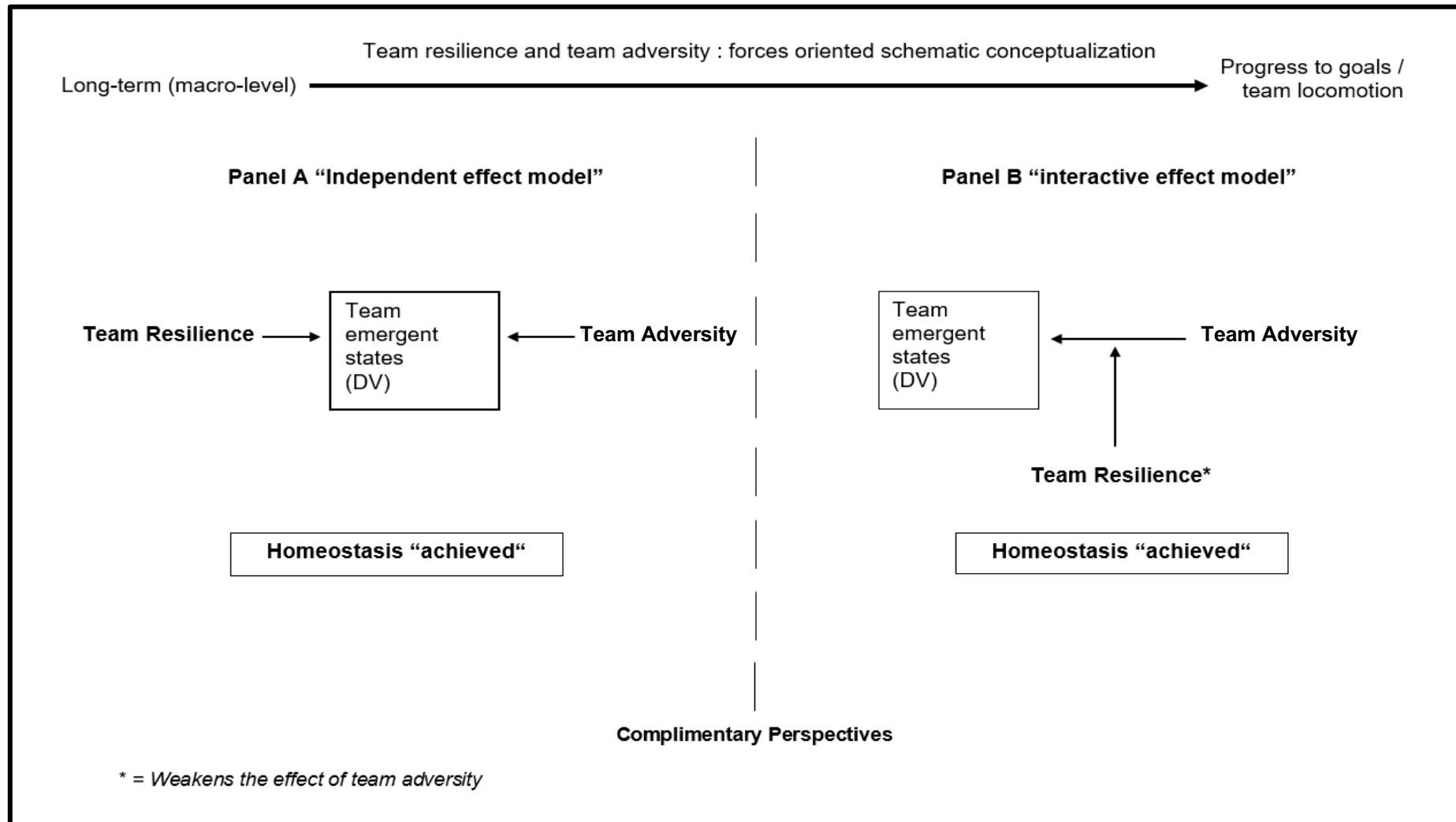
Since the role of team resilience might be to off-set adversity experienced by teams, both theoretical perspectives were tested. More specifically, in Study 1, the role of adversity and team resilience was investigated in a sports setting based on how participants' current team would operate under recalled adverse conditions (e.g., facing an overwhelming opponent). Based on the existing team resilience literature, the team level constructs of task cohesion and collective efficacy were used as the primary dependent variables. However, drawing from Gucciardi et al. (2018) multilevel theorising of team resilience, athletes' individual level attitudes towards training for more exploratory purposes were included. Study 2 identifies the different types of stressors that teams experience via qualitative interpretative phenomenological analysis (IPA) to examine athletes' lived experiences of team adversity. The final study builds on the findings of Study 1 and 2 by re-examining the role of team adversity and team resilience within the context of relatively short and long-term stressors.

Study 1

The aim of Study 1 was to examine the role of team resilience through an independent and interactive lens. That is, I set out to examine the respective opposing roles of team adversity and team resilience (i.e., an independent perspective) as well as test the interactive (or buffering) effect of team resilience on the relationship between team adversity and selected team and individual-level outcomes (whilst controlling for players' resilience). More specifically, when viewing things through an independent perspective lens, I expected that when increasing levels of adversity (e.g., a competition loss) are experienced by a team, this has the potential to disrupt the post-event dynamic of the team (e.g., emergent states such as team cohesion) as well as athletes' personal views regarding their upcoming training/practice session (resulting in negative associations). Conversely, due to the advantages stemming from team resilience, positive relationships between team resilience and its correlates were predicted. However, when adopting an interactive lens, I hypothesised that team resilience

would temper the negative relationship between team adversity and team-level outcomes (i.e., task cohesion, collective efficacy) as well as an individual-level outcome (i.e., attitude to training). A similar effect was predicted for each outcome variable. For example, for teams with *low team resilience*, we expected increasing levels of adversity to have a negative relationship with team cohesion; whereas for teams with *high team resilience*, increasing levels of adversity were expected to have a null (or reduced negative) relationship with team cohesion.

Method

Participants

The study sampled male ($n = 98$) and female ($n = 130$) athletes (3 participants indicated their gender as non-binary/third gender) competing in team sports. Athletes participated in baseball ($n = 4$), basketball ($n = 9$), football ($n = 84$), and rugby ($n = 15$). All participants were at least 18 years old ($M_{age} = 30.41$, $SD = 9.9$) and competed at a variety of skill levels including recreational ($n = 192$), county/provincial/state ($n = 31$), and national ($n = 8$).

Measures

The Characteristics of Resilience in Sports Teams (CREST)

The Characteristics of Resilience in Sports Teams Inventory (CREST; Decroos et al., 2017) is a 20-item questionnaire that measures the resilience of sports teams. It consists of two subscales that reflect the team's ability to demonstrate both resilient characteristics (e.g., "the team was able to focus on what was important") and vulnerability under pressure (e.g., "teammates started to communicate negatively with each other"). The participants respond using a seven-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). With a Cronbach coefficient of $\alpha = .89$ for the current sample, researchers have provided evidence to support the reliability and validity of the CREST, which has been translated and used successfully in several languages/cultures (e.g., factorial validity). Since examining team resilience requires considering the social and environmental factors that affect teams, as well as the resources that

teams can use together, we decided to limit our focus to the demonstration of resilient characteristics (DRC) subscale (Yukelson & Weinberg, 2016).

Mental Toughness Index (MTI)

Gucciardi et al. (2015) developed the Mental Toughness Index (MTI) to measure individual mental toughness across 8 items (e.g., "I am able to use my emotions to perform the way I want") and is scored on a 7-point scale (1 = *false, 100% of the time* to 7= *true, 100% of the time*). With a Cronbach coefficient of α = .86 for the current sample, the MTI has been shown to be a reliable and valid measure of mental toughness (Gucciardi et al., 2015).

Group Environment Questionnaire (GEQ)

We utilised the positively worded version of the Group Environment Questionnaire (GEQ; Eys et al., 2007) which is an 18-item questionnaire measuring four dimensions of team cohesion: individual attraction to the group (social), individual attraction to the group (task), group integration (social), and group integration (task). Given that team resilience is inherently goal oriented (Duchek et al., 2021) and that the primary goals for many sports teams are task oriented as well as our desire to assess team level outcomes, only items from the group integration (task) subscale were administered. This subscale consists of five items (e.g., "Our team members have consistent aspirations for the team's performance") that are responded to using a 1-9 Likert scale (1 = *Strongly Agree*, 9 = *Strongly Disagree*). For our sample, this subscale appeared to be a reliable measure of task cohesion (Cronbach α = .83), and previous research has demonstrated relationships between task cohesion and theoretically relevant correlates (e.g., transformational leadership; Callow et al., 2009), indicating that data collected via the GEQ are valid.

Collective Efficacy Measure (CEM)

We administered the subscale of perceived efficacy for collective team actions (Sharma & Sharma, 2016). The subscale consists of five items (e.g., "My team is capable of helping a team member solves his/her problem"). Items are responded to via a 1-5 Likert scale (1 =

Strongly Disagree, 5 = *Strongly Agree*) with data collected from the present sample demonstrating internal consistency (α = .85). Sharma and Sharma's work in developing their measure provides support for the validity of the efficacy for collective team actions subscale.

Attitude to Training

To assess attitude to training, we drew from standard practice in the Theory of Planned Behaviour (Ajzen, 1985) literature and conceptualised attitude as being comprised of affective and instrumental components. Items administered to our participants were based on Rhodes and Courneya (2003) measure assessing attitude towards exercise sessions that included a seven-point bipolar adjective scale response format. Our athletes responded to the statement "for me, the first training session following the game would be …" via four affective (bad/good, harmful/beneficial, useless/useful, and unimportant/important; α = .74) and four instrumental items (boring/fun, unpleasant/pleasant, dull/exciting, and unenjoyable/enjoyable; α = .84).

Primary Appraisals of Stress

With respect to team adversity, we draw from the appraisals of stress literature (Čavrak et al., 2019; Codonhato et al., 2018), and more specifically based the measure around athletes' primary appraisals of stress (Gucciardi et al., 2017), which refers to an occurring cognitive process when someone is judging whether an event is stressful in a given scenario. For example, a football team may be subject to fierce counterattacks from the opposition who are looking likely to score very soon, further adding pressure to the team. Participants were asked four questions to assess how aversive the situation was: (a) how much adversity did the team experience during this event, (b) how stressful was the situation for the team, (c) how disruptive was this event to the team, and (d) how harmful was the event to the team? Participants responded on a five-point Likert scale ranging from 1 (*not at all*) to 5 (*very much*). In this study, for the primary appraisals of stress, there were four (4) questions, which aimed at assessing how aversive the situation was, and the outcome of this analysis produced a Cronbach

alpha value of .47. However, deleting question number 2, which asked "how well did the team cope during this event?" increased Cronbach to .68.

Procedures

Following approval from Bangor University's SSHES Ethics Committee, data were gathered through the Prolific website, a service for distributing questionnaires to specific participant groups, such as athletes. Participants were asked to complete an online version of the survey, which was made available through Qualtrics, a cloud-based platform for creating web-based surveys. To recruit our athlete participants, search filters were applied based on the following inclusion criteria: male and female athletes; older than the age of 18 years; competing in team sports; at recreational, provisional/state, national, and international standards; and who spoke English as a first language. Participants were informed that their information would be kept private and confidential and that they were required to provide electronic consent before commencement of the study.

Participants completed the five and then a reduced set of three questionnaires in reference to two distinct typical and adverse conditions. When referring to typical conditions, athletes completed the five measures of mental toughness, team resilience, team cohesion, collective efficacy, and attitudes to training. In reference to adverse conditions, participants were first asked to recall instances of adversity their team had encountered (i.e., difficult, and adverse circumstances such as losing a football game, facing an overwhelming opponent, or perhaps a lack of confidence in the team). Based on this experience, the athletes then completed three of the measures (team cohesion, collective efficacy, and attitudes to training). In addition, items assessing athletes' appraisal of the identified adverse experience were completed. Collectively, the questionnaires took approximately 20 minutes to complete.

Data Analysis

The data analysis was conducted using an add-on to SPSS created by Hayes (2017) called PROCESS. This add-on combines mediation and moderation analysis and is used when the analytical goal is to highlight and understand the conditional nature of the mechanism by which one variable transmits its effects to another variable (Hayes, 2017). Prior to running analyses, data were standardised to aid interpretation of the regression coefficients from the Model 1 analysis. Aiken et al. (1991) also recommend the use of such transformed data to avoid multicollinearity issues involving the predictors and the interaction term. In the regression models, appraisal of the team adversity served as the predictor, team resilience was conceptualised as the moderator, and team cohesion, team efficacy, and attitude towards training were the respective outcome variables.

Mental toughness is used as covariate variable, meaning it refers to the innate or learned ability to handle stressful and competitive sports situations effectively. Mental toughness is also a psychological assessment tool designed to measure an individual's ability to cope with stress, pressure, and challenges. Key dimensions of mental toughness include facing off against competitors, enduring tough training, staying consistent, and outperforming rivals while staying focused, confident, and in control under pressure (Jones et al., 2002; Gucciardi et al., 2015). The researchers included mental toughness as a covariate to account for individual responses to difficult circumstances. That is, individuals with higher levels of mental toughness are expected to be better equipped to overcome difficult situations.

Since the study investigated whether team resilience would moderate the relationship between the independent (team adversity) and dependent variables (i.e., post-stress levels of team cohesion, collective efficacy, and attitude towards training; instrumental and affective), testing of the hypotheses required a series of four moderated hierarchical regressions. Post-hoc tests of simple slopes were conducted to better understand the nature of any interactions

identified as well as highlight the specific conditions when the predictor was significantly related to the outcome variable.

Results

Descriptive Statistics

To ensure the appropriate handling of missing data and outliers in the dataset, an outlier analysis was conducted using simple box-plot analysis of the respective measures to remove participants having null or invalid responses. This was conducted on SPSS by plotting and inspecting the various boxplots of the measure values. The findings from this analysis identified two participants with outlying scores on instrumental and affective attitudes to training. These responses were removed from the dataset. Table 3.1 presents the uncentered means and standard deviations for each of studied variables as well as the correlations between them.

Table 3.1

Correlation matrix with descriptive statistics

	Mean	SD	MT	TC	CE	ADV	TCA	CEA	TR	ATTA	ATTI	ATTAA	ATTIA
MT	5.68	0.80	---										
TC	7.26	1.25	.43**	---									
CE	4.21	0.58	.49**	.67**	---								
ADV	4.01	.72	.20**	.10	.05	---							
TCA	4.18	0.71	.38**	.67**	.64**	-.02	---						
CEA	5.38	0.85	.41**	.66**	.72**	-.03	.75**	---					
TR	5.97	0.93	.33**	.74**	.69**	.21**	.57**	.61**	---				
ATTA	5.69	1.12	.32**	.35**	.41**	-.02	.41**	.36**	.37**	---			
ATTI	5.93	1.02	.30**	.43**	.39**	.06	.40**	.35**	.38**	.64**	---		
ATTAA	5.23	1.29	.17**	.29**	.36**	-.06	.47**	.42**	.30**	.53**	.37**	---	
ATTIA	5.68	0.80	.18**	.28**	.29**	-.14*	.52**	.47**	.27**	.36**	.45**	.66**	---

Note: *** denotes $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. All the measures are scaled as 1 to 7 except Adversity 1 to 5 and Cohesion which were responded to via a 1 to 9 Likert type scale.

MT = Mental Toughness, TC = Team Cohesion (Normal), CE = Collective Efficacy (Normal), ADV = Adversity, TCA = Team Cohesion (Adversity), CEA = Collective Efficacy (Adversity), TR = Team Resilience (Normal), ATTA = Attitude towards Training (Affective), ATTI =

Attitude towards Training (Instrumental), ATTAA = Attitude towards Training (Affective

Adversity), ATTIA = Attitude towards Training (Instrumental Adversity).

Team Cohesion

After inputting the variables in PROCESS (team resilience, team adversity and team

cohesion), the regression equation totalled 49% of the variance of team cohesion. Both

covariates were significantly related to the criterion variable in the directions expected (see

Table 3.2 for the regression statistics from these analyses). Adversity (b = -.15, $p < .05$) and

team resilience (b = .24, $p < .05$) were significant predictors within the regression model.

Offering support for our moderation-oriented expectations is the adversity × team resilience

interaction term (b = .14, $p < .05$), which accounted for a significant 1.4% proportion of team

cohesion over and above the main effects.

Figure 3.2

An illustration of the interaction between adversity and team resilience in predicting team cohesion.
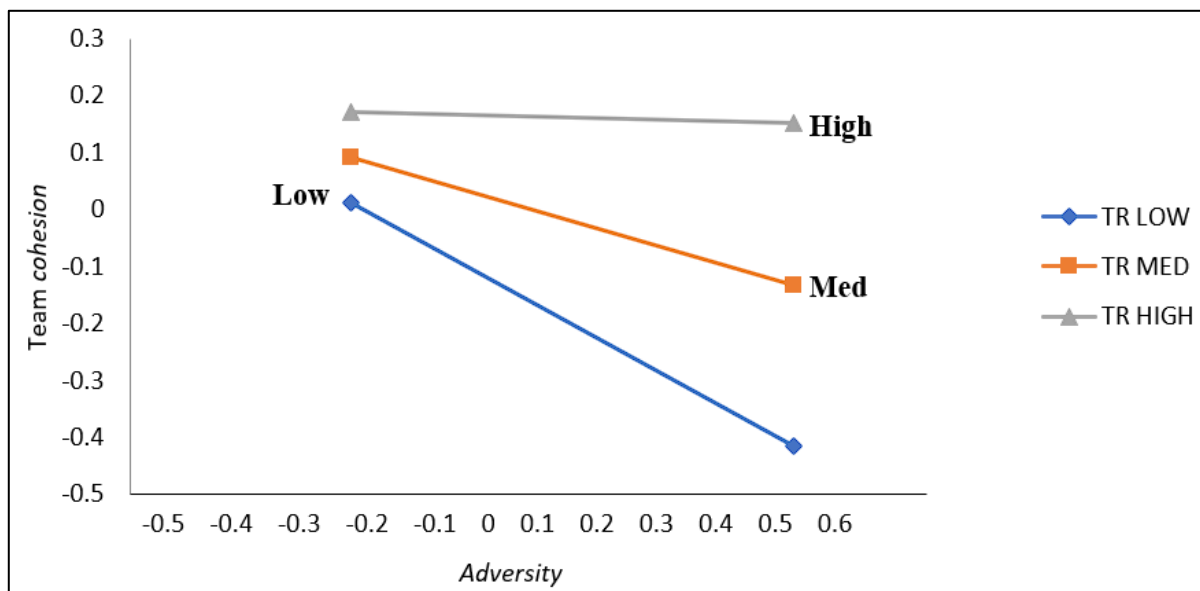
More specifically, post-hoc tests of simple slopes analysis revealed a significant

negative association between adversity and cohesion at low levels of team resilience (b = -.28,

$p < .001$), that became nonsignificant at mean levels of team resilience (b = -.13, $p = .056$), and

remained nonsignificant at high levels of the moderator (b = -.28, p =.91). Figure 3.2 depicts a conceptual diagram of the relationships for the model, which supported our interaction hypothesis.

Collective Efficacy

By using the PROCESS tool to analyse team resilience, team adversity, and collective efficacy variables, a significant 56% of the variance in collective efficacy was accounted for. Additionally, the covariates (team resilience and team adversity) were found to be significantly related to the criterion variable (collective efficacy) in the expected directions. Adversity (b = -.08, $p < .05$) and team resilience (b = .18, $p < .001$) were also significant unique predictors within the regression model and consistent with our a priori expectations the adversity × team resilience interaction term (b = .06, $p < .05$) accounted for a significant 0.8% proportion of collective efficacy over and above the main effects.

Figure 3.3

An illustration of the interaction between adversity and team resilience in predicting collective efficacy
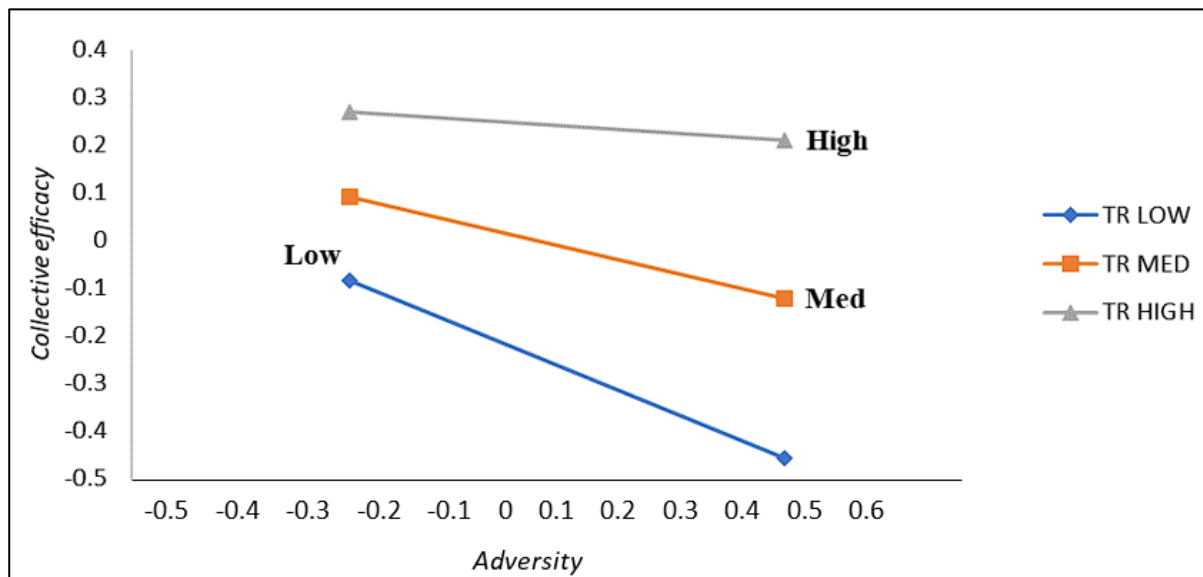
More specifically, post-hoc tests of simple slopes analysis supported our hypothesis as we revealed a significant negative association between adversity and collective efficacy at low levels of team resilience (b = -.13, $p < .05$), that remained significant at mean levels of team

resilience (b = -.07, p < .05), but became nonsignificant at high levels of the moderator (b = -.02, p =.67; see Figure 3.3).

Attitudes to Training

It was also hypothesised that team resilience would temper the negative relationship between team adversity and attitudes to training. As reported in Table 3.2, the findings for both aspects of attitude towards the immediate post-stress training session were similar, with one exception. For instrumental attitudes to training, a significant and negative coefficient was evident for team adversity (b = -.25, p < .01); irrespective of additive or interactive perspectives, no other associations were significant.

Table 3.2

Statistics from hierarchical regression models for our dependent variables (n=231)

Group	Predictors	Team cohesion	Collective efficacy	Instrument Attitude	Affective Attitude
Covariates	Mental Toughness	.15[*]	.05	.05	-.03
	Typical level of dependent variable	.64[***]	.36[***]	.49[***]	.53[***]
Additive Effect	Team adversity	-.15[*]	-.08[*]	-.25[**]	-.08
	Team resilience	.24[*]	.18[***]	.19[*]	.11
Interactive effect	R^2	.49	.56	.25	.32
	$r_{adversity} \times resilience$	.14[*]	.06[*]	.09	.04
	ΔR^2	.01[*]	.01[*]	.01	.002

Note: *p < .05, **p < .01, ***p < .001

Discussion

Our analytic strategy enabled us to parse out the effect of personal mental toughness to gain a better appreciation of the (additive and/or interactive) role of team resilience. Collectively the findings from our analyses provided mixed support for our a priori expectations. More specifically, when the dependent variable was a team level construct (i.e., team cohesion and collective efficacy) there was support for the predicted additive and interaction effects between adversity and team resilience.

In contrast, when predicting individuals' attitudes to training, there was no support for our (interaction-based) hypotheses. Confidence in the creditability of the presence of an interaction is increased when considering that we found evidence of a similarly shaped interaction for both our team level outcomes. When team resilience was low there was a negative relationship between adversity and team cohesion (and collective efficacy) although this was buffered by increasing levels of our moderator such that, high levels of team resilience protected against the negative impact of adversity.

As seen in similar field research on team resilience (Lu et al., 2016), the proportion of variance accounted for by the interaction term was modest (~1.5%). There are at least two potential explanations worth consideration. First, it is possible that this is partly due to respective recall issues combined with our flexible approach involving stimulated recall for the stressful event that participants used as a reference point to complete the questionnaires. Given the range of stressors that teams might have encountered (e.g., financial, coaching issues, poor form) gaining a firmer understanding of the nature of team stressors and integrating this newly gained knowledge into subsequent studies has value. Second, an alternative contributing factor to the relatively low predictive power of our interaction adversity and team resilience is the new measure of adversity. Although we believe the scale shows promise, the reliability of the data collected from the measure could be improved. The integration of both these issues forms the basis of the remaining studies in this chapter.

Study 2

The purpose of the second study was to build from the findings of Study 1 by identifying the different types of stressors teams experience. Although there has been much written about stressors that individual performers encounter (Fletcher et al., 2012; Marchant-Haycox & Wilson, 1992; Mellalieu et al., 2009), a qualitative approach was used to provide an in-depth

analysis of team stressors. Interpretative phenomenological analysis (IPA) facilitated the examination of athletes' lived experiences of team adversity.

Method

Participants

Following approval from the University's ethic committee, the same participants as those involved in Study 1 were utilised in the present study.

Procedures

The procedures for the current study were chiefly the same as those for Study 1 and revolved around the use of the prolific website. Of relevance for the present study was the open-end question participants responded to before they completed Study 1's quantitative measures. However, the present study's focus was on the athletes' exposure to adverse conditions impacting on their teams.

Data Analysis

Reflexive thematic analysis was used to analyse the data obtained from the open-ended question (Braun & Clarke, 2019). Reflexive thematic analysis can be approached from a variety of perspectives including inductive, deductive, semantic, latent, realist, and constructionist. While Study 1 used quantitative data analysed in PROCESS rather than qualitative, in the present study we conducted an inductive analysis of the qualitative data enabling my supervisors and I to gain insight into the participant's attitudes, thoughts, opinions, experiences, and perceptions (Azungah, 2018). This type of data analysis aims to organise and describe the dataset by identifying patterns (also known as themes), as well as similarities and/or differences that occur across it (Braun & Clarke, 2019). We used the six-step method by Braun and Clarke (2006) to ensure that our analysis and interpretation of the data followed a clear process and structure. Familiarisation and coding formed the first two stages, while stages three to five focused on theme development, refinement, and naming. The sixth and final stage involved

developing a report of our findings. After familiarising ourselves with the data, the inductive analysis was facilitated by the identification of meaning units within the participants' written responses. A meaning unit refers to a single concept or idea that can be presented as a phrase, sentence, or a paragraph of text (Miles et al., 2018). In the rare instance of discrepant views amongst the authors (93% agreement rate) regarding the separation of the responses into meaning units, consensus was reached via discussion between ALJHSB. As is common in reflexive inductive analysis, this step enabled us to code and then theme the data, guided by our interpretation of its content (Braun & Clarke, 2019; Braun et al., 2017).

Initially we familiarised ourselves with the data by reading participants' open-end responses numerous times in search of patterns and meanings. Subsequently, the first set of codes were generated, and were represented as meaning units where one idea existed per meaning unit. Early themes then emerged from the analysis and organisation of the codes. We grouped like thoughts together into broad categories called "themes". Themes were re-evaluated and fine-tuned in the fourth stage. In the event of insufficient data to support individual themes, or the data were too diverse to make the theme clear, they were either deleted or collapsed into other themes. For themes to be grouped together, they had to have a common core meaning determined using common words/phrases, or by examining and interpreting the latent meaning of responses. It was at this point that the themes were named and defined. Collectively, these steps enabled the authors to understand the participants' experiences and to make sense of their situation via the data provided.

A non-foundational approach was also adopted to improve the quality of the data, based on the following criteria: coherence, resonance, and credibility of the research and its subsequent contribution to the field (Tracy, 2010). The overall aim of this study was to produce new and useful information about athletes' reported experience of team adversity competing in various sports. This was made possible by the inclusion of in-depth quotes and data extracts.

An important aspect of this study was the use of the critical friend's approach during key stages such as data analysis to assess the findings for coherence and credibility. Critical friends share their ideas on how the study can be improved, as well as provide honest and impartial feedback. Within this approach, the critical friend (supervisors) are trusted researchers who posed provocative questions, encouraged interpretation of the data through a different lens, and offered constructive criticism (Costa & Kallick, 1993). As well as facilitating trustworthy data analyses, critical friends can constructively criticise and challenge the status quo, while also encouraging best practices within the research team fostering an environment conducive to growth and reflection. The analysis was deemed complete upon attaining theoretical saturation, meaning that the analysis concluded once the data no longer contributed any more to the development of new themes and sub-themes. Following the completion of their respective analyses, results found that the initial interrater agreement was 85%, which illustrated excellent reliability. Researchers discussed any discrepant coding until reaching consensus regarding the housing of all meaning units.

Overall, the coding process was conducted as a collaborative effort involving regular meetings with the supervisors. In these sessions, the items and meaning units extracted from the data were systematically coded. The coding process involved in-depth discussions to ensure a comprehensive understanding of all the data. Themes were derived from these codes and further deliberated upon through our individual interpretations of the data. The discussions facilitated consensus-building, allowing us to reach agreement regarding the names and definitions of the identified themes. This collaborative approach not only enhanced the reliability and validity of the coding process but more importantly, also ensured that diverse perspectives were considered in the interpretation of the themes emerging from the data.

Results

Analysis of the qualitative data in the current study revealed nine first-order themes (see Figure 3.4). These related to instances of adversity: a) weakened teams, b) challenging upcoming game, c) losing score line, d) travel/transportation issues, e) fixture issues, f) interpersonal concerns, g) training issues, h) challenging playing conditions, and i) coach/team support issues. Overall, there were 252 meaning units that helped to develop the sub-themes, and then the first-order themes. Quotes were used to add depth and legitimacy to the conclusions drawn from the data. The sections that follow summarise the findings.

From a conceptual perspective, since team resilience and adversity experienced by teams operate at the nexus of resilience and group dynamics, it is possible to view the current initial findings through the lenses of both these research literatures. When doing so, a striking common feature emerges. When group dynamics researchers (and theoreticians e.g., Delice et al., 2019) have tried to better understand team performance, effective teams, and teamwork behaviours (e.g., McEwan & Beauchamp, 2014), temporal (i.e., transition and action) stages have been noted to represent the episodic cycles that teams experience. For example, a rugby team will likely go through a weekly episodic cycle to prepare for, compete in, and then review performance. This process is then replicated for the following match. With a focus on teamwork, numerous frameworks propose that certain behaviours are relevant under acute episodes, while certain behaviours are relevant under chronic episodes (Marks et al., 2001). Similarly, a temporal feature is present within the individual resilience and team resilience literatures. We examined both short-term or acute stressors (e.g., losing scoreline) and long-term or chronic stressors (e.g., weakened team). Sports scholars have also written about the about the potential importance of proactive and reactive forms of athlete resilience (e.g., Gupta & McCarthy, 2021) which have overlap with chronic and acute stressors, respectively.

Figure 3.4

Hierarchical tree diagram of team stressors
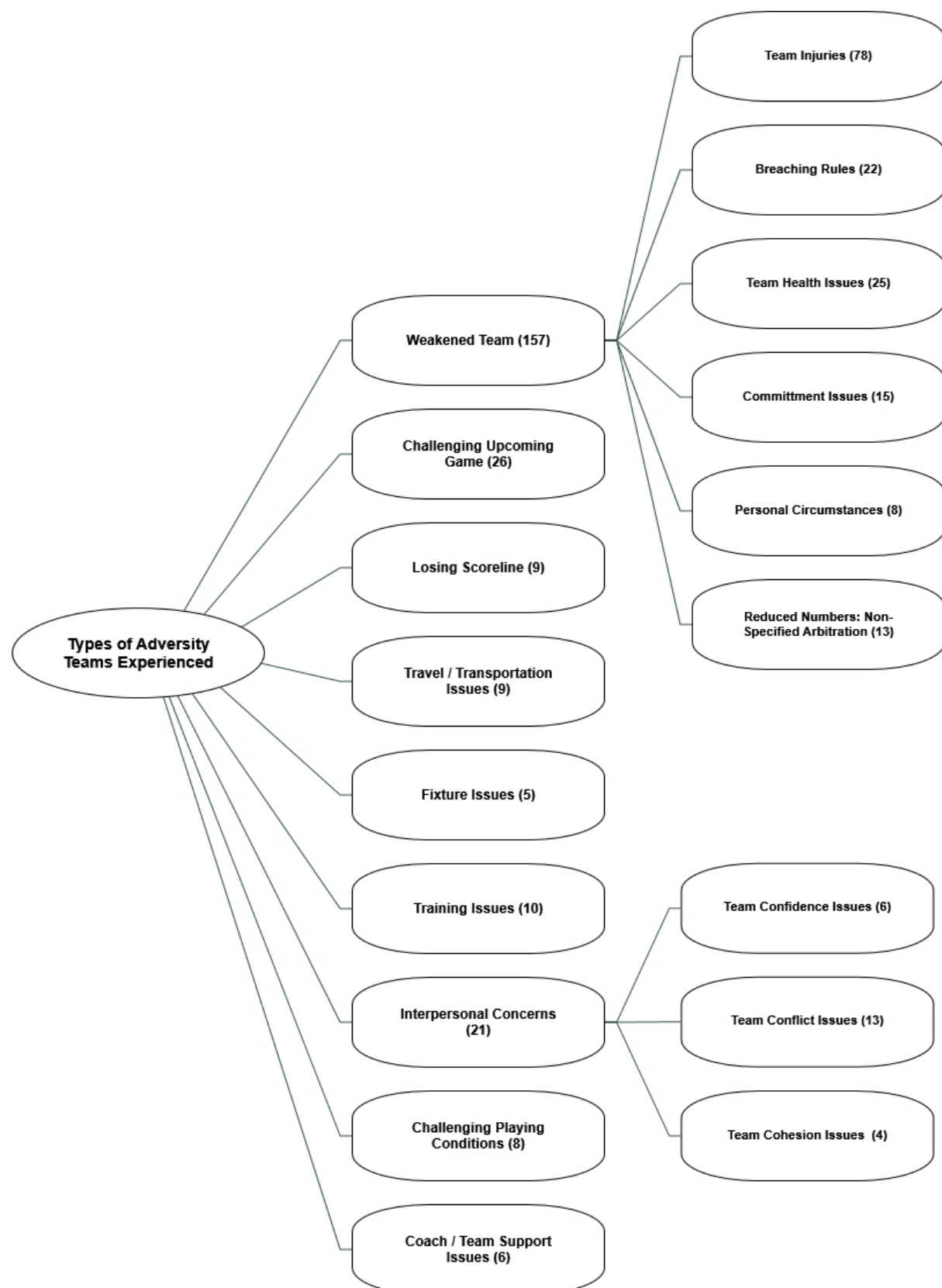
Weakened Team

The higher-order theme weakened team referred to a range of reasons why teams were weakened or placed at a disadvantage. This theme comprised of six sub-themes: (a) Team Injuries, (b) Breaching Rules, (c) Team Health Issues, (d) Commitments Issues, (e) Unforeseen Circumstances, and (f) Non-Specified Attribution. A total of 157 meaning units were associated with this higher order theme.

Team Injuries

While teams often face several adverse situations across the sports, one aspect of team adversity frequently noted by the participants was team injury. In fact, team injuries represented the most endorsed attribution of a weakened team and reflected acute, chronic, and overuse type of injury as well as injuries that occurred before and during competitive matches. Team injuries led to various consequences that weaken the team, particularly if first choice players were unavailable for matches (where non-starters had to step up). For example, one participant described a scenario where "*An important player got injured in the middle of an important match, then shortly after another key player was injured also. They were unable to play, and we were being beaten by our rival team and faith was being lost by all of our players*". Other subthemes included individuals playing while "carrying" injuries and players having to play out of position, which in turn impacted the team's overall effectiveness.

Breaching Rules

Participants in the current study further suggested that breaching rules resulted in weakened teams. Participants views of rule breaching was based on team members' lack of discipline which threatened the teams' chances of success. Although this occasionally reflected a violation of team rules (e.g., poor attendance at practice sessions), the more common demonstration occurred during competitive matches (e.g., violating laws of the game resulted in team members being sent off the field of play). In some instances, this had serious

consequences for the team as one footballer noted *"We had 2 teammates sent off during a final match where we were only a few points behind to win"*.

Team Health Issues

Another stressor contributing to a weakened team was team health issues. Unsurprisingly, participants based many of their responses on the recent COVID-19 virus outbreak where players felt unwell prior to, during, and following a match. One soccer player stated: *"We recently played a game with three substituted players due to ill health. This was relatively last minute and changed the dynamics and interactions of the team members significantly. We lost the game."*

Commitment Issues

Participants reported external responsibilities as another source of a weakened team with participants describing long standing commitments such as education and work obligations. For example, one footballer noted, *"Most of our team members could not attend a Tuesday game* as they were at work, and we had to play short by two players and there were no substitutes". A lack of commitment to the team and training was different type of commitment concern: for instance, one rugby player revealed his/her "…team was in a situation where players were given game time based on practice attendance, however key players often didn't attend training, so we played with non-starters on an important match, it was really challenging as we had to adapt to a slower tempo with a lot of foul plays". A lack of commitment to the team also played out in team members being "poached" to play for other teams.

Unforeseen Circumstances

Another explanation behind a weakened team was due to unforeseen circumstances such as important personal events e.g., as one netballer noted; *"We were to play an important tournament and two of my team members had to be absent because they had to attend funeral at their homes"* and mental wellbeing issues e.g., one netballer stated *"Our captain had to drop*

out due to personal pressures, and she is the crux of our team…there was reluctance to keep going and fear that our performances would decline".

Reduced Team Numbers: Non-Specified Attribution

The meaning units in this subtheme made explicit reference to teams being short-handed and under-staffed; however, the precise reason behind these situations were not clarified. Nevertheless, participants referred to how being short of players or key positional players, having a lack of substitutes/reserve players, and last-minute personnel changes affected how the team had to adapt and compete. For example, one basketball player stated: *"We were missing a lot of our players and ended up having to play the game with just one person on the bench. This meant people were asked to play a lot more minutes than normal."* Participants also reported similar but more extreme instances: *"We had to play a [football] game to win the league and we only had 9 players. It was the toughest game I've ever played…we lost the game 2-0 however it was an excellent effort from us as a team. We tried our best and it felt like a win walking off the pitch. We still talk about that game even though we lost."*

Challenging Upcoming Game

Participants also referred to adverse situations in the form of pre-identified threats imposed by the opposition who had a stronger line-up or who were in formidable form before the match. For example, one Gaelic footballer indicated: *"We had an upcoming game that had much better players than our own…the other team had much older more experienced players"*. Not only did participants refer to the strength and athleticism of the opposition, but also the importance of "big" matches against tough opposition: *"Before the final match of the season, we knew that if we win against our challenging opponents, we win the league, but the pre-match pressure and the formidable side we were facing did overwhelm us. This translated on the pitch as we capitulated and ended up losing 2-0."*

Losing Score Line

Participants also reported that a losing score line, which represents times when teams were put on the back foot or trailed in a game or series, placed extra pressure on the team e.g., *"We had a difficult start to a final game. We were down a lot at half time and needed to support and encourage each other to play to our better abilities in the second half"*. Participants further suggested that losing a previous match also placed mental strain on the team: *"...we had to deal with the added element of dealing with the mental pressure of playing after losing the first match"; "Whenever the opposition scores, some of the team sort of give up or seem deflated..."*.

Travel / Transportation Issues

The theme of travel and transportation issues refer to hardship endured due to the difficulties teams encountered when traveling to sporting venues. Participants' responses reflected external demands e.g., *"We had an accident on our way to the game. No one was hurt but the teammates were nervous and emotionally unstable. We managed to play but lost the game"*, internal demands e.g., *"By the time we turned up to the match we were really tired as had to drive 5 hours to get there and the other team had insisted on an early kick off"* and financial demands of travel e.g., *"We had to play the National games but found out that we can't afford to travel all the way across the country. We did a lot of fund-raising events but still ran short. We had been training for a long time, so the situation was very unfortunate"*.

Fixture Issues

Fixture issues captured the emergence of adverse situations due to the cancellation or abandonment of teams' matches and the difficulties encountered in the planning and scheduling of matches. This later issue included the mental strain of playing multiple matches over a condensed period. With respect to scheduling problems, one respondent stated: *"Due to time and scheduling constraints, our team was tasked with playing two matches consecutively..."*. Participants further suggested that match cancellations leading to future fixture issues had a

negative impact on the team's emergent states: *"Everyone was stoked to be finally playing a pre-season match after all the trouble with coronavirus pandemic, but unfortunately it was called off and it really affected morale."*

Training Issues

This theme represented training issues, mostly resulting from the recent pandemic; these illness and financial factors contributed to the team's lack of or disrupted training/practice. For instance, one soccer team was impacted in the following manner: *"We had to work around several players not feeling well enough to train, which disrupted training sessions. Many of the women could not make it to the sessions due to flu type symptoms so when we played, we didn't feel well prepared or at our strongest for the match."* A secondary aspect of training issues, revolved around participants' perceptions of how well trained and more confident opposition teams appeared.

Interpersonal Concerns

Another example of team adversity experienced by our participants centred on interpersonal concerns, which is a higher-order theme comprised of three sub-themes: team confidence, team conflict and team cohesion issues.

Team Confidence

A prominent feature of team confidence reported by the participants was a lack of belief in the team's or players' ability to win the game. For example, one Gaelic footballer noted: *"We were aware of it and many of the members lost confidence even before stepping into the field. We were nervous and made many mistakes because of it, which made it easy for the most temperamental and competitive team members to get angry and start bickering."* In contrast, participants also reported problems caused by being overconfident: *"We were playing a match against a worse team, we went into it a bit too confident and went 1-0 down."*

Team Conflict

Participants further suggested that team (relationship) conflict and in turn, negative forms of communication undermined interpersonal bonding. One netballer expanded on their experiences: "*It came out that one of the team members was speaking very negatively about personal things to do with some of the other team members. It caused a massive shift in trust within the group and made the training sessions following that awkward. Eventually the head coach spoke to the group about trust and respect.*"

Team Cohesion Issues

Team cohesion issues were reported by the participants, and these appeared to disrupt the team's collective and cooperative actions to accomplish the team goal. One netballer stated: "*We were at a tournament, and we were playing against a team that we should be able to beat easily but we were making a lot of sloppy mistakes we tried to have a chat and get everyone to focus but it did not work as well as we wanted because some team members would call out and blame others.*" Participants also reported team cohesion concerns due to multiple strong personalities in the team: "*We were also losing at half time by one goal. I think in our team we have a mixture of characters and personalities, some push hard and try to focus on the task at hand, I believe I belong to this group. But we also have young players who give up easily, who blame everyone else in the team, who start to play sloppy. The anger and frustration these players display really holds our team back. There is a lot of shouting and a lot of big egos which I believe is the reason we lose when the pressure is on us. We lost that match 2-0 which was frustrating…*"

Challenging Playing Conditions

Challenging playing conditions represented another cause of team adversity identified by the participants. Text in this theme referred to environmental concerns, such as severe weather e.g., "*While playing water polo the weather was very hot not like our usual conditions. Players were struggling to play in the heat….*", intimidating crowds e.g., "*One of our matches*

as a team where a massive crowd with cameras were spectating putting more pressure on us.",
and poor playing conditions. Participants also suggested that losing key players during a match
added to the challenging playing environment: "*My team was batting, and the star player was
second in the line-up. She got striked out and the rest of us had to ensure we score points
without her...*"

Coach / Team Support Issues

Support issues represent the various ways in which a lack of support impacted teams
including the coach's attitude toward the team, the coach's faith in the team, their
professionalism, as well as unforeseen circumstances associated with the coaches. One
participant stated, "*Our coach also lost faith in his team, and it resulted in us having no coach
as he was spending some of his money to get us exposure*". Although several participants
reported on such issues, to a lesser extent, the lack of support from other staff members (e.g.,
assistant coach or the strength and conditioning coach) was also noted as a source of team
adversity.

Discussion

The purpose of this study was to examine athletes' reported exposure to team stressors
within various sports. From our inductive analysis of the data, we reported on nine themes
regarding the types of adversity that sports teams face that included logistical (e.g.,
travel/transportation issues), situational (e.g., losing scoring line, challenging upcoming game),
organisational (e.g., fixture issues), environmental (e.g., challenging playing conditions), and
social (e.g., interpersonal issues, coach/team support issues) factors. Although team stressors
have not featured heavily within the sport psychology literature to date, they appear to have
breadth since all participants recruited for the study reported at least one example. From this
first investigation of the issue, a weakened team was reported to be a primary source of stress
experienced by teams that represented 69% of the data. Team injuries was the most cited cause

for this undesirable situation. While other causes were reported (e.g., team health issues), they all resulted in player shortages, harm to the team's ability to compete at their best and were a common source of stress encountered by teams, therefore suggesting the presence of acute and chronic stressors, which this study investigated. While acute stressors are short-term stressors that typically occur suddenly and for a brief period of time (e.g., team conflict or argument), chronic stressors are long-term stressors that persist over an extended period and can have serious consequences on physical and mental health on teams (e.g., player injury).

Taken together, the two studies reported on advance our understanding of how teams might benefit from being resilient and their experience of stressors. For example, Study 1 reported some support for the additive and buffering effects of team resilience with regards to how adversity encountered by sports teams undermines team dynamics (e.g., collective efficacy and team cohesion) although this was not the case for individual (e.g., attitude to training) outcomes. Considering the replication crisis within social psychology (Bardi & Zentner, 2017), greater faith in the findings we reported in Study 1 would be garnered via confirmation. However, Study 2 highlighted the presence of multiple types of qualitatively different team stressors reflecting distinct contexts (e.g., acute, and chronic stressors). Given the findings of Study 2, there is also a need to extend the scope of Study 1 to incorporate contexts that might impact on the role of team resilience and better match the experience of those on sports teams. Hence, Study 3 builds on the findings of Study 1 and 2 by investigating the additive and interactive effects of team resilience and adversity when teams encounter acute and more chronic stressors that have short and long-implications on teams.

Study 3

The purpose of Study 3 was to re-examine the role of team adversity and team resilience within the context of relatively short and long-term stressors that were used in Study 2. Consequently, Study 1's research question was readdressed as finding similarities or

differences in how team resilience operates across relatively short and long-term stress situations, ought to inform researchers about it constitute fabric and generate knowledge practitioners might use in their work with teams. To this end, we utilised a vignette experimental design manipulating acute and chronic stress conditions of teams' episodic cycle.

Method

Participants

The study surveyed 215 athletes of which 80 were male and 135 were female (1 participants did not specify their gender). They participated in a variety of team sports; rugby ($n = 11$), football ($n = 80$), basketball ($n = 16$), and netball ($n = 49$). All participants were at least 18 years old ($M_{age} = 29.2$, $SD = 8.12$), and competed at various levels including recreational ($n = 166$), county/provincial/state ($n = 22$), national ($n = 4$), and international ($n = 24$).

Measures

The same five questionnaires were used from Study 1.

Procedures

The same procedures were conducted as in Study 1. This involved obtaining ethical approval from Bangor University's SSHES Ethics Committee (see Appendix A) and gathering online data through the Prolific website. Participating athletes were found using the same search filters. All participants' information was kept private and confidential and informed consent was provided to the researcher electronically before completion of the questionnaires in relation to two vignette-based scenarios. Questionnaires were completed in conjunction with normal/typical circumstances before exposure to the experimental vignettes, after reading the acute stressor vignette, and then after the chronic stressor vignette in which all were counterbalanced. Participants' involvement took approximately 25 minutes.

Stress Based Vignettes

The scenario-based role-playing experimental approach for the two scenario vignettes used in this study were inspired by Rungtusanatham et al. (2011) three-stage process pre-design, design, and post-design. This approach allows researchers to elucidate why and how humans make decisions when confronted with complex issues. Vignettes are used to convey scripted information about specific levels of factors of interest hypothesised in advance to influence judgments, preferences, or decisions in the experiment. Participants are required to make decisions in response to scripted information while assuming an a priori defined position (e.g., member of a sport teams encountering the described situation). Before they can be administered to participants, the vignettes need to be appropriately designed, written, validated, and presented (Rungtusanatham et al., 2011). This ensures that the vignettes are clear, realistic, and complete in the sense that it contains all the information necessary for participants to respond to it perceiving the desired levels of the factors of interest. Study 3 utilised two stress related vignettes: an acute and a chronic stressor vignette.

Acute Stressor Vignette

"During an important match, your team's best player sustained an injury after attempting a challenge on an opposition player. They will be unavailable for the remainder of the match. Further, as the team's tactics were largely based around this player, their absence leaves your team in a weakened state."

Chronic Stressor Vignette

"A week before an important match, during a practice session your team's best player sustained an injury. Consequently, they will be unavailable for the upcoming match. Further, the team's tactics were largely based around this player and their absence leaves your team in a weakened state."

To judge whether the two descriptions were fit for purpose, we run an online pilot study recruiting 12 (M_{age} = 30.50; males n = 3, females n = 9) team sport athletes. Participants were

asked to read the two scenarios and then provide feedback via four questions: "What degree has your team experienced this type of situation?" (combined $M = 6.7$, $SD = 1.81$), "How realistic is this scenario?" (combined $M = 8.5$, $SD = 1.31$), "How believable is this scenario?" (combined $M = 8.6$, $SD = 0.10$), and "How interesting is this scenario?" (combined $M = 8.0$, $SD = 1.85$). Athletes answered the questions on a five-point Likert scale ranging from 1 (not at all) to 5 (very much so). Examination of the mean feedback values for the two scenarios separately, revealed that all the values are significantly greater than the midpoint of the Likert scale (one sampled $t (11) > 2.46$, $p < .01$). Moreover, results from paired t tests revealed that both vignettes were viewed similarly; $t (1.60) > .16$, $p < .01$. Further, this positive quantitative data was corroborated by participant's qualitative feedback referring to chronic preparatory scenario: "*This is in fact how I came to play. The team was short of members as a result of the key position being injured.*"

Primary Appraisals of Stress

Participants completed five questions to estimate how aversive two proposed short and long-term stress situations were i.e., a) "How much adversity did your team experience during this situation?", b) "How stressful was the situation for the team?", c) "How harmful was the situation for your team's chance of success?", d) "How threatening was this situation for your team's success?", and e) "How much pressure did your team face during this situation?" For the present study, we added questions b and c to the items utilised in Study 1 as internal consistency of the first set of items was not optimal. Participants responded to the items a five-point Likert type scale from 1 (not at all) to 5 (very much).

Data Analysis

We used the same general approach to analyse the data as we did in Study 1. One additional analytic approach involved testing the relationships in the context of the two scenarios in a separate manner to allow us to understand where there may be similarities and

differences across these two types of team stressors. Additionally, to further understand our measurement of team adversity, we conducted confirmatory factor analyses (CFA) on the primary appraisals of stress measure with MPlus (version 6.11; Muthén & Muthén, 1998-2010) using the robust maximum likelihood (MLR) estimator. Model fit was deemed acceptable if the comparative fit index (CFI) and Tucker-Lewis's index (TLI) approached .95, and the root-mean-square error of approximation (RMSEA) and the standardised root-mean-square residual (SRMR) indices were less than 0.08 (Hu & Bentler, 1999). Composite reliability was used to examine internal consistency.

Table 3.3

Correlation Matrix of the variables of interest

	MT	TR	TA	TC	CE	AA	IA
MT	---	.57***	.06	.56***	.56***	.33***	.24***
TR	.57***	---	.01	.71***	.68***	.39***	.28***
TA	.05	.13	---	.04	.02	.01	-.21**
TC	.56***	.70***	.18**	---	.64***	.42***	.37***
CE	.52***	.63***	.08	.70***	---	.29***	.22***
AA	.31***	.34***	.09	.43***	.32***	---	.48***
IA	.23***	.21***	-.16	.25***	.25***	.56***	---

Note: *** denotes $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Values above the diagonal stem from data collected in conjunction to the chronic team stressor scenario, while the lower diagonal values represent variables relevant to acute team stress. MT = Mental Toughness, TR = Team Resilience, TA = Team Adversity, TC = Team Cohesion, CE = Collective Efficacy, AA = Affective Attitude, IA = Instrumental Attitude.

Results

Measurement of Team Adversity

With regards to the chronic scenario, the initial fit of the single factor model was inadequate; $\chi^2 (5) = 40.00$, CFI = .88, TLI = .77, SRMR = .05, RMSEA = .18 and was

accompanied by sizable modification indices relating to items three and five. Closer inspection

of this pair of items revealed similarity in the wording of these items, which we subsequently

modelled by correlating the residual errors of these observed variables. The modified model

produced a good fit; χ^2 (4) = 9.54, CFI = .98, TLI = .95, SRMR = .03, RMSEA =.08 with factor

loadings ranging from .44 to .81. Internal consistency of the items was supported by a

composite reliability coefficient of .70. For the acute scenario, we reran the same final model

which produced similarly supportive results for our unidimensional conceptualisation of team

adversity; χ^2 (4) = 1.73, CFI = 1.00, TLI = 1.00, SRMR = .01, RMSEA =.00; factor loadings

from .63 to .83; composite reliability = .87.

Descriptive Statistics

Zero-order bivariate correlations between the variables of interest, nested within the

acute and chronic team stressor scenarios, are presented in Table 3.3. Means, standard

deviations, and Cronbach's alpha values are reported in Table 3.4.

Table 3.4

Descriptive statistics for variables in study

		Condition		
	Reliability	**Typical Level**	**After Chronic Stressor**	**After Acute Stressor**
				Mean (SD)
MT	.87	5.66 (.80)	-	-
TC	.82	7.25 (1.09)	7.46 (1.07)	7.49 (1.09)
CE	.84	4.28 (.52)	4.24 (.52)	4.20 (.60)
ATT	.90	5.95 (.76)	5.94 (.76)	5.82 (.93)
IAT	.87	5.82 (.85)	4.91 (.99)	4.84 (.93)
TR	.91	5.67 (.72)	-	-
TA	.82	-	4.01 (.66)	3.74 (.60)

Note: MT = Mental Toughness, TC = Team Cohesion, CE = Collective Efficacy, ATT =

Affective Attitude to Training, IAT = Instrumental Attitude to Training, TR = Team Resilience,

TA = Team Adversity. All the measures are scaled as 1 to 7 except Adversity from 1 to 5 and

Cohesion which were responded to via a 1 to 9 Likert type scale.

Additive and/or Interactive Effects

Team Cohesion

When considering the more chronic stressor encountered in the lead up to an important event with all variables entered, 53% of the variance of team cohesion was predicted. As seen in Table 3.5, both covariates were significant positive predictors of cohesion. In conjunction with the long-term team stressor presented, only team resilience ($b = .63$, $p < .001$), and not team adversity, was found to have a unique relationship with levels of team cohesion. There was no support for an interactive effect or that team resilience reduced the effects of team adversity on team cohesion ($b = -.06$, $p = .32$).

Analysis of the data from the scenario involving the more acute stressor revealed a similar pattern of results. That is, 53% of the variance of team cohesion was accounted for when entering all variables into the model. Both covariates made a significant contribution to this prediction. Since both team adversity ($b = .17$, $p < .05$) and team resilience ($b = .40$, $p < .001$), were associated with the levels of cohesion reported after experiencing this stressor. A nonsignificant interaction between team adversity and team resilience was found ($b = -.06$, $p = .29$), generating some support for our additive oriented hypothesis.

Collective Efficacy

In the first scenario, which considers the more chronic stressor encountered in the lead up to an important event, all variables accounted for 51% of the variance of collective efficacy. As seen in Table 3.5, both covariates were significant positive predictors of collective efficacy. However, only team resilience ($b = .20$, $p < .001$) and not team adversity was found to have a unique relationship with levels of collective efficacy after the chronic team stressor. There was no support for an interactive effect or that team resilience reduced the effects of team adversity on collective efficacy ($b = -.03$, $p = .28$).

Considering the data from the scenario involving the more acute (or transition-oriented) team stressor, the analysis revealed a similar set of findings (see Table 3.5). With this analysis,

it was observed that only team resilience ($b = .22$, $p < .001$) was associated with the levels of efficacy reported after experiencing this stressor. No significant interaction between team adversity and team resilience was found ($b = -.02$, $p = .66$).

Attitudes to Training

The findings from the attitudes to training analyses were consistent across both (acute and chronic) scenarios, for both affective and instrumental attitudes. Except for once instance, team resilience, neither independently nor interactionally, was related to attitudes of training.

Table 3.5

Regression results for the simultaneous models involving team resilience and team adversity (n = 209)

	Predictors	Team cohesion		Collective efficacy		Instrument Attitude		Affective Attitude	
		Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute
Covariates	Mental Toughness	.12**	.19***	.13***	.15**	.09	.11	.05	.09
	Typical level of dependent variable	.55***	.35***	.15***	.14*	.35***	.31**	.29***	.43***
Additive Effect	Team adversity	.06	.17**	.00	-.00	-.27***	-.25**	-.02	.04
	Team resilience	.30***	.40***	.29***	.30***	.08	.05	.12**	.08
Interactive effect	*Team adversity × resilience*	-.01	-.06	-.03	-.03	.004	.02	-.08	-.10
	ΔR^2	.00	.00	.00	.00	.00	.00	.01	.01
Overall	R^2	.64	.58	.49	.43	.20	.13	.21	.24

Note: * denotes $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

Our analytic strategy enabled us to re-examine the role of team adversity and more specifically, team resilience within the context of relatively acute and chronic stressors. Collectively, we hypothesised a significant main effect for team resilience (and team adversity) as well as a significant interaction, especially when the dependent variable was a team-level construct (i.e., team cohesion and collective efficacy). Consistent with the forces-oriented theorising presented in Figure 3.1, we found that team resilience was a significant positive

predictor of team cohesion and collective efficacy, while team adversity did not have a unique relationship with either. The findings were similar for both chronic and acute stressors, and there was no evidence of an interactive effect. The present study also found that team resilience was not necessarily correlated with athletes' attitudes towards their training.

When the current findings are considered in concert with those reported in Study 1 there is consistent support for an independent effect of team resilience. Although evident in Study 1, there was a lack of support for an interactive effect in the present study. However, our findings suggest that team resilience can have a positive impact on group dynamics following stressful events, regardless of whether the stress experienced by the group was acute (short-term) or chronic (long-term). This implies that developing team resilience may be a useful strategy for groups to better cope with stress and adversity, and to foster more positive and cohesive group dynamics in the aftermath of such events. By promoting team resilience, groups may be better equipped to handle stressors and to support one another in challenging situations, which should ultimately lead to greater team effectiveness.

General Discussion

This chapter presented three studies to better understand the theorised beneficial role of team resilience in relation to sports oriented team stressors. To this end, both quantitative and qualitative research designs were utilised. Across the studies, insight was provided into how team resilience can mitigate the negative effects of stress on team and individual outcomes. The first study investigated the interplay between team adversity and team resilience. The second phase of this research identified and categorised the types of team stressors encountered by sport teams, highlighting both short- and long-term stressors. In the final study we integrated the findings of Studies 1 and 2 within an experimental design. Using a vignette-based manipulation we incorporated the most common type of team stressor to investigate the role of team resilience across both types of stressors; that is, injury to a key player during an important

match (acute stressor) or sustained a week prior to an important match (chronic stressor). Studies 1 and 3 found support for the positive relation of team resilience with team cohesion and collective efficacy. However, only in Study 1 was support found for an interactive effect between team resilience and team adversity. When taken together, the chapter presents a framework for understanding team resilience as well as novel findings regarding the role of team resilience in the context of adversity and the first description to date of team stressors experienced in sport.

Role of Team Resilience

We discussed two different theoretical perspectives for the role of team resilience in the context of team adversity, as represented in our "forces framework" (see Figure 3.1). The framework illustrates an independent effect perspective, where team resilience can counter the effects of team adversity to aid progress towards team goals, and the alternative an interactive effect perspective, where team resilience moderates the disruptive effect of adversity. Irrespective of perspective, team resilience is purported to have importance for maintaining team homeostasis following stress (and facilitating team locomotion).

In both Study 1 and Study 3, an independent (or significant) main effect for team resilience and team adversity, as well as a significant interaction was hypothesised. Indeed, we found support for the independent effect of team resilience but only partial support (in Study 1) for an interactive effect with team adversity for our team level outcomes. The null results for the individual level outcome of (affective and instrumental) attitudes to training reported in Study 3 were consistent across both chronic and acute stressors. In this study similar findings across team stressors were also found for the emergent state outcomes.

There are at least three potential explanations regarding the discrepant interaction-oriented findings across Study 1 and 3. First, the relationship between team resilience and adversity on team cohesion, and collective efficacy differed between Studies 1 and 3. While

Study 1 found support for additive and interactive effects, Study 3 emphasised the independent effect of team resilience in promoting positive group dynamics. However, detecting significant interactions in field-based research can be challenging, as noted by previous researchers (e.g., Cowden, 2016), since field studies often involve complex and multifaceted real-world settings, making it difficult to control and isolate specific variables of interest. The presence of numerous contextual factors and uncontrolled variables can obscure or weaken the observed interaction effects, which may have led to different interactive effect outcomes across Study 1 and Study 3. However, this may have not been the case since both studies employed different data collection methods and had minor differences in sample size and composition. The differing data collection methods and samples used between the studies (with Study 1 using a simulated recall approach and Study 3 employing vignette-based scenarios) may have resulted in the possibility that the scenarios in Study 3 might not have resonated as strongly with participants compared to Study. That said, vignette scenarios have several limitations such as limited representativeness of team stressors and the potential for response bias, all of which may have contributed to null interactive effects reported in Study 3.

Furthermore, a potential limitation unique to Study 3 may lie in the use of a single source team stressor, specifically the scenario involving the injury to and of a key player. Since teams, as indicated in Study 2, often encounter multiple stressors, focusing on a single stressor might not accurately capture the breadth of team stress experience. For instance, it is possible that the loss of a key player alone may not generate a sizeable stress response as initially anticipated. Additionally, the loss of a key player may allow others to shine which could be perceived as a positive influence on the team.

Based on the possible explanations discussed above, the inconsistent interactive effects can most likely be attributed to the scenarios in Study 3 not resonating as strongly with participants compared to Study 1 given the vignette scenario approach used in Study 3.

Moreover, a stimulated recall approach was used in Study 1 which is a valuable tool to gain accurate and in-depth insights into participants' experiences, thoughts, and emotions related to specific events or experiences, which in turn enhances the overall validity of the research findings (Henderson & Tallman, 2006). Therefore, it is possible that the interactive effect found in Study 1 was driven by the perceived meaningfulness of the stress-related context, and this effect was not replicated in Study 3 due to differences in how participants perceived the stressors. This was also due to the issue that the participants may not solely rely on their best player combined with this being the only team stressor included in the experimental vignettes.

Regarding the independent effect, the consistent positive relationship found for team resilience and team cohesion, and collective efficacy aligns well with findings reported in the sports literature (Decroos et al., 2017; Gorgulu et al., 2018; Morgan et al., 2013; 2015; 2019; Yang et al., 2020). Operationalising team resilience via the CREST questionnaire means that resilience should be viewed as a multi-dimensional construct encompassing aspects such as confidence, coordination, adaptability, and support. Confidence in the sense that it is the team's belief in their ability to cope with and overcome challenges; coordination in the sense that teams are expected to work together effectively and efficiently, even in the face of adversity; adaptability in the sense that teams have the capacity to adjust and respond to unexpected events or disruptions; and support in the sense that social and emotional resources available within teams can facilitate interpersonal relationships and a supportive team environment. As a result, it should come as little surprise that athletes on teams with more resilience also reported higher levels of togetherness and confidence following setbacks.

Team Stressors

With respect to the nature of stressors that teams may face, research in this area is sparse. When these have been mentioned in the literature, this has primarily occurred in the introductions of papers to provide context for the investigation of team resilience. For example,

in their study of team resilience at major international tournaments, Kegelaers et al. (2020) noted injuries, absent players, and trailing the opponent as salient team stressors. While such examples offer validity for the findings reported in Study 2, the breadth of themes emerging from our inductive analysis showed much greater diversity of stressors experienced (e.g., weakened teams, fixture issues, challenging upcoming game etc.). As a result, we now have a more accurate and richer understanding of the stressors teams must deal with. Indeed, a new perspective regarding team stressors outlined here pertains to the temporal nature of these events. In Studies 2 and 3 this related to more acute and chronic team stressors. For example, when a team experiences the loss of a key player due to injury, the timing of this occurrence can significantly impact the overall scenario. The consequences of losing a key player during the preparation phase for an event may differ from the impact it has when it happens during the middle of the event itself.

Drawing from the previously noted issue pertaining to when a team encounters stressors, it is possible to conceptualise which phases of a team's episodic cycles particular team stressors are most likely to occur. In fact, the concept of temporal stages (e.g., transition and action) is also a feature common to both individual resilience and team resilience literatures. Individual resilience studies have explored the effects of resilience in coping with short-term or acute stressors such as strenuous exercise (e.g., Childs & de Wit, 2014) and long-term or chronic stressors such as immunosuppression (e.g., Schetter & Dolbier, 2011). Sports scholars have also emphasised the importance of proactive and reactive forms of athlete resilience (Fletcher & Sarkar, 2013). In the team resilience literature, Alliger et al. (2015) identified three behavioural dimensions: (a) minimise, which involves addressing conditions before a challenge arises as anticipatory control; (b) manage, which refers to how the challenge is handled when it arises; and (c) mend, which focuses on reclaiming resources and team health once the challenge has passed. The integration of temporal stages is a shared characteristic

among these perspectives. Figure 3.5 presents a schematic representation depicting when the multiple stressors identified in Study 2 might be most pertinent for sports teams.

As seen in Figure 3.5, it is possible to conceptualise team stressors into two distinct classes: transitionary and actionary. Certain stressors, such as a weakened team, travel issues, and training issues, are more likely to be transitionary stressors that occur in between and before important events. The weakened team stressor appears to be more transitionary (before) than actionary (during) oriented, as indicated by the larger part of the box covering this area of the episodic cycle. The data collected in Study 2 revealed that sub-theme stressors such as team injuries and health issues occurred primarily before matches. However, more actionary sub-theme stressors such as breaching rules and personal circumstances that are relevant during competitive matches remain applicable. Seemingly, a weakened team can occur due to stressors salient to both transitionary and to a lesser extent actionary phases, hence the extended length of this box compared to other transitionary stressors.

Figure 3.5

Team stressors encountered during sports teams' episodic cycles

Transitionary | Actionary

Weakened Team

Travel / Transportation Issues

Training Issues

Challenging upcoming game

Losing Scoreline

Interpersonal Concerns

Challenging Playing Conditions

Coach / Team Support Issues

Fixture Issues
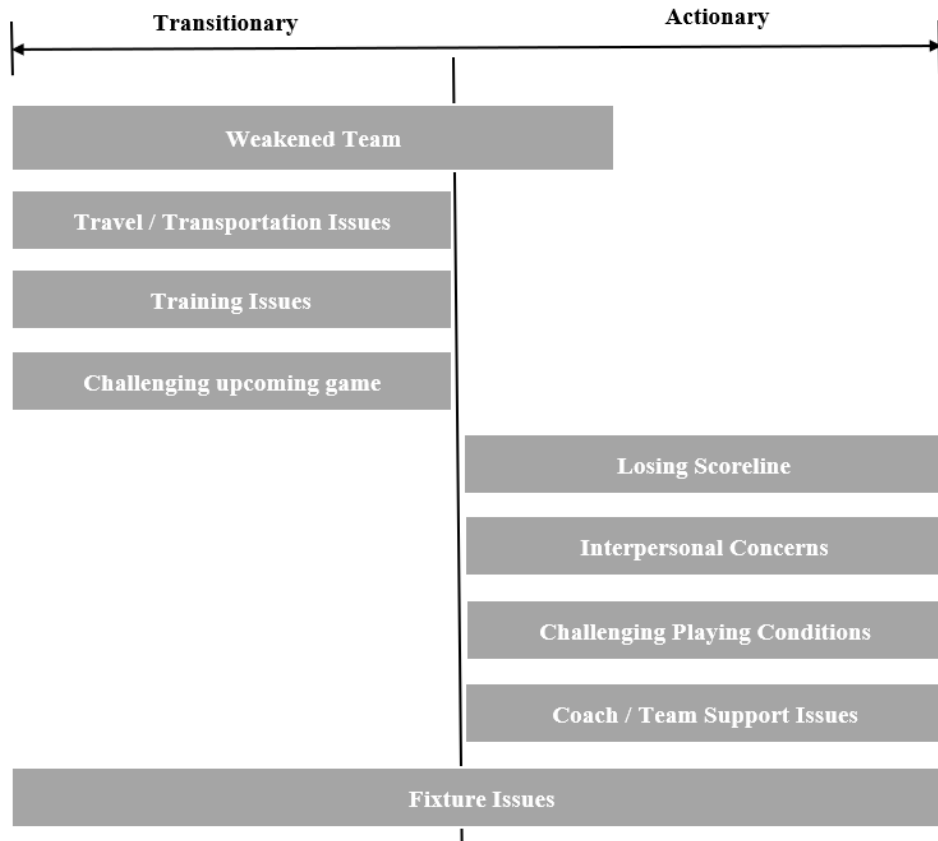
A second class of team stressor related to the actionary phase of the episodic cycle included a losing score line, interpersonal concerns, challenging playing conditions and coach/team support issues. Such stressors were deemed action-oriented as teams can only face issues such as a losing score line and challenging playing conditions during a match. Although interpersonal issues and support issues could conceivably be linked to both actionary and transitionary phases, from the current data collected on this, these were much more likely to occur during a match (e.g., arguing with competitors). The final category of team stressor encompassed both the transitionary and action phases. Fixture issues may initially seem to be primarily transitionary in nature, as conflicts in scheduling, adverse weather conditions, and venue complications are likely to be anticipated ahead of challenging matches. However, they can also be actionary, as technical equipment issues or pitch-related problems within matches can cause delays or even abandonment. Additionally, fixture issues may arise if a team is

unable to field a complete squad due to unforeseeable circumstances, which may necessitate the postponement of a match, or it being played with a disadvantageous number of players.

Overall, Figure 3.5 could be helpful for researchers and coaches in several ways. First, it provides a clear conceptualisation of team stressors, grouping them into three distinct classes based on their likelihood to occur in the transitionary or actionary phases of the team's episodic cycle. This can help researchers to identify the types of stressors that teams are most likely to encounter and develop targeted interventions to address them. For coaches, the schematic representation can be useful in helping them to anticipate and prepare for potential stressors that their team may encounter before and during important events. By understanding the nature of different stressors and their timing, coaches can develop and practice strategies to mitigate their impact and helping their team to cope more effectively.

Despite the above implications for researchers and coaches, the conceptualisation of team stressors may not be universal, and there may be a need to clarify and standardise the way researchers and practitioners understand and categorise different types of stressors. This may involve developing sub-themes for stressors that have various meanings or clarifying the existing themes. Furthermore, the need to reconceptualise team stressors suggests that the current measures of team resilience may not be comprehensive enough to capture the range of stressors that teams can encounter. Therefore, there may be a need to develop a new measure of team resilience that can account for the temporal features associated with the different types of stressors that teams face and the varying degrees of impact they can have on team performance and well-being.

Limitations and Future Research

Inevitably, our findings have some limitations associated with them. The first limitation is that the data collection method relies on retrospective recall, which can be prone to recall biases and inaccuracies. In other words, participants were asked to recall past events,

experiences, or behaviours, which may lead to biased and/or inaccurate data due to limitations in human memory. Employing strategies such as real-time monitoring or observational studies, prospective data collection and validation studies may help reduce recall biases and inaccuracies and provide a more comprehensive understanding of past events or behaviours as they pertain to team resilience. Therefore, future research should supplement their study designs with said approaches to yield more objective data.

The second limitation is that most participants only competed at the recreational level, which may limit the generalisability of the results. Indeed, it might be argued that teams competing at the recreational level do not encounter pressure and adversity. However, the data collected using the new measure of team adversity (with M ~ 4.00 out of a maximum of 5 in both Study 1 and 3) did not provide support for the argument regarding the integration of temporal (i.e., transition and action) stages in team resilience. Despite the teams experiencing a high level of adversity, the results did not align with the expected relationship between adversity and resilience. This suggests that our measure of team adversity did not fully substantiate our proposed hypothesis. However, it is important to consider that higher-level teams, not specifically examined in the studies, may face even greater adversity, which could potentially affect the relationship between adversity and resilience.

An exciting development would be the combining of the two directions for future research, which will contribute to a better understanding of the dynamics between adversity, team resilience, and team outcomes. More specifically, future studies could investigate the relationship between team resilience, team stressors, and team outcomes (e.g., team performance) over an extended period. For instance, researchers could follow several teams over the course of a season, tracking their resilience levels and responses to different stressors whilst measuring performance outcomes. This would provide a more in-depth understanding of how team resilience affects performance and how it evolves over time.

Researchers have suggested that in the context of sports, team resilience during major competition is more related to performance than how well team members get along (Kegelaers et al., 2020; Morgan et al., 2013; 2015), thereby reinforcing our idea. Therefore, conducting future studies may contribute to further insights and address unanswered questions, such as investigating whether higher-level teams facing even greater challenges exhibit different patterns of team resilience. Due the inherent overlap between individual and team resilience, future study designs should continue to remove the influence of individual resilience (as was done in Study 1 and 3) to afford an enhanced understanding of the specific role of team resilience.

Summary

This chapter explored a new forces model of team resilience in the sports context, which was inspired by the current literature (Decroos et al., 2017; Gorgulu et al., 2018; Morgan et al., 2013; Morgan et al., 2015; Morgan et al., 2019; Yang et al., 2020). The chapter presents three studies that investigate the relationship between team resilience, adversity, and team (and individual) outcomes. Study 1 found support for the interaction-based hypotheses between adversity and team resilience, while Study 2 identified nine themes of stressors experienced by sports teams. Study 3 found that team resilience was a significant positive predictor of team cohesion and collective efficacy regardless of whether the stress experienced was acute or chronic. However, there is a need to explore these situations from a more proactive or reactive perspective (cf., Alliger et al., 2015). As a result, this chapter suggests the need for a new measure of team resilience, inspired by the work of Alliger et al. (2015), to have the potential to unravel the complexity of the role of team resilience in the context of adversity.

CHAPTER 4: INITIAL VALIDATION OF THE TEAM RESILIENCE BEHAVIOUR SCALE

Abstract

Chapter 4 focused on the development of the Team Resilient Behaviour Scale (TReBS) to advance research based around the assessment of team resilience in sports. The TReBS fills a gap in the existing literature by providing a comprehensive and reliable measure of team resilience behaviours. The TReBS consists of 20 items grouped into four subscales: Anticipate, Minimise, Manage, and Mend. These items were refined and validated for content, and participants ($N = 242$, $M_{age} = 32.03$, $SD = 8.11$) responded to the items on a 5-point Likert-type scale. The study utilised Bayesian Structural Equation Modelling (BSEM) to evaluate the validity of the TReBS, and the findings supported its factorial validity, internal consistency, construct validity, discriminant validity, and concurrent validity. The TReBS demonstrated internal consistency within subscales, and meaningful relationships with relevant variables such as resilient characteristics, transformational leadership, task cohesion, and collective efficacy. However, future research should continue this validation work focusing on assessing different types of validity, such as predictive validity. These efforts would enhance the understanding and application of the TReBS, allowing it to be utilised in training programmes aimed at enhancing team resilience in various contexts.

Towards a Theoretically Grounded Measurement of Team Resilience in Sports

Understanding the performance of sports teams is a complex endeavour, and existing theorising and empirical research informs us that many factors impact team effectiveness (McEwan & Beauchamp, 2014; Salcinovic et al., 2022). Team resilience has been proposed to be one of these influential team factors (Bowers et al., 2017). We use the definition of team resilience by Morgan et al. (2013) to capture the role of team resilience in sporting contexts, in which they refer to the construct as a "dynamic, psychosocial process that protects a group of individuals from the potential negative effects of the stressors they collectively encounter" (p. 549). In fact, there are many sporting examples where league or cup-winning teams have been able to "grind out" results when not playing particularly well, come back from deficit score lines within matches, or bounce back quickly in time for the next game after difficult defeats. One notable example occurred in the 2005 soccer European Cup final. The soccer team AC Milan went into halftime with a 3-0 lead over their opponents Liverpool, who were not playing well. Suddenly, Liverpool improved their game to score three goals in five minutes to equalise. Both teams held on at 3-3, and penalties were to be taken. Liverpool won the shootout, making it one of the greatest sporting comebacks. Even though team resilience has been viewed as a potential asset for sports teams, it is presently under-researched within sports psychology. One reason for this might the lack of suitable options with regards to measuring team resilience of sports teams.

To date, the sports literature has attempted to characterise team resilience through qualitative approaches. Following interviews with 31 athletes competing in a range of sports such as soccer, rowing, hocky, handball, and futsal, Morgan et al. (2013) identified four important characteristics. First, group structure allows the team to settle differences that affect both psychosocial and physical aspects of group norms and roles. Second, mastery of approaches towards adversity allows teams to share attitudes and actions that support a focus

on team development. Third, social capital allows for caring relationships and high-quality interactions within groups. Finally, collective efficacy allows for shared convictions of a group in its capacity to carry out a task (Morgan et al., 2013). While the purported characteristics of team resilience help describe what resilient teams might look like, they do not provide clarity concerning what resilient teams do or how they respond to adversity. Consequently, it remains unclear what resilient teams do to prepare for stressful events or how they handle adversity. Adopting a behavioural approach to assessing team resilience affords researchers some of the same advantages as those realised in the mental toughness literature (Gucciardi & Gordon, 2009; Hardy et al., 2014).

A second shortcoming is the lack of theoretical support pertaining to the team resilience literature (primarily due to the lack of available frameworks to initially draw from). Inevitably, this is also reflected in the measurement of team resilience (e.g., the CREST). Decroos et al. (2017) developed a 20-item questionnaire that measures the resilience of sports teams and comprises of 2 subscales that reflect a team's ability to demonstrate resilience and vulnerability under pressure. However, due to recent advances in the team resilience literature (e.g., Alliger et al., 2015; Gucciardi et al., 2015), there is an opportunity to further develop research in this area.

Aligned with the theorising of Alliger et al. (2015), we proposed a new measure of team resilience based on three behavioural aspects that resilient teams use to deal with pressures, stressors, and difficult circumstances. That is, their ability to minimise (actions taken at the earliest sign of a problem or before it manifests), (b) manage (actions taken while a problem is occurring), and (c) mend (actions taken after a problem has occurred) strategies. However, to minimise against potential problems, we also utilise a fourth behavioural strategy, "anticipate," which Petit (2022) refers to as "identifying and appraising an upcoming problem." In other words, it may be difficult for teams to minimise upcoming problems if they have not anticipated

they may happen. Based on the resilience research by Sarkar and Fletcher (2014), it is possible to conceptualise these four resilience processes into two broad types, or phases. A proactive phase consisting of anticipating and minimising threats and a reactive phase consisting of managing and mending from adversity.

Proactive Resilience

It is likely that teams high on proactive resilience are likely to frequently use *anticipate* and *minimise* strategies. As such, resilient teams plan and reduce the burden of obstacles, and mitigate the consequences of those that cannot be reduced (Alliger et al., 2015). For example, soccer teams (or more likely the coach) will often research their opponents' strategies, formations, and style of play to find strengths and weaknesses of their opponents and devise strategies (i.e., minimise) to increase the chances of winning. Moreover, resilient individuals may actively anticipate and identify upcoming challenges they must face (e.g., a particularly important match). Losing a game to a fierce rival may be due to poor preparation strategies (training) because the team failed to correctly anticipate the many threats that they faced. Therefore, poor preparation led to poor performance. In short, teams with high levels of proactive resilience quickly identify challenges/threats and develop plans to address them. This may include practicing "what-if" scenarios and preparing for what might go wrong as well as what might go well. This in turn may mitigate the pressure from any threats they may have to react to on the day.

Reactive Resilience

However, when anticipate and minimise strategies have failed (either they were not implemented or important information was missed), difficult situations must sometimes be managed. Consequently, teams who are perhaps low on their use of proactive resilience strategies, often need to utilise managing actions that are taken during a challenge to help the team deal with stressful situations as they arise. For example, in business contexts (Alliger et

al., 2015; Hartwig et al., 2020; Morgan et al., 2017), resilient teams assess challenges in a timely, accurate, and frank manner. They take the time to talk about what is going on, how they are reacting, and what is and is not working. In a sports setting, a player may be playing poorly and impacting the confidence of the team. The manager may have to implement management strategies and substitute the player for a teammate to improve the team's performance and restore confidence in the players. Finally, mending strategies involve recovering from stress, learning from mistakes, and making necessary adjustments. These are the actions taken in the aftermath of a tense situation. For example, in healthcare (Hart et al., 2014) and education contexts (Cavark, 2019), resilient team members are quick to share what they know and seek clarification when they have concerns about the circumstances their team is facing. Finding the areas that require individual or team "recovery" is an essential part of regaining situational awareness. In a sports setting, a team may have played poorly and as a result, lost the game. This may have been down to poor proactive resilient strategies implemented by the coach or poor management strategies during the game. Therefore, going forward, the coach may actively engage in mending strategies and question whether s/he adequately anticipated upcoming threat, managed effectively, and subsequently trained the team accordingly.

Given the theoretically derived research on team resilience (Alliger et al., 2015; Gucciardi et al., 2018; Morgan et al., 2015), it is unfortunate that there is a dearth of such instruments in the team resilience literature, be it in or beyond the sports setting. The present study represents the initial steps towards rectifying this shortcoming by developing a reliable and valid measure of team resilience that considers the temporal nature of the resilience process. To this end, the conceptualisation of team resilience used in the study is largely inspired by the theorising of Alliger et al. (2015). Based on our understanding of the concepts of anticipate, minimise, manage, and mend, which will be the foundation of our new measure of team resilience, the current study sets out to: (a) examine the validity (content, factorial,

criterion, concurrent and discriminant), and (b) test the reliability (e.g., internal consistency) of data derived from our new behavioural measure of team resilience.

Method

The present sample included male ($n = 139$), female ($n = 100$), and non-binary or third gender ($n = 3$) athletes competing in team sports. The sample were derived from netball ($n = 39$), basketball ($n = 15$), football ($n = 125$), and rugby ($n = 18$). All participants were at least 18 years old ($M_{age} = 32.03$, $SD = 8.11$) and competed at various skill levels, including recreational ($n = 206$), county/provincial/state ($n = 20$), and national ($n = 3$).

Measures

Team Resilience

During the study's initial phase, we developed a preliminary list of potential items (total $n = 102$) representing anticipate, minimise, manage, and mend aspects of team resilience. These candidate items were either taken from existing measures of team resilience or developed by the research team. For face validity purposes, we then modified, combined, and removed items as required (e.g., Chen et al., 2016; McEwan et al., 2018; Smith et al., 2008). That is, we made certain that each item reflected one of the four behavioural aspects of team resilience, that the phrasing of items was clear and understandable, and that "double-barrelled" items were avoided. Items with excessively similar phrasing were also removed. This process results in 43 items representing four domains of team resilience: anticipate; 8 items e.g., "My team recognises the importance of approaching stressful events", minimise; 14 items e.g. "In the lead-up to stressful events, my team works well together," manage; 10 items e.g., "When adversity occurs, team members can easily handle a variety of tasks", and mend; 11 items e.g., "After adversity, my team discusses mistakes in a way that we learn from them". See Table 4.1 for full presentation of the items generated.

Table 4.1

Items included for analysis

	Items
Anticipation	1. Our team recognises the importance of future stressful events 2. Our team displays good awareness of upcoming challenging events. 3. Team members ask relevant questions about potentially stressful situations. 4. Our team anticipates when critical events might be stressful 5. Our team anticipates potential threats to success ahead of time. 6. Our team picks up on potential barriers to performing well. 7. In the build-up to critical events our team anticipates the challenges we might encounter. 8. Team members are vocal in pointing out their concerns about upcoming stressful events.
Minimise	1. In preparation for challenging events, team members engage with the tasks that are set out for them. 2. Our team works well together, in the lead-up to stressful events. 3. In the build-up to stressful events, our discussions identify solutions to some of the challenges we might encounter. 4. Our team practices coping with situations that potentially problematic. 5. Our team discusses preparation strategies for upcoming stressful events. 6. Our team leaves no stone unturned when preparing for critical events. 7. Team members support each other before important challenging events. 8. In the run up to challenging situations, team members offer solutions to potential problems. 9. Leading up to potentially future situations, our team thoroughly discusses its readiness to perform. 10. In the run up to challenging events, our team thoroughly discusses its weaknesses. 11. Leading up to stressful events, our team practices dealing with "what if" situation. 12. Team members offer advice to each other when challenges are looming. 13. In the run up to stressful events, our team maximises their efforts to reduce the impact of identified stressors. 14. Team members maintain emotional control concerning important upcoming challenging events.

Manage	1. During pressurised situations, our team gets the basics right 2. When adversity occurs, team members easily handle a variety of tasks. 3. When our team is under pressure team members are able to maintain effective role performance. 4. Teamwork is maintained under stressful situations 5. During stressful situations team members effectively communicate with one another. 6. When things are going wrong team members support each other. 7. When experiencing pressure, the level of collective effort in the team drops (Reverse coded). 8. Team members remain composed in the face of adversity. 9. Under challenging circumstances, our team quickly makes real-time adjustments. 10. Our team responses well to changing circumstances.
Mend	1. After making mistakes, our team discusses them in a constructive manner. 2.Our team addresses mistakes that occur during stressful events 3. Even when a mistake is caught in time, the event is still discussed in depth by our team. 4. After challenging events, differences between actual and expected performance are constructively analysed by our team. 5. After poor team performances, our team discusses the situations we failed to anticipate. 6. After successful performances we discuss what we could have done better. 7. Our team maintains effective communication after poor performances. 8. Our team responds positively to failure. 9. After stressful events, it takes a long time for our team to learn from its experiences. 10. After encountering stressful events, our team critically discusses our preparation strategies. 11. After poor performances, our team quickly implements new strategies.

Item Refinement and Content Validity

We assessed the content validity of these items using a procedure like that described by

MacKenzie et al. (2011). Three external sport and exercise psychologists (independent of the

research team) with expertise in resilience, measurement development, and competing in or

coaching team sports, evaluated how well each item matched its associated definition of team

resilience (i.e., anticipate, minimise, manage, and mend) using a 7-point Likert scale (1 = poor

match to 7 = excellent match) as well as how well the participants matched the item to its

associated definition (1 = extremely unclear to 7 = extremely clear). Scores received generally, provide support for the items. However, for items that received scores of 4 or less we paid particular attention to because they seem to be not clear or not a good match to the construct as intended. Written feedback was also provided which further aided our refinement efforts. For example, the item "My team recognises the importance of approaching criterial events" was edited to "Our team recognises the importance of future stressful events" whereas "After challenging events, my team discusses mistakes" was refined to become "After making mistakes, our team discusses them in a constructive manner."

Before responding to the items, members of sports teams read a brief instructional introduction that indicated we were interested in their perceptions of how their team generally behaves and deals with not only upcoming stressful events but how they manage and recover from difficult events. Participants then responded to the items via a 5-point Likert-type scale ranging from *1 (Never)* to *5 (Always)*, with a midpoint of *3 (Sometimes)*. We used a 5-point Likert-type scale to enhance the response quality, reduce the respondents' level of frustration when answering the questions, and to increase the number of valid responses (Babakus & Mangold, 1992).

The Characteristics of Resilience in Sports Teams

The Characteristics of Resilience in Sports Teams Inventory (CREST; Decroos et al., 2017) is a 20-item questionnaire that measures the resilience of sports teams. It consists of two subscales that reflect the team's ability to demonstrate both resilient characteristics (e.g., "team members fought for each other") and vulnerability under pressure (e.g., "the level of collective effort in the team dropped"). We used the resilient characteristics (DRC) subscale because examining team resilience requires the consideration of the social and environmental factors that affect teams, and the resources that teams can use together (Yukelson & Weinberg, 2016). The participants respond using a seven-point Likert scale (1 = *strongly disagree* to 7 = *strongly*

agree). With a Cronbach coefficient of α = .89 for the current sample, researchers have provided evidence to support the reliability and validity (e.g., factorial validity) of the CREST, which has been translated and used successfully in several languages/cultures.

Team Cohesion

The Group Environment Questionnaire (GEQ; Eys et al., 2007) is an 18-item questionnaire designed to assess four aspects of team cohesion: individual attraction to the group (social), individual attraction to the group (task), group integration (social), and group integration (task) (task). We used the GEQ's positively worded version (Eys et al., 2007). Only items from the group integration (task) subscale were distributed because team resilience is goal-oriented, whereas sports teams are task-oriented, and our aim was to evaluate team level outcomes. This subscale includes five items (e.g., "Our team members have consistent aspirations for the team's performance") that are responded to on a 1-9 Likert scale (1 = *Strongly Agree* to 9 = *Strongly Disagree*). Previous research has found links between task cohesion and its theoretical correlates such as transformational leadership, such that GEQ data have been found to support its validity (Callow et al., 2009). This subscale appeared to be a reliable measure of task cohesion in our sample (Cronbach α = 83).

Collective Efficacy

The Collective Efficacy Questionnaire for Sports (CEQS; Feltz & Lirgg, 1998; Short et al., 2005) was used to assess team efficacy. The 20-item measure is divided into five subscales: team ability, unity, perseverance, preparation, and effort. Athletes are asked the following: "Rate your team's confidence that your team has the ability to (*insert item*) in terms of the upcoming game or competition". Items are scored on a scale of 0 to 10, with 0 representing the *least confident* and 10 representing *extremely confident*. The present study used the 4-item preparation scale (e.g., "Physically prepare for this competition") with a Cronbach coefficient of α = .89 and the 4-item persistence scale (e.g., "Persist when obstacles

are present") with a Cronbach coefficient of $\alpha = .88$. Glenn (2003) provided support for the validity of the CEQS measure.

Transformational Leadership

Carless et al. (2000) developed the Global Transformational Leadership (GTL) scale to assess transformational leadership. With a Cronbach coefficient of $\alpha = .89$ for the current sample, the GTL contains seven items (e.g., "My coach inspires me by being highly competent and instils pride and respect in others") and has been found to have a high degree of convergent validity with more established and lengthy questionnaires such as the MLQ and the LPI (Carless et al., 2000). The GTL response scale ranges from 1 (*rarely or never*) to 5 (*this happens quite frequently, if not always*).

Procedure

After receiving approval from Bangor University's School of Human and Behavioural Sciences Ethics Committee, data were collected using the Prolific website, a service for distributing questionnaires to specific participant groups, such as athletes. Participants were required to complete the survey, which was made available online via Qualtrics, a cloud-based platform for developing and presenting web-based surveys. The inclusion criteria used to recruit our athlete participants were that the sample consisted of both male and female athletes, over the age of 18 years, participating in team sports, performing at recreational, provisional/state, national, and international levels, and spoke English as a first language. Participants were informed that electronic consent was required and that their information would be kept private and confidential. After reading an information sheet, participants consented to take part in the study.

For the current project, we proposed a sample to assess factorial and concurrent validity in which we asked participants to complete five questionnaires consisting of our Team Resilient Behaviour Scale (TReBS), CREST, Transformational leadership, The Group Environment

Questionnaire, and the Collective Efficacy Scale. The questionnaire packages for each sample took approximately 20 minutes to complete. Attentional check items (e.g., It is important that you pay attention in this study. Please tick '1 strongly disagree') were added to enable us to remove participants who were not appropriately engaged in the completion process.

Data Analysis

To conduct a confirmatory factor analysis using a Bayesian approach, we used Bayesian Structural Equation Modelling (BSEM) which allows for a less restrictive maximum likelihood analysis that better reflects substantive theories (Muthén & Asparouhov, 2012). Rather than treating parameters as constants, BSEM views them as variables with a mean and distribution of values, which permits informative priors on cross-loadings and residual correlations with small variances within a specified model. The variance is set a priori, and researchers can specify a small variance to imply that estimates are close to zero. Muthén and Asparouhov (2012) discuss how BSEM can be a useful tool for conducting confirmatory factor analyses. Niven and Markland (2015) also mention how BSEM can be used to specify priors and set variances to better reflect the underlying theory.

Following Niven and Markland's (2015) recommendations we estimated three different Bayesian Structural Equation Modelling (BSEM) models for the Team Resilient Behaviour Scale (TReBS). We set the prior variance for cross-loadings and residual correlations at ±.01 in our analyses, which corresponds to factor loadings and residual correlations with a 95% limit of ±.20. This indicates relatively small cross-loadings and residual correlations (Muthén & Asparouhov, 2012). To assess the stability of the parameter, we performed a sensitivity analysis by adjusting the variance of the chosen priors, following the recommendations of Muthén and Asparouhov (2012) and Niven and Markland (2015). As a result, the final models were rerun with smaller (0.005), and larger (0.015) prior variances and divergence estimates were compared with those obtained with a prior variance of 0.01. The results showed that the model

fit indices remained stable and there is no difference between the groups. We estimated all models using the Markov Chain Monte Carlo algorithm with the Gibbs sampler and two chains to ensure convergence on stable estimates. We used 100,000 iterations to check for convergence and stability. To assess model fit, we used posterior predictive checks to compare the model to observed data, including the likelihood χ^2 test and associated posterior predictive p-value (PPp). A well-fitting model should have a PPp near 0.50 and a symmetric 95% credibility interval for the difference between the observed and replicated χ^2 centred around zero (Muthén & Asparouhov, 2012).

We also examined items for factor validity and checked for any items consistently escaping their priors and their overall model fit using the criteria mentioned above. The composite reliability coefficient was used to assess the internal consistency of the TReBS subscales (Fornell & Larcker, 1981). The obtained latent variable correlations were used to investigate the relationships between the TReBS subscales. For convergent and construct validity reasons we also determined bivariate correlations to investigate the relationships among the TReBS subscales and theoretically relevant external measures.

We therefore hypothesised that data from all subscales of the TReBS would be positively related with transformational leadership, team cohesion and CREST. There were also specific hypotheses regarding the relationship with collective efficacy, focusing on different dimensions of the TReBS framework. It was expected that the Anticipate and Minimise subscales of TReBS would exhibit a positive correlation with the preparation subscale of collective efficacy. Conversely, it was hypothesised that the Manage and Minimise subscales would demonstrate a positive correlation with the persistence aspect of collective efficacy.

Results

Factorial validity

The objective of the BSEM was twofold: first, to assess the suitability of our new questionnaire's model fit and factor structure; and second, to gather supplementary data that would assist in eliminating items and creating a more practically relevant questionnaire. Consequently, we examined the items' fit and theoretical underpinning to identify items that could be removed. As part of the initial step, items with the lowest factor loadings were eliminated from the 43-item model. A factor loading greater than .60 has historically been considered very good, while a factor loading greater than .70 has been considered excellent (Comery & Lee, 1992). However, according to Ford et al. (1986), loadings above .40 are acceptable. Initial results found a poor fit for the 43-item model, therefore items with factor loadings exceeding .60 were retained, resulting in the removal of 21 items: three Anticipate items (.51–.57), eight Minimise items (.47–.58), four Manage items (-.07–.56), and six Mend items (-.07–.59).

For example, some items had relatively low standardised factor loadings (e.g., item 7 of the Manage subscale, *When experiencing pressure, the level of collective effort in the team drops*, had a negative standardised factor loading) because it was reverse scored item that might led to some confusion for certain participants, while others significantly loaded above the prior's tolerance (e.g., item 3 of the Mend subscale, *Even when a mistake is caught in time, the event is still discussed in depth by our team*). We examined each of the particularly problematic items individually, assessed the quality of the question based on the underlying construct, and removed items where appropriate. For example, item 12 of the Minimise subscale (*Team members offer advice to each other when challenges are looming*), was removed due to ambiguity about this item, namely due to what type of advice being given was vague and unspecified. Within the measurement development literature, such item removal is common

and accepted practice, provided it is accompanied by theoretical and statistical justification (e.g., Markland, 2007). As a result, the scale was condensed to a 20-item version.

As expected, the third and least restrictive model (which employed informative priors for major loadings, informative approximate zero cross loadings, and estimated residual correlations) displayed superior fit for the 20-item version of the scale. Table 4.2 illustrates the overall fit for the initial and revised versions of the scale, with the PPp value indicating a poorer fit for the first two model types, with the third model's PPp value exceeding .5 and relatively symmetrical CIs.

Table 4.2

BSEM fit and model convergence for the (TReBS) scale

Model		Difference between observed and replicated χ^2 95% CI			
	No. free parameters	PPP	Lower 2.5%	Upper 2.5%	PSR
TReBS 43 item.					
Non-informative 654.192 1.00	135	0.000		451.90	
Informative priors (cross loadings) N/A	N/A	N/A	N/A		N/A
Informative priors (cross-loadings + residual 90.237 1.01 correlations)	1167	0.812		-171.303	
TReBS 20 item.					
Non-informative	66	0.007	11.984	112.128	1.00
Informative priors (cross loadings)	126	.060	-10.245	94.250	1.01
Informative priors (cross-loadings + residual correlations)	316	.594	-67.443	53.496	1.01

The items' standardised factor loadings and 95% credibility intervals (in brackets) for the 20-item TReBS are shown in Table 4.2. Each item strongly loaded on its corresponding factor. The smallest loading in the present study was .65 which represents a strong loading

(Muthén & Asparouhov, 2012). As can be seen in Table 4.3, there were no concerns regarding the cross loading of items in the 20-item model.

Table 4.3

TReBS standardised factor loadings (20-item version)

Item	Anticipate	Minimise	Manage	Mend
Our team recognises the importance of future stressful events.	**0.71 (.38,.1.0)**	0.00 (-.19,0.1)	-0.02 (-.20,.16)	-0.01 (-.19,.16)
Team members ask relevant questions about potentially stressful situations.	**0.69 (.36,1.0)**	0.03 (-.17,.23)	-0.02 (-.20,.14)	-0.01 (-.19,.17)
Our team anticipates when events might be stressful	**0.73 (.44,.1.0)**	0.03 (-.16,.23)	0.02(-.15,.19)	-0.00 (-.18,.17)
Our team picks up on potential barriers to performing well	**0.65 (.32,.96)**	0.01 (-.18,.21)	0.02 (-.16,.19)	0.04 (-.14,.22)
Team members are vocal in pointing out their concerns about upcoming stressful events.	**0.68 (0.34,.98)**	-0.03 (-0.2,.15)	0.02 (-.15,.20)	0.02 (-.15,.22)
Our team practices coping with situations that are potentially problematic.	0.01 (-.18,.20)	**0.75 (.46,.1.0)**	-0.03 (-.21,.13)	0.00 (-.17,.17)
Our team leaves no stone unturned when preparing for stressful events.	0.05 (-.15,.24)	**0.69 (.39,.98)**	0.02 (-.15,.19)	0.02 (-.15,.20)
In the run up to challenging situations, team members offer solutions to potential problems	0.03 (-.16,.23)	**0.70 (.37,1.0)**	0.00 (-.17,.18)	-0.03 (-.21.,14)

In the build-up to stressful events, our discussions identify solutions to some of the challenges we might encounter	-0.01 (-.20,.18)	**0.72 (0.42,1.0)**	0.02 (-.15,.19)	0.01 (-.17,.18)
In the run up to stressful events, our team maximises their efforts to reduce the impact of identified stressors	-0.02 (-.22.,16)	**0.75 (0.44,.19)**	0.01 (-.13,.22)	0.01 (-.16,.19)
During pressurised situations, our team gets the basics right	-0.01 (-.19.,16)	-0.02 (-.20,.16)	**0.65 (.31,.95)**	-0.02 (-.21,.17)
When adversity occurs, team members easily handle a variety of tasks	0.02 (-.15,.28)	0.02 (-.16,.20)	**0.67 (.38,.96)**	0.05 (-.13,.23)
When our team is under pressure team members are able to maintain effective role performance	0.03 (-.14,.21)	0.04 (-.13.,21)	**0.70 (.43,.96)**	0.00 (-.17,.18)
Team members remain composed in the face of adversity	-0.04 (-.22,.13)	-0.03 (-.21,.14)	**0.78 (.47,1.0)**	-0.03 (-.21,.21)
Our team responds well to changing circumstances	0.01 (-.14,.21)	0.00 (-.18,.17)	**0.72 (.45,1.0)**	0.03 (-.15,.21)
After making mistakes, our team discusses them in a constructive manner	-0.03 (-.21,.14)	-0.02 (-.14,.20)	0.01 (-.17,.19)	**0.78 (.49,1.0)**
Even when a mistake is caught in time, the event is still discussed in depth by our team	0.02 (-.15,.19)	-0.02 (-.20,.15)	-0.00 (-.18,.17)	**0.78 (.53,1.0)**
After challenging events, differences	-0.07 (-.18,.16)	0.00 (-.17,.18)	0.03 (-.15,.20)	**0.72 (.44,.98)**

between actual and expected performance are constructively analysed by our team			
After poor team performances, our team discusses the situations we failed to anticipate	-0.04 (-.14,.22) -0.03 (-.14,.21) -0.05 (-.23,.22) **0.70 (.34,.94)**		
After encountering stressful events, our team critically discusses our preparation strategies	0.04 (-.14,.22) 0.03 (-.14,.21) 0.05 (-.13,.22) **.65 (.37,.94)**		

Subscale Internal Consistency and Descriptive statistics

Table 4.3 displays the composite reliabilities, inter-factor correlations, as well as means and standard deviations of the four subscales of the TReBS. The composite reliability of all subscales was acceptable, exceeding .70. The mean scores were relatively high for each subscale as the mean scores ranged from 3.43 to 3.57 (out of a maximum of 5). These scores were somewhat different in the mean score of the CREST, which was 3.5 (out of a maximum scale of 7).

Construct and Discriminant Validity: Relationships among TReBS subscales

For the TReBS, all subscales of Anticipate, Minimise, Manage, and Mend were positively correlated with each other (see Table 4.4). Close inspection of the upper bound estimates of the 95% CIs reported in Table 4.4 provided information about the discriminant validity of the TReBS' subscales. Given that none of the upper bound values exceeded 1.0 this suggested the moderate to large correlations found were not excessive, indicating that each factor was distinct. Offering further support for the construct validity of the TReBS, the relationship between the respective proactive behaviours of team resilience (i.e., anticipate and

minimise) was particularly strong and positive (as might be expected). Similarly, the second highest association (although very marginal) was between the two subscales representing the more reactive form of team resilience (i.e., manage and mend).

Table 4.4

Means, SDs, Composite Reliabilities (CR) and Inter-factor correlations, and Confidence Intervals for the TReBS

	M	SD	CR	Anticipate	Minimise	Manage	Mend
			.85			.58(37,.73)*	
Anticipate	3.54	0.64	.87		.78(.63,.87)*	.60(.41,.75)*	.63(.37,.73)*
Minimise	3.43	0.70					.64(.45,.77)*
Manage	3.57	0.56	.85				
Mend	3.54	0.69					.65(.46,.78)*
			.88				

Note: * significant at *p* < .01

Concurrent Validity: Existing measure of team resilience

In relation to CREST measure of demonstrate resilient characteristics subscales, the results showed weak positive but significant relationships for the TReBS subscales *r* = .21 - .27 (see Table 4.4).

Concurrent Validity: Relationships between TReBS and other relevant constructs.

Table 4.5 shows the correlations among the TReBS subscales, and the external measures completed. It was hypothesised that all subscales of the TReBS would be positively related to the transformational leadership; the results confirmed the presence of moderate to large significant positive correlations (*r* = .41 - .57).

It was also hypothesised that all subscales of the TReBS would be positively related to task cohesion. These expectations were supported as all subscales of TReBS demonstrated moderate to large significant positive correlations with task cohesion (*r* = .49 - .64).

Finally, we hypothesised that the Anticipate and Minimise subscales of TReBS would be significantly and positively correlated to CE preparation; with the results confirming this prediction (*r* = .59 - .62). Moreover, we expected that the Mange and Minimise subscales of

TReBS would be positively and significantly correlated with CE persistence. Again, correlations found provided support for this theorising *(r = .60 - .70)*.

Table 4.5

Concurrent Validity of Bivariate Correlations, TReBS Subscales and the other Measures

	CREST	TL	Cohesion	CEpersistence	CEpreparation
Anticipate	.27**	.41**	.49**	.59**	.62**
Minimise	.26**	.49**	.53**	.54**	.59**
Manage	.21**	.52**	.63**	.70**	.63**
Mend	.21**	.57**	.64**	.60**	.65**

Note: CREST: Characteristics of Resilience in Sports Teams Inventory, **TL** = Transformational Leadership, **Cohesion**: Task Cohesion via GEQ, **CEpersistence** and **CEpreparation**: Collective Efficacy
** *p* < .01

Discussion

Chapter 4 focused on the development of a measurement tool called the Team Resilient Behaviour Scale (TReBS) to assess team resilience in sports. We argue that while team resilience is considered an important factor in sports team performance, it has been under-researched in sports psychology due to the lack of suitable measurement options. The existing literature has mainly relied on employing quantitative approaches to characterise team resilience (Hartwig et al., 2020). We proposed a new behavioural approach broadly couched with Alliger et al.'s (2015) framework that assessed four behavioural strategies: anticipate, minimise, manage, and mend. These strategies represent the proactive and reactive phases of team resilience. Proactive resilience involves anticipating and minimising threats, while reactive resilience involves managing and mending after adversity. Hence, a redeeming feature of this study was successfully showing that anticipate is an important standalone variable (separate from minimise) and supports existing research for proactive and reactive resilience processes.

We used the Bayesian Structural Equation Modelling (BSEM) to evaluate the Team Resilience Behaviour Scale (TReBS) offering significant advantages in assessing its validity as a tool for measuring team resilience behaviours. BSEM provides valuable insights due to its flexible modelling capabilities, ability to evaluate model fit, estimation of uncertainty and assessment of construct validity. These features enhance the usefulness of the TReBS as a comprehensive measure of team resilience behaviours. The use of BSEM in evaluating the TReBS also enhanced the rigor and comprehensiveness of the analysis, providing valuable insights into the validity and usefulness of the scale for assessing team resilience behaviours. The findings of the BSEM analysis, which supported the factorial validity of the TReBS (Muthén & Asparouhov, 2012), indicate that the scale accurately represents the underlying structure of team resilience behaviours. The strong factor loadings further support the robustness of the items in the TReBS as indicators of their respective factors.

The assessment of internal consistency, as measured by composite reliability, demonstrated that the TReBS subscales exceeded the acceptable threshold of 0.70 (Fornell & Larcker, 1981). This suggests that the items within each subscale consistently measure the same construct, indicating good internal consistency for the overall scale.

Construct validity was evaluated through the examination of correlations between the TReBS subscales, such as Anticipate, Minimise, Manage, and Mend (Alliger et al., 2015). The positive correlations between these subscales provide evidence that they measure related aspects of team resilience. Additionally, the upper bound estimates of the 95% confidence intervals showed that the correlations were not excessive, offering some support for discriminant validity. This demonstrates that the TReBS subscales are distinct from one another and measure different but related constructs.

Concurrent validity was assessed by examining the relationships between the TReBS subscales and other relevant variables, including the demonstrate resilient characteristics

subscales of the CREST, transformational leadership, task cohesion, collective efficacy (CE) persistence, and CE preparation (Decroos et al., 2017; Carless et al., 2000; Eys et al., 2007; Feltz & Lirgg, 1998; Short et al., 2005). The weak to moderate positive correlations observed between the TReBS subscales and these variables provide support for the concurrent validity of the scale.

The correlations between the proactive behaviours, Anticipate and Minimise, of team resilience were strong and positive. Furthermore, the unexpected stronger relationships between Managing and Mend with CE preparation compared to Anticipated and Minimise suggest interesting patterns that warrant further exploration. It highlights the need for further exploration and understanding of the nuanced connections between team resilience and collective efficacy in order to gain a comprehensive understanding of their interplay and potential impact on team dynamics.

In summary, the study provided initial evidence for the factorial validity, internal consistency, construct validity, and concurrent validity of the TReBS. To date, the 20-item version of the scale demonstrated satisfactory psychometric properties. However, it is important to note that these findings were specific to our sample, and further validation research is needed to assess the scale across different populations and settings, thereby suggesting a revision to the scale. Nevertheless, the data collected using the TReBS is promising and have provided valuable insights into the conceptualisation and measurement of team resilience. However, there are several limitations that need to be acknowledged. Future research directions should also be considered to address these limitations. This will further enhance the understanding and application of the TReBS.

One of the primary limitations of this study is the lack of a confirmatory stage in examining the factor structure of the questionnaire. The exploratory nature of the present study limits the validation of the questionnaire's factor structure to a single sample. To better establish

the reliability and validity of the TReBS, it is crucial to conduct a confirmatory stage using an independent sample (Flora & Flake, 2017). This would involve testing the 20-item questionnaire and its four-factor structure to validate the findings and testing the generalisability of the results (e.g., producing factorial validity findings and investigating discriminant and divergent validity associated with data collected using the TReBS, Brief Team Resilience Scale, Single-Item Narcissism Scale, The Ten Item Personality Inventory, and the Mental Toughness Index). However, due to current time constraints within this PhD timeframe, we did not have the opportunity to validate our findings and test the generalisability.

Another limitation that applies to some of the data we collected is that it comes from the same source, the player. This increases the chance of introducing common method bias that inflates the strengths of correlations reported between the TReBS subscales and other measures. To counter this limitation, future studies should employ multi-source data collection involving coaches, teammates, and observers to provide a comprehensive understanding of team resilience. This would help to minimise bias and yield more accurate assessments of relationships (Little, 2013). Additionally, utilising a longitudinal design would enable data collection at different time points, capturing changes and dynamics over time (Creswell & Creswell, 2018). This approach would help mitigate common method bias and provide insights into the stability and reciprocal relationships between TReBS subscales and other measures.

Future research directions can also contribute to advancing the understanding and application of the TReBS in several ways. One important aspect is assessing the test-retest reliability of the TReBS to determine the stability of questionnaire scores over time (Decroos et al., 2017). By administering the TReBS to the same group of participants on separate occasions, with a time interval in between (e.g., 2-4 weeks), researchers can examine the consistency of scores and evaluate the temporal stability of team resilience as measured by the TReBS. A high test-retest reliability coefficient would indicate that the TReBS reliably

measures team resilience behaviours over time, suggesting that the scores are not significantly influenced by situational or temporary factors. This assessment would enhance confidence in using the TReBS for longitudinal studies, allowing researchers to track changes in team resilience and evaluate the effectiveness of interventions or training programs aimed at enhancing team resilience. Therefore, it would be particularly valuable for researchers investigating longitudinal research questions related to team resilience.

Another important future research direction is to investigate inter-rater reliability. This would involve assessing the consistency of ratings or scores provided by different raters, such as coaches, captains, or players. Understanding whether different raters perceive and assess team resilience in a consistent manner would enhance the applicability and reliability of the TReBS, particularly in applied settings where multiple raters may be involved. For instance, this might mean that relatively efficient and user-friendly data collection methods could be utilised such that only a selected subset of team members (e.g., player leadership group) might be required to complete the measure.

Furthermore, investigating the external validity of the TReBS is crucial for understanding its generalisability across different populations and contexts. Administering the questionnaire to teams from various sports or different organisational settings and even wider range of athletes (we largely focused on recreational athletes) would allow researchers to examine the extent to which the measure applies and holds true in diverse contexts.

Future research should also focus on gathering data that provides a more comprehensive evaluation of the questionnaire's validity. This could involve assessing different types of validity, such as predictive validity, construct validity, or criterion validity, to ensure a robust evaluation of the TReBS, which we did not have the opportunity to conduct. Predictive validity can assess the extent to which team resilience measured by the TReBS can predict future outcomes, such as the achievement of long-term goals. Construct validity examines how well

the TReBS measures the theoretical construct of team resilience, providing evidence of its accuracy. Criterion validity involves evaluating the TReBS against established criteria or benchmarks related to team effectiveness and performance (Zumbo & Chan, 2014). By conducting comprehensive validity evaluations, future research can identify the aspects of team resilience that are most important in predicting long-term goal achievement, team effectiveness, and team performance, further enhancing our understanding of the construct and its practical applications.

Lastly, while it may be too soon in the validation process to make firm practical recommendations concerning the use of the TReBS, it is worthwhile offering a flavour of some of its potential applied implications. In the future it may be possible to utilise data from the TReBS to propose training programmes aimed at enhancing team resilience. For instance, by analysing the scores on different TReBS subscales, teams and organisations can identify specific areas of strength and weakness in their resilience behaviours. This information can then be used to tailor training programmes (e.g., anticipate would lead to building a stronger foundation of mental and strategic preparedness, promoting resilience and enhancing team performance under pressure during actual competitive events; minimise would lead to better training behaviours and supports skill development, team cohesion, and confidence building, while also promoting adaptability, learning from mistakes, and stress management) that target the identified areas for improvement, ultimately enhancing team resilience and eventually, overall performance (e.g., manage leading to improving performance stats of team players, and feedback can collectively contribute to building a resilient team that can effectively manage stress and perform at their best in high-pressure competitive settings; mend can foster a culture of continuous improvement, growth, and resilience, as well as learning from mistakes, providing constructive feedback, embracing a growth mindset, and creating a supportive team atmosphere). The TReBS serves as a valuable tool in this process by providing a reliable and

valid measure of team resilience behaviours, enabling organisations to assess, monitor, and develop strategies to foster resilience in their teams. Given the importance of evidence-based practice, applied researchers should conduct investigations that align with these types of real-world applications.

In conclusion, our findings indicate that the 20-item TReBS is a valid tool for assessing team resilience behaviours. It demonstrates good factorial validity, internal consistency, construct validity, discriminant validity, and concurrent validity. The scale demonstrates acceptable internal consistency, measures related aspects of team resilience, is distinct from other constructs, and exhibits meaningful relationships with relevant variables, further establishing its validity in assessing team resilience behaviours. Hence, these findings contribute to a better understanding of team resilience and provide a reliable instrument for measuring and studying this construct in various contexts.

CHAPTER 5: GENERAL DISCUSSION

General Discussion

The general discussion and concluding section of this thesis provides a concise overview of the research inquiries and outcomes outlined throughout the systematic literature review and empirical chapters. It also explores the findings from the perspective of theoretical and practical viewpoints. This analysis encompasses an evaluation of the thesis' strengths and limitations, along with potential avenues for future research.

Summary of Findings

Chapter 1 provides a theoretical foundation for the entire thesis, providing coverage of individual and team resilience conceptualisations as well as the measurement of team resilience. The chapter also includes a brief review of influential team resilience studies conducted in the sports setting and culminates in a thorough discussion of the thesis' purpose and structure. This sets the stage for Chapter 2, which plays a crucial role in identifying and addressing the theoretical gaps in the existing team resilience literature and leads to the development of a new measure of team resilience.

Chapter 2 investigated the essential characteristics and correlates of team resilience across four performance domains: the workplace, healthcare, education, and sports settings. The chapter reviewed the existing measures of team resilience found in the literature, which later inspired us to develop our own measure as we found a lack of theoretical alignment regarding an effective measure of team resilience in the sports context. A systematic review was conducted, analysing 16 relevant studies obtained from five electronic databases. The majority of these studies focused on the workplace and sports settings.

The quality assessment of these studies highlighted both strengths and areas for improvement across the performance domains. Overall, quality of the literature was deemed good, indicating a satisfactory standard of research. Researchers in the work/business setting demonstrated strong presentation of results, while the sports setting exhibited higher-scoring

introduction criteria and superior qualitative research compared to the business setting. These examples of good practice in both contexts provide valuable insights for future research. However, the presence of varied bias scores suggests a lack of consistency in their quality across studies. In particular researchers in the work/business setting struggled to develop comprehensive discussions, and there is a need to strengthen the methodology and discussion sections in both work/business and sports studies. Additionally, despite strong presentation of results, the critical reporting of findings in relation to existing literature and lack of bias in them appears to be lacking, particularly in work and sports related studies. These critical points highlighted areas for improvement in order to enhance the overall rigor and impact of research in these domains.

Next, from a total of 52 different correlates, antecedents and consequences were identified and categorised into cognitive, motivational, behavioural, affective, and group characteristics. Among these, behavioural correlates had the highest number of associations. The review also revealed the presence of nine measures of team resilience, with the CREST measure being the most established and widely used (Decroos et al., 2017). A feature of the team resilience research literature was the presence of limited knowledge exchange and integration of findings across performance domains, particularly in the sports domain.

Chapter 3 proposed our "forces model", which aimed to bridge some of identified gaps in team resilience literature via a rigorous empirical investigation that applied a multi-method approach combining qualitative, quantitative, experimental and measure development study designs to focus on the domain of sport. The chapter delved into the complex dynamics between team adversity, stressors, and resilience, examining their independent and interactive effects. This examination was conducted through a series of three interconnected studies, each contributing to a more developed understanding of the role of team resilience in relation to team stressors. Study 1 examined the interplay between team adversity and team resilience,

shedding light on their complex (i.e., independent and/or interactive) relationship with emergent states (e.g., team cohesion). Study 2 further expanded the investigation by categorising and classifying various types of team stressors, providing a nuanced perspective on the diverse challenges encountered by sports teams. Building upon the insights gained from Studies 1 and 2, the purpose of Study 3 was to delve deeper into the role of team resilience in managing common team stressors while also considering the temporal aspects of these stressors, specifically distinguishing between acute and chronic phases. Study 3 stood out as a unique component of the chapter, as it employed an experimental design to systematically examine the effects of two vignettes representing acute and chronic stress conditions. By manipulating these stress conditions within teams' episodic cycles, we aimed to evaluate their impact and carefully assess the effectiveness of the vignettes. The findings from this study provided insights into the dynamics of stress within team settings, contributing to a comprehensive understanding of team resilience and its implications.

Study 1 supported the hypothesis that the interaction between adversity and team resilience influences team cohesion. Study 2 identified nine distinct themes of stressors experienced by sports teams such as, acute, and chronic stressors, which were then examined in Study 3. The final study revealed that team resilience significantly predicted emergent states such as independent and interactive effects involving team adversity, regardless of whether the stressors were acute or chronic. This showed that team resilience can have a beneficial impact on group dynamics after both short-term and long-term stressful events, and thus help teams cope with stress, promote positive and cohesive group dynamics, and enhancing overall team effectiveness. By fostering team resilience, groups can better handle challenges and provide support to one another in difficult situations. The research identified a positive association between team resilience, team cohesion, and collective efficacy. However, inconsistencies were observed in the interactive effects found across Studies 1 and 3, influenced by contextual

factors and variations in data collection methods. To partially address these issues, a new measure of team resilience, based on Alliger et al. (2015) conceptual framework, was proposed so as to gain a better understanding of its role in conjunction with adversity.

Chapter 4 introduced a new measure that contributes to the field of team resilience assessment tools and offers valuable insights for future research and practical applications. The proposed measure is the "Team Resilient Behaviour Scale" (TReBS), for measuring team resilience in the sports context, though it might also have application across different performance domains such as healthcare, education, and the workplace. The TReBS is based on a modified version of Alliger et al.'s (2015) conceptual framework, incorporating proactive and reactive aspects of resilience (cf. de la Fuente et al., 2022). The chapter outlined the beginnings of the validation process, comparing it to existing measures of team resilience (i.e., CREST) and other theoretically relevant constructs (e.g., transformational leadership). Via Bayesian factorial analytic work, a condensed 20-item version of the TReBS was subsequently developed. Additionally, the subscales exhibited positive inter-factor correlations, supporting the construct validity of the proactive and reactive dimensions. Taken together, these promising findings offer support for the TReBS in terms of factorial validity, internal consistency, and its ability to measure team resilience, though they await confirmation from a proposed second study.

Theoretical & Practical Implications

The three studies presented in Chapter 3 and the new measure of team resilience in sports presented in Chapter 4 provide valuable insights into the role of team resilience, team stressors, and their interactions in sports psychology. These findings have important implications for both theoretical understanding and practical application in the field.

Theoretical Contributions

One of the key theoretical implications of this thesis is the recognition of team resilience as a crucial factor in mitigating the negative effects of stress and adversity on team outcomes. Having taken into consideration the potential impact of individual resilience, the current findings demonstrate the unique role of team resilience. Numerous studies provide support for a positive relationship between team resilience and team cohesion, as well as collective efficacy (López-Gajardo et al., 2023). The present findings align with existing literature on individual resilience and emphasises the importance of developing team resilience to foster positive group dynamics and effectively cope with stressors (George M. Alliger et al., 2015; Fletcher & Sarkar, 2013; P. B. C. Morgan et al., 2015, 2013; Morgan et al., 2017). Importantly they extend the knowledge base. By explicitly conceptualising team resilience within context of adversity, the studies provide a more comprehensive framework for understanding resilience within a team context, which we defined as our "forces model", inspired by the current literature (Decroos et al., 2017; Gorgulu et al., 2018; Morgan et al., 2013; Morgan et al., 2015; Morgan et al., 2019; Yang et al., 2020). This model expands our current knowledge of resilience and extends its applicability to sports teams (Fletcher & Sarkar, 2016).

Through examining outcomes that represent team and individual variables, this research contributes to closing gaps in empirical understanding. Guided by Gucciardi et al.'s (2018) model of team resilience, which emphasises the importance of inputs, processes, emergent states, and outcomes in relation to task demands and adverse events, we utilise our forces model to explore team adversity and team stressors in the context of sports teams. By investigating specific types of team stressors and their interplay with team resilience, the research further develops Gucciardi et al.'s theoretical perspective.

The three studies we conducted guided by our forces model provide insight into the protective effects of team resilience against the negative impacts of stress on team and individual outcomes. Two theoretical perspectives are outlined to understand the role of team

resilience in the face of team adversity: an independent effects perspective and an interactive

effects perspective. The former suggests that team resilience counteracts the effects of team

adversity, while the latter suggests that team resilience moderates the disruptive impact of

adversity. Through quantitative and qualitative research designs, the research examines the role

of team adversity and team resilience in sports teams, considering factors such as task cohesion,

collective efficacy. Overall, this research contributes to a better understanding of the dynamics

between team resilience and team adversity and their implications for team performance and

outcomes.

The thesis also contributes to the understanding of team stressors by identifying various

stressor themes, including logistical, situational, organisational, environmental, and social

factors. This expands the knowledge base on team stressors, which has been underexplored in

the field of sport psychology. The categorisation of stressors into transition and action-oriented

phases provides a temporal perspective and helps elucidate when and how different stressors

impact team dynamics (Childs & de Wit, 2014; Schetter & Dolbier, 2011). Considering the

temporal nature of stressors is crucial when developing interventions and strategies for stress

management and resilience-building in sports teams (Mellalieu et al., 2009).

The development and validation of the Team Resilient Behaviour Scale (TReBS), have

significant theoretical implications for sports psychology and the team resilience literature.

First, the TReBS enhances the theoretical understanding of team resilience by drawing upon a

comprehensive conceptual framework that includes dimensions of anticipation, minimisation,

management, and mending (George M. Alliger et al., 2015). Therefore, this framework offers

a holistic view of team resilience, encompassing both proactive and reactive behaviours.

Presenting a comprehensive framework that divides resilience processes into proactive

and reactive phases makes a further significant theoretical contribution to the study of team

resilience in sports. By drawing inspiration from established resilience research and theory,

specifically the work of Sarkar and Fletcher (2014) and Alliger et al. (2015), the proposed TReBS measure encompasses both proactive and reactive aspects of resilience, which is essential for capturing the multifaceted nature of teams' ability to withstand and recover from challenges in the sports context. By distinguishing these phases, we offer valuable insights into how teams effectively cope with challenges and adversity. We found that proactive resilience involves anticipating and minimising threats through careful planning and preparation, while reactive resilience centres on managing and mending situations during or after challenges, with a focus on timely assessment, open communication, and learning from experiences. These findings hold the promise of enhancing strategies to promote resilience in sports teams and beyond, potentially leading to improved performance and well-being. Hence, understanding both phases of resilience can help researchers and practitioners develop targeted interventions to enhance team resilience and promote adaptability across various performance domains such as healthcare, education, the workplace, and sport.

By translating this framework into a reliable and valid measurement tool, the TReBS improves our understanding of how team resilience functions within the context of sports. Second, the introduction of the TReBS advances measurement in the field by expanding the range of available scales for assessing team resilience (George M. Alliger et al., 2015; Decroos et al., 2017; Gucciardi et al., 2015; Morgan et al., 2015). Previously, there was a lack of specific scales targeting team resilience, which limited the precision and specificity of measurement at the team level. The TReBS addresses this gap, allowing researchers to more accurately capture the unique dynamics of team resilience. This advancement contributes to a more nuanced understanding of team resilience and its implications for team functioning.

The validation process of the TReBS adds to the methodological rigour of team resilience research. Through a comprehensive analysis of model fit, factor structure, and item selection, the TReBS ensures that it possesses good psychometric properties, including

factorial validity, internal consistency, and construct validity. This rigorous validation process strengthens the credibility and reliability of the TReBS as a measurement tool for team resilience in sports.

Overall, the impact of the TReBS on sports psychology and the team resilience literature may become significant. The theoretical implications of the TReBS contribute to the advancement of knowledge by providing a comprehensive framework and measurement tool that more captures the complex nature of the team resilience process. This advancement enhances our understanding of the factors and processes that contribute to resilient team functioning and performance in sports.

Practical Contributions

The findings from the three studies have not only theoretical implications but also practical implications for sports practitioners working with teams. Understanding the specific types and nature of team stressors enables practitioners to develop targeted interventions that address these stressors and promote team well-being and performance. By identifying and addressing stressors, practitioners can create an environment that fosters resilience and facilitates team success. Moreover, the positive relationships observed between team resilience, team cohesion, and collective efficacy suggest that enhancing team resilience can improve team dynamics and potentially enhance overall performance. Coaches, sports psychologists, and team managers can utilise these insights to develop strategies and interventions that promote team resilience and positive dynamics within the team.

In practical terms, the proposed forces model, which inspired our Team Resilient Behaviour Scale (TReBS) has implications for interventions and strategies aimed at enhancing team resilience in sports. With an accurate assessment of team resilience provided by the TReBS, practitioners can tailor interventions to target specific dimensions of resilience and effectively address the unique challenges faced by teams. The TReBS serves as a valuable tool

for evaluating the effectiveness of these interventions and monitoring changes in team resilience over time. By utilising the TReBS, practitioners can track the progress of resilience-building efforts and make data-driven adjustments to their strategies.

Overall, the development and validation of the TReBS not only contribute to the theoretical understanding of team resilience but also have practical implications that can directly benefit sports practitioners. The insights gained from the TReBS enhance our ability to support teams in achieving optimal performance and well-being by providing a comprehensive framework for assessing and promoting team resilience. This advancement in knowledge and measurement strengthens the field of sports psychology and facilitates the development of effective interventions and strategies for teams.

Strengths and Limitations of the Thesis

The thesis showcases a comprehensive research design that effectively combines quantitative and qualitative methods, offering a well-rounded exploration of the role of team resilience in the context of sports-oriented team stressors. Steckler et al. (1992) highlight that despite both qualitative and quantitative paradigms having their respective weaknesses, they are partially offset by the strengths of the other approach. While quantitative methods are advantageous in producing factual and reliable outcome data that can often be generalised to a larger population, qualitative methods excel in generating rich and detailed process data that capture the perspectives of study participants in a valid manner (Creswell & Creswell, 2018). Hence, a mixed approach allows for a more comprehensive and nuanced understanding of the role of team resilience, as it captures diverse perspectives and gathers rich data that contributes to a holistic view.

An important strength of the thesis lies in its integration of findings from three studies. By combining data from multiple studies, the thesis constructs a robust framework for understanding team resilience and its impact on team and to a lesser extent, individual

outcomes. For example, the research findings show how important it is to build team resilience to deal with stressors, improve team cohesion, and promote positive group dynamics. They also give insights into the different types of stressors and how they change over time, which can enable practitioners to use targeted interventions and strategies. This integration strengthens the overall argument and significantly contributes to the existing knowledge on the topic.

The thesis also introduces a conceptual framework that provides a valuable basis for further research on team resilience and serve as a potential conceptual roadmap that researchers and practitioners can employ to explore and analyse team resilience in different contexts and situations (e.g., healthcare, education, workplace, and sports). For example, healthcare teams adapt and collaborate under pressure during emergencies, educational teams support diverse student needs by adjusting strategies and providing emotional support, workplace teams overcome setbacks through effective collaboration and creative problem-solving, and sports teams display resilience by rallying together, adapting strategies, overcoming adversity, and persistently working towards success.

More generally, the research presented in this PhD also possesses a number several strengths that contribute to the robustness and validity of the data collected and subsequently presented. For example, the use of vignette experimental manipulation, developed with recognised guidelines and pilot testing, ensures a reliable and standardised procedure. Second, the employment of Bayesian CFA allowing a priori conceptual knowledge to be better represented in the analyses, enhancing the credibility of the findings. Third, controlling for individual resilience (see Chapter 3) allows for a more accurate assessment of team-level resilience. And finally, the inclusion of a repeated measures design (see Study 3, Chapter 3) better captures the dynamic nature of team resilience than is commonplace in the literature and provides unique insights into short-term team-level stress responses.

However, there are also several limitations that should be acknowledged. First, there are concerns about the generalisability and applicability of the present's findings to higher-level sports, and second, the focus on stress experiences across different levels of sports. Existing data, albeit outdated, indicates that at the individual level, both skilled and unskilled athletes report similar levels of stress. However, skilled athletes demonstrate more effective coping strategies for dealing with stress (Kaiseler et al., 2009). The present thesis primarily focuses on participants competing at the recreational level, which may limit the generalisability of the findings to higher-level teams facing more significant challenges. Including teams from various competitive levels in future research would broaden the scope and applicability of the findings. However, due to a lack of literature it remains unclear if the trends at the individual level apply to the team level.

Another limitation is the reliance on retrospective recall for data collection. This method can introduce recall biases and inaccuracies, as participants may not remember their experiences precisely. To help reduce this concern, participants were asked to recall instances of adversity their team had encountered with concrete examples provided (i.e., difficult, and adverse circumstances such as losing a football game, facing an overwhelming opponent, or a lack of confidence in the team). Importantly, the situations reported in the data had much greater variety than the illustrative examples suggesting that this approach did not prime participants' responses. Addressing this limitation in future research could involve employing real-time monitoring or observational studies providing more objective data and mitigate the impact of recall bias.

The thesis also acknowledges the need for standardisation in the conceptualisation and categorisation of team stressors. While there is a better understanding of team stressors as indicated by our findings in Chapter 3, their level of disruptiveness remains unknown. It questions whether the most significant team stressors were considered in Study 3. Different

researchers and practitioners may have varying understandings and classifications of team stressors, which can impede comparison and replication of findings across studies. Establishing a standardised framework for identifying and categorising stressors would enhance the validity and reliability of future research.

Furthermore, the measures used in Chapter 3 to assess team resilience may not fully reflect the range of stressors that teams encounter and their varying impacts on team locomotion and maintenance due to potential incomplete coverage of stressors, lack of specificity in measuring different types or levels of stressors, and insufficient consideration of contextual factors (e.g., cultural influences, organisational support systems, team climate, and leadership styles). This led to the proposal of a new measure in Chapter 4 that more comprehensively measures team resilience and as such provide a more accurate representation of the construct and enhance the validity of future studies.

A further limitation includes the lack of error being accounted for within the regression analyses in Chapter 3. This implies that measurement and random error in the data may have influenced the reported findings. One way of including error within analyses is through the use of structural equation modelling (SEM). Unfortunately, large sample sizes are a prerequisite of SEM and given the modest samples collected for Chapter 3 we were unable to utilise this statistical approach. Moreover, a small sample size reduces the statistical power of the analysis and limits the generalisability of findings. Consequently, this may have compromised the accuracy of the results and the understanding of the true relationships between variables (Faber & Fonseca, 2014). Addressing these limitations through improved error accounting analyses and larger sample sizes would strengthen our faith in the current findings.

Another limitation was that the validation process of the TReBS was only in its initial stages, indicating an incomplete assessment of the measure's psychometric properties. This might raise potential concerns about the reliability and validity of the data collected and

suggests that further validation work is needed to confirm the robustness and appropriateness of the instrument in accurately capturing the concept of team resilience.

A further limitation pertains to the qualitative approach used in Chapter 3's Study 2. It is possible that the data obtained from open-ended survey questions is relatively superficial, with this method precluding the opportunity for further probe and explore participants' responses. This can impact the depth of insight and the ability to fully explore and understand the complexities of team stressors, suggesting the need for a more in-depth qualitative approach. This might be achieved by conducting longer and more detailed interviews, employing multiple data collection methods, or incorporating member checks or prolonged engagement with participants (Creswell & Creswell, 2018; Saunders et al., 2019). These strategies would provide future researchers with richer and more comprehensive data, enabling a deeper exploration of the underlying dynamics associated with team resilience and team stressors.

The reliance on single-source data from athletes limits the generalisability of the findings. While this can provide valuable insights into athletes' individual experiences of team resilience, it may not capture the full picture or account for other broader contexts or perspectives from other stakeholders involved in the team, such as coaches and the coaching staff. Different individuals within the team may have varying perspectives, experiences, and interpretations of team resilience, which could provide a more comprehensive understanding from multiple perspectives.

Team-level efforts were not adequately considered in the analyses, although the data collection method used did not generate nested data. This suggests that despite looking at the individual-level of team resilience, how the collective actions and dynamics of the team impact resilience were not considered, thus overlooking other crucial aspects of team resilience (e.g., Level 2 data of team resilience).

Lastly, the use of the Prolific data collection platform, similar to MTurk, may raise some concerns about data quality and representativeness due to potential issues with participant motivation and lack of demographic diversity (Chmielewski & Kucker, 2019). Participants' primary motivation for participating may be financial incentives rather than genuine interest in the research topic, potentially compromising the accuracy and thoughtfulness of their responses. Additionally, data from such platforms can often lack sample diversity, and skewed towards younger, educated, and technologically literate individuals, limiting the generalisability of findings (Ford & Scandura, 2023). However, we implemented attentional check items and examined participant completion times to ensure clean data in our analyses.

Lastly, the studies primarily focus on the immediate effects of team resilience on team outcomes. While this provides valuable insights into short-term dynamics, a long-term perspective is lacking. Examining the relationship between team resilience, team stressors, and team outcomes over an extended period would offer a deeper understanding of how resilience affects performance and how it evolves over time. Acknowledging and addressing these limitations in future research will further advance our knowledge and understanding of team resilience and its implications in sports psychology.

Future Research

Future studies in the field of team resilience can capitalise on the findings and contributions of the thesis, expanding our understanding of this complex construct and its implications for team dynamics and performance. Several key areas for future research can be identified based on the strengths and limitations of the thesis.

Future studies could investigate the role of team resilience in high-performance teams or teams facing more significant challenges. The thesis primarily focused on recreational level sports teams, and examining the applicability of the findings to elite or professional teams would provide valuable insights. Anecdotal evidence suggests that high-performance teams

often encounter intense pressure, adversity, and stressors, and understanding how team resilience operates in these contexts can inform the development of targeted interventions and strategies to enhance performance and well-being. Exploring team resilience at different competitive levels and domains would yield a more comprehensive understanding of the factors that influence team resilience across a wider range of settings.

Another important area for future research is the exploration of team resilience interventions and their effectiveness. Building upon the practical implications of the thesis, researchers can design and implement interventions aimed at enhancing team resilience and evaluate their impact on team outcomes. Interventions can include training programmes, psychological skill development, or team-building activities specifically focused on fostering resilience. Longitudinal studies can assess the sustained effects of these interventions over time, providing insights into the long-term development of team resilience and its influence on team functioning and performance.

In addition, future research should place an emphasis on the longitudinal nature of team resilience and its dynamics. The thesis primarily examined the immediate effects of team resilience on team outcomes but understanding how team resilience evolves over time and how it interacts with changing stressors and team dynamics is crucial. Morgan et al. (2015) suggested that longitudinal research is required to explore deeper into the resilience processes. Hence, longitudinal studies could track team resilience across different phases of a season or competitive cycle, capturing the fluctuations and patterns of resilience in response to various stressors and challenges. Such studies can also explore the factors that contribute to the development and maintenance of team resilience over time, including individual differences, team processes, and external support systems.

Furthermore, future studies can explore the contextual factors that influence the relationship between team resilience and team outcomes. The thesis acknowledged the

potential impact of contextual factors on the interaction between team resilience and team adversity, and further investigation can shed light on these dynamics. Contextual factors may include cultural influences, organisational support systems, team climate, and leadership styles. Understanding how these factors shape the effectiveness of team resilience in different contexts can provide valuable insights for practitioners and policymakers in creating environments that foster resilience and optimise team performance. This links to the need for more interaction-oriented studies in team resilience research. These types of studies reflect the complexity of real-life team dynamics, capturing the interplay between team resilience and contextual factors. This realism could enhance the applicability of findings, allowing practitioners to draw insights relevant to their own team contexts, and thus contribute to evidence-based decision-making, promoting resilient team environments and positive outcomes.

Another avenue for future research is examining team resilience in diverse team compositions. While the thesis primarily focused on intact sports teams, team resilience is relevant across various team settings like healthcare, education, and workplace teams. Examining diverse team compositions, including differences in roles, expertise, communication channels, and team processes, could provide insights into unique challenges and dynamics. This understanding may guide the development of targeted interventions and strategies to enhance team resilience in specific contexts. By broadening the scope of team compositions studied, researchers can uncover valuable knowledge to support resilient functioning in diverse teams.

Moreover, future studies could investigate how team resilience is understood and expressed across different cultures by comparing teams from different countries or regions of the world and examining how they define resilience and how it manifests in their responses to stressors. By exploring the cultural influences on team resilience, the study could offer valuable insights into how this concept is perceived and enacted in different contexts.

Lastly, future studies can address the methodological limitations of the thesis by employing advanced research designs and measurement techniques. For example, employing real-time monitoring or ecological momentary assessment methods can yield more accurate and objective data on team stressors, resilience, and outcomes. These methods capture real-time information within natural team settings, offering a dynamic and ecologically valid understanding of team resilience. By examining fluctuations and contextual factors that influence resilience, these approaches support the development of interventions and strategies to enhance team resilience in real-world contexts. Furthermore, utilising longitudinal designs with larger sample sizes enhances statistical power and improves the generalisability of findings. Additionally, incorporating multi-method approaches, such as combining qualitative interviews with quantitative surveys, provides a more complete understanding of team resilience and its underlying processes. By integrating these methodological advancements, future studies can overcome limitations, strengthen research outcomes, and contribute valuable insights to the field of team resilience.

Overall, future studies in the field of team resilience can build upon the strengths and limitations of the thesis to deepen our understanding of this potentially important construct. Investigating team resilience in high-performance teams, exploring the effectiveness of interventions, examining the longitudinal dynamics of team resilience, considering contextual factors, studying diverse team compositions, and employing advanced research designs are all valuable avenues for future research. By addressing these areas, researchers can further enhance our knowledge of team resilience and its practical applications in sports psychology and other team contexts.

Future research questions to consider based on the areas discussed above are:

1. What influences team resilience in high-performance teams facing intense pressure, adversity, and stressors?

2. What are the long-term effects of team resilience interventions on team outcomes?

3. How does team resilience evolve over time and interact with changing stressors and dynamics?

4. How do contextual factors like team climate, organisational support, and culture moderate the relationship between team resilience and team outcomes?

5. How does team resilience vary in diverse team compositions across different settings and cultures, and how can it be improved?

6. How does team resilience interact with team processes like cohesion, communication, and leadership to influence team outcomes?

7. What mechanisms link team resilience to individual well-being and performance within the team?

To further explore these research questions, it would be beneficial to consult relevant literature in the fields of team resilience, sports psychology, and organisational psychology. By reviewing existing studies and theoretical frameworks, researchers can identify existing gaps in knowledge and formulate research questions that build upon the existing literature while addressing the unique aspects of team resilience.

Conclusion

This thesis contributes to the understanding of team resilience in the context of sports psychology. The research findings highlight the positive association between team resilience, team cohesion, and collective efficacy, emphasising the importance of developing team resilience to cope with stressors and foster positive group dynamics. The studies also identify various types of team stressors and provide insights into their temporal aspects, enabling practitioners to develop targeted interventions and strategies. The introduction of the Team Resilient Behaviour Scale (TReBS) as a reliable and valid measurement tool enhances the

theoretical and practical understanding of team resilience, offering a comprehensive framework for assessing and promoting resilience in sports teams. While the thesis has several strengths, such as its comprehensive research design and integration of findings, it also acknowledges limitations, such as the focus on recreational-level teams and the need for standardised frameworks and measures. Future research should explore team resilience in high-performance teams, evaluate the effectiveness of resilience interventions, examine the longitudinal dynamics of team resilience, and investigate contextual factors that influence resilience outcomes. Overall, this thesis provides valuable insights and tools for both researchers and practitioners in the field of sports psychology.

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Appendices

Appendix A: Ethical Approval

Christopher Saville
To: James Hardy
Wed 09/03/2022
Cc: Ammar Salem Y Alyousef; Stuart Beattie; Lindsey Graham

Hi all,

Sorry for the wait! I am happy to approve your amendment. Lindsey, we can give this approval code 090322Aleg.

The one thing I'd like you to change is the details of who to address complaints to. These should go to Huw Roberts (huw.roberts@bangor.ac.uk), College Manager CHS.

Best of luck with your research

Chris

| **Dr Christopher Saville**
Darlithydd Clinigol
Ysgol Gwyddorau Dynol ac Ymddygiadol

E-bost: c.saville@bangor.ac.uk
Ffôn: 01248 388740 | **Dr Christopher Saville**
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UNIVERSITY |

SS SHES Ethics Submissions
To: Ammar Salem Y Alyousef
Sun 04/07/2021 07:49
Cc: James Hardy

📄 FORM1 ETHICS Review & Ap...
214 KB

Dear Ammar

Thank you for your email. I am well, thank you.

Study Title   Investigating the Role of Adversity and Team Resilience in Sports Settings
REC Reference   P12-20/21

Thank you for your revised application for Ethical Approval. I am pleased to confirm that all of the points / concerns raised previously have been addressed satisfactorily and your study has been approved by Chair's Action.

After ethical review
Any additional amendments, such as a change to the approved protocol, need to be referred to the Committee for consideration quoting the REC Reference. This includes adding new sites, investigators and extension of end dates for data collection. Breaches to the approved protocol, or other serious incidents, must be reported to the REC. Failure to comply may nullify this approval.

Your REC reference is P12-20/21. Please quote this on all correspondence

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Ethical approval granted for 2022-17258 Developing a new measure of team resilience

E ethics@bangor.ac.uk
To: Ammar Salem Y Alyousef
Thu 26/01/2023 13:46

Dear Ammar Salem Y,

2022-17258 Developing a new measure of team resilience

Your research proposal number 2022-17258
has been reviewed by the [Pre-Aug 2021] School of Psychology Ethics and Research Committee
and the committee are now able to confirm ethical and governance approval for the above research on the basis described in the application form, protocol and supporting documentation. This approval lasts for a maximum of three years from this date.

Ethical approval is granted for the study as it was explicitly described in the application

If you wish to make any non-trivial modifications to the research project, please submit an amendment form to the committee, and copies of any of the original documents reviewed which have been altered as a result of the amendment. Please also inform the committee immediately if participants experience any unanticipated harm as a result of taking part in your research, or if any adverse reactions are reported in subsequent literature using the same technique elsewhere.

↩ Reply   → Forward

Appendix B: Questionnaire (Chapter 3)

Participant instructions

Please answer all questions truthfully. There are no right or wrong answers so please give your immediate reaction. Your honest responses are very important to us. **Your responses will be kept in strict confidence**. No one other than the researcher will see your responses.

Sex (Please circle)	MALE / FEMALE/ NON-BINARY
Age (in years)	
What is your team sport?	
How long have you been playing this sport (years)?	
What is the name of the club/team you play for?	
How long have you been a member of this team (seasons)?	
What competitive level do you play at? (Please circle)	Recreational/ Provincial/ National/International
Are you a… (Please circle)	Starter / Substitute
How many hours a week does your team typically train?	
When is the last training session you had?	

MTI

Please indicate how true each of the following **statements are as an indication (** **how YOU typically think, feel, and behave as a sportsman/woman** – *rememb(* *there are no right or wrong answers so be as honest as possible.*

1.   I believe in my ability to achieve my goals.

	1	2	3	4	5	6	7
False					True		

2. I am able to regulate my focus when performing tasks.

	1	2	3	4	5	6	7
False					True		

3. I am able to use my emotions to perform the way I want.

	1	2	3	4	5	6	7
False					True		

4. I strive for continued success.

	1	2	3	4	5	6	7
False					True		

5. I effectively execute my knowledge of what is required to achieve my goals.

	1	2	3	4	5	6	7
False					True		

6. I consistently overcome adversity.

	1	2	3	4	5	6	7
False					True		

7. I am able to execute appropriate skills or knowledge when challenged.

	1	2	3	4	5	6	7
False					True		

8. I can find a positive in most situations.

	1	2	3	4	5	6	7
False					True		

The Characteristics of Resilience in Sports Teams Inventory (CREST)

Please circle a number to complete the following statements in relation to your team:

When my team was under pressure .....

1- My teammates were able to focus on what was important

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

2- My teammates started to communicate negatively with each other.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

3- My team members fought for each other.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

4-My team lost its confidence.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

5-I felt that I could count on other members of the team.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

6-the level of collective effort in the team dropped.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

7-effective communication kept players' minds focused on the task at hand.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

8-My teammates started to mistrust one another.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

9-members of the team were committed to contributing to the collective belief of the team.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

10- My team members fought hard to not let each other down.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

11-individuals forgot their role in the team and did not know what they had to do.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

12-the challenges we have gone through as a team helped us learn to withstand pressures.

1	2	3	4	5	6	7
Strongly Disagree					Strongly Agree	

13-there came no support from teammates.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
Strongly Disagree   **Strongly Agree**

14-the strong bonds between teammates helped the team during difficult times.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

15-My teammates could not persist through the most difficult moments.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
Strongly Disagree   **Strongly Agree**

16- My teammates were able to reset their focus to alleviate pressure.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
Strongly Disagree   **Strongly Agree**

17- My teammates gained belief by working together to withstand pressures.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
Strongly Disagree   **Strongly Agree**

18- My teammates drew on an agreed team vision, values, and guiding behavioural principles.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
Strongly Disagree   **Strongly Agree**

19- My teammates did not belief in its ability to withstand pressure.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
Strongly Disagree   **Strongly Agree**

20- My teammates reflected on a shared team vision.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
Strongly Disagree   **Strongly Agree**

Group Environment Questionnaire (GEQ-2)

The following questions are designed to assess your perceptions of **YOUR TEAM AS A WHOLE.** Please CIRCLE a number from 1 to 9 that best indicates your level of agreement with each of the statements.

1.   Our team is united in trying to reach its goals for performance.

      1   2   3   4   5   6   7   8   9
      Strongly Disagree   **Strongly Agree**

2.   We all take responsibility for any loss or poor performance by our team.

      1   2   3   4   5   6   7   8   9
      Strongly Disagree   **Strongly Agree**

3.   Our team members have consistent aspirations for the team's performance.

      1   2   3   4   5   6   7   8   9
      Strongly Disagree   **Strongly Agree**

4.   If members of our team have problems in practice, everyone wants to help them so we can get back together again.

      1   2   3   4   5   6   7   8   9
      Strongly Disagree   **Strongly Agree**

5.   Our team members communicate freely about each athlete's responsibilities during competition and practice.

      1   2   3   4   5   6   7   8   9
      Strongly Disagree   **Strongly Agree**

Collective Efficacy Measure

Please circle a number to complete the following statements in relation to your team:

1. My team is capable of helping a team member solves his/her problem

        1   **2**   **3**   **4**   **5**
  Strongly Disagree   **Strongly Agree**

2. My team can work together in order to accomplish a goal

        1   **2**   **3**   **4**   **5**
  Strongly Disagree   **Strongly Agree**

3. I believe in my team's ability to do things together

        1   **2**   **3**   **4**   **5**
  Strongly Disagree   **Strongly Agree**

4. My team can handle the most difficult situations

        1   **2**   **3**   **4**   **5**
  Strongly Disagree   **Strongly Agree**

5. Together our team is able to solve problems

        1   **2**   **3**   **4**   **5**
  Strongly Disagree   **Strongly Agree**

Commitment to Training (Theory of planned behaviour measures)

Attitude towards the behaviour.

Please circle a number to complete the following statement in relation to your training session:

For me the first training session after the game would be :

bad :___1__:___2__:___3__:___4__:___5__:___6__:___7___: good

unimportant:___1__:___2__:___3__:___4__:___5__:___6__:___7___:important

useless:___1__:___2__:___3__:___4__:___5__:___6__:___7___:useful

harmful:___1__:___2__:___3__:___4__:___5__:___6__:___7___:beneficial

dull:___1__:___2__:___3__:___4__:___5__:___6__:___7___:exiting

painful:___1__:___2__:___3__:___4__:___5__:___6__:___7___:enjoyable

unpleasant:___1__:___2__:___3__:___4__:___5__:___6__:___7___:pleasant

boring:___1__:___2__:___3__:___4__:___5__:___6__:___7___:fun

- **How much aversity did your team experience during this event?**

1	2	3	4	5
not at all				very much

- **How well did the team cope during this event?**

1	2	3	4	5
not at all				very much

- **How stressful was the situation for the team?**

1	2	3	4	5
not at all				very much

- **How disruptive was this event for your team?**

1	2	3	4	5
not at all				very much

How harmful was the event for your team's chance of success?

1	2	3	4	5
not at all				very much

Appendix C: Questionnaire (Chapter 4)

Participant instructions

Please answer all questions truthfully. There are no right or wrong answers so please give your immediate reaction. Your honest responses are very important to us. **Your responses will be kept in strict confidence.** No one other than the research team will see your responses.

Sex (Please circle)	MALE / FEMALE/ NON-BINARY
Age (in years)	
What is your team sport?	
How long have you been playing this sport (years)?	
What is the name of the club/team you play for?	
How long have you been a member of this team (seasons)?	
What competitive level do you play at? (Please circle)	Recreational/ Provincial/ National/International
Are you a... (Please circle)	Starter / Substitute
How many hours a week does your team typically train?	

The Characteristics of Resilience in Sports Teams Inventory (CREST)

The word 'team' – used in most of the questions – refers to all persons involved such as the players, coaches and team managers. The following statements describe some of the possible characteristics that sports teams may display when they experience pressure. Please keep in mind those moments that your team has been under pressure and indicate the extent to which you agree or disagree with the following statements.1 represents 'strongly disagree', 7 represents 'strongly agree'.

When my team was under pressure .....

1- My teammates were able to focus on what was important
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

2- My teammates started to communicate negatively with each other.
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

3- My team members fought for each other.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

4-My team lost its confidence.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

5-I felt that I could count on other members of the team.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

6-the level of collective effort in the team dropped.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

7-effective communication kept players' minds focused on the task at hand.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

8-My teammates started to mistrust one another.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

9-members of the team were committed to contributing to the collective belief of the team.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

10- My team members fought hard to not let each other down.
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

11-individuals forgot their role in the team and did not know what they had to do.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

12-the challenges we have gone through as a team helped us learn to withstand pressures.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

13-there came no support from teammates.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

14-the strong bonds between teammates helped the team during difficult times.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

15- My teammates could not persist through the most difficult moments.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

16- My teammates were able to reset their focus to alleviate pressure.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

17- My teammates gained belief by working together to withstand pressures.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

18- My teammates drew on an agreed team vision, values, and guiding behavioural principles.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

19- My teammates did not belief in its ability to withstand pressure.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

20- My teammates reflected on a shared team vision.

1	2	3	4	5	6	7

Strongly Disagree   **Strongly Agree**

Team Resilient Behaviour Scale (TReBS)

The word 'team' – used in most of the statements – refers to all persons involved such as the players, coaches and team managers. The following statements are designed to assess your perceptions of how your team **GENERALLY** behaves and deals with not only **UPCOMING CRITICAL EVENTS** but how they **MANAGE AND RECOVER FROM DIFFICULT EVENTS.** Please CIRCLE a number from 1 to 7 that best indicates how often your team carries out the following actions. There are no right or wrong answers and all responses will be kept confidential, so please answer honestly.

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

GENERALLY SPEAKING (THINK BACK ACROSS VARIOUS TIME POINTS), HOW FREQUENTLY DOES *YOUR TEAM PREPARE FOR UPCOMING, POTENTIALLY STRESSFUL, EVENTS* IN THE FOLLOWING WAYS …

1. In the run up to a critical event, my team thoroughly discusses its vulnerabilities.
2. My team recognizes the importance of approaching critical events.
3. In preparation for important events, team members engage with the tasks that are set out for them.
4. My team displays good awareness of upcoming critical events.
5. In the lead-up to stressful events, my team works well together.
6. Team members ask relevant questions about important future situations.
7. In the build up to critical events, our discussions identify solutions to some of the challenges we might encounter.
8. Team members display emotions concerning important upcoming challenging events
9. My team practices coping with potentially threatening scenarios.
10. My team anticipates when critical events will be stressful
11. When preparing for an important event, team discussions involve everyone.
12. My team anticipates potential threats to success early (e.g., consequences of failing on a task).
13. Our team leaves no stone unturned when preparing for critical events.
14. My team anticipates potential barriers to performing well.
15. In the run up to stressful events, my team maximizes their efforts to reduce the impact of identified stressors.
16. In the build up to a critical event we anticipate the challenges we might encounter.
17. Team members support each other before important challenging events.
18. Team members are vocal in pointing out their concerns about upcoming events.
19. In the run up to important situations, our team offers solutions to potential problems
20. Leading up to a critical event, my team thoroughly discusses its readiness to perform.
21. Team members offer advice to each other when challenges are looming.
22. Leading up to a critical event, my team practices dealing with "what if" scenarios.

GENERALLY SPEAKING (THINK BACK ACROSS VARIOUS TIME POINTS), HOW FREQUENTLY DOES *YOUR TEAM DEAL WITH AND RECOVER FROM PRESSURE* IN THE FOLLOWING WAYS ...

1.During pressurized situations, my team gets the basics right.

2.After adversity, my team discusses mistakes in a way that we learn from them.

3.When adversity occurs, team members easily handle a variety of tasks.

4.My team addresses mistakes that occur during stressful events.

5.When adversity is experienced by the team, team members are able to maintain effective execution of their roles.

6.Even when a mistake is caught in time, the event is still discussed in depth by the team

7.Teamwork is maintained under stressful situations.

8.After challenging events, differences between actual and expected performance are critically and constructively analyzed by the team.

9.During stressful situations team members effectively communicate with one another.

10.After a poor team performance, my team discusses the situations we failed to anticipate.

11.When things are going wrong team members support each other.

12.After successful performances we still question each other about what we could have done better.

13.When experiencing adversity, the level of collective effort in the team drops (Reverse coded).

14.The team maintains effective communication after poor performances.

15.Team members maintain confidence in the face of adversity.

16.My team responds positively to failure.

17.Under challenging circumstances, my team quickly makes real-time adjustments.

18.After adversity, it takes a long time for the team to learn from its experiences.

19.My team adapts well to changing circumstances.

20.After encountering stressful events, my team critically discusses our preparation strategies.

21.After a poor performance, my team quickly implements new strategies

MTI

Please indicate how true each of the following **statements are as an indication of how YOU typically think, feel, and behave as a sportsman/woman** – *remember there are no right or wrong answers so be as honest as possible.*

1. I believe in my ability to achieve my goals.

1	2	3	4	5	6	7	
False							True

2. I am able to regulate my focus when performing tasks.

1	2	3	4	5	6	7	
False							True

3. I am able to use my emotions to perform the way I want.

1	2	3	4	5	6	7	
False							True

4. I strive for continued success.

1	2	3	4	5	6	7	
False							True

5. I effectively execute my knowledge of what is required to achieve my goals.

1	2	3	4	5	6	7	
False							True

6. I consistently overcome adversity.

1	2	3	4	5	6	7	
False							True

7. I am able to execute appropriate skills or knowledge when challenged.

1	2	3	4	5	6	7	
False							True

8. I can find a positive in most situations.

1	2	3	4	5	6	7	
False							True

Transformational Leadership Questionnaire

Please rate **your coach** in terms of how frequently he or she engages in the behaviour described.

"Rarely or never"   "Very frequently, if not always"

1   2   3   4   5

My coach ...
1. Communicates a clear and positive vision of the future
2. Treats staff as individuals, supports and encourages their development
3. Gives encouragement and recognition to staff
4. Fosters trust, involvement and cooperation among team members
5. Encourages thinking about problems in new ways and questions assumptions
6. Is clear about his/her values and practices what he/she preaches
7. Instills pride and respect in others and inspires me by being highly competent

Collective Efficacy Questionnaire

Not at all Confident   Extremely Confident

0   1   2   3   4   5   6   7   8   9   10

Rate your team's confidence, in terms of the next upcoming game or competition, that your team has the ability to ...

1- Perform under pressure.
2- Stay in the game when it seems like your team isn't getting any breaks.
3- Persist when obstacles are present
4- Mentally prepare for this competition
5- Play well without your best player
6- Be ready
7- Devise a successful strategy
8- Physically prepare for this competition

Group Environment Questionnaire (GEQ-2)

The following questions are designed to assess your perceptions of **YOUR TEAM AS A WHOLE.** Please CIRCLE a number from 1 to 9 that best indicates your level of agreement with each of the statements.

1.   Our team is united in trying to reach its goals for performance.

     1   2   3   4   5   6   7   8   9
Strongly Disagree   **Strongly Agree**

2.   We all take responsibility for any loss or poor performance by our team.

     1   2   3   4   5   6   7   8   9
Strongly Disagree   **Strongly Agree**

3.   Our team members have consistent aspirations for the team's performance.

     1   2   3   4   5   6   7   8   9
Strongly Disagree   **Strongly Agree**

4.   If members of our team have problems in practice, everyone wants to help them so we can get back together again.

     1   2   3   4   5   6   7   8   9
Strongly Disagree   **Strongly Agree**

5.   Our team members communicate freely about each athlete's responsibilities during competition and practice.

     1   2   3   4   5   6   7   8   9
Strongly Disagree   **Strongly Agree**

Appendix D: DSEP Conference

Division of Sport and Exercise Psychology Annual Conference 2022   🖉 1 ⌄   🔍 ⌄   ⊟

BT Brianna Tutulan <brianna.tutulan@redactive.co.uk>   ☺ ↩ ↩ ↪ 🔳 ⋯
      To: Ammar Salem Y Alyousef   Tue 13/09/2022 10:3

Dear AMMAR,

Thank you for your submission to the Division of Sport and Exercise Psychology Annual Conference 2022.

We are pleased to inform you that your submission has been accepted as a Poster Presentation, however the reviewers have asked that some slight adjustments are made. Please see below:

Submission Title: A systematic review of team resilience across four performance contexts

Reviewer 1 Comments: Thank you for your submission. You present an interesting topic pulling research data from four contexts. Please resubmit your abstract in accordance with the formatting guidelines (i.e. distinct labelled headings).

Reviewer 2 Comments:

Please can you send back your updated submission by **Tuesday 27ᵗʰ September**, so that we can ensure it is included on the programme.

Booking to attend

Please note as a speaker you will need to book to attend the conference. The early bird rate to attend ends on Friday 23ʳᵈ September. To book your place please click here.

The programme will be added to the website in the coming weeks, and we will send you further presentation details shortly.

Please let us know if you have any queries.

Sincerely,
Division of Sport and Exercise Psychology Annual Conference 2022

PRIFYSGOL BANGOR UNIVERSITY

KFU — King Faisal Unevirsity

A systematic review of team resilience across four performance contexts

Ammar Alyousef[2, 1], James Hardy[1] & Stuart Beattie[1]

[2]King Faisal University, Saudi Arabia. [1]Institute for the Psychology of Elite Performance, Bangor University, UK

Background and Purpose

Research on team resilience has increased in recent years; thus, a systematic review of this literature base is timely. Across four performance-oriented domains (workplace, healthcare, education, and sports), we first examined what characteristics or correlates were important for team resilience to flourish. Second, we critically reviewed how team resilience has been measured in existing literature.

Method

- Between September 2019 and December 2020, four online databases searches were conducted (i.e., ProQuest, MEDLINE/PubMed, Science Direct (Elsevier) and Emerald Insight).
- For the search strategy we used Pluye and Hong's (2014) seven-stage protocol.
- The 16-item quality assessment tool (QATSDD) was used to assess reliability and validity of the included studies
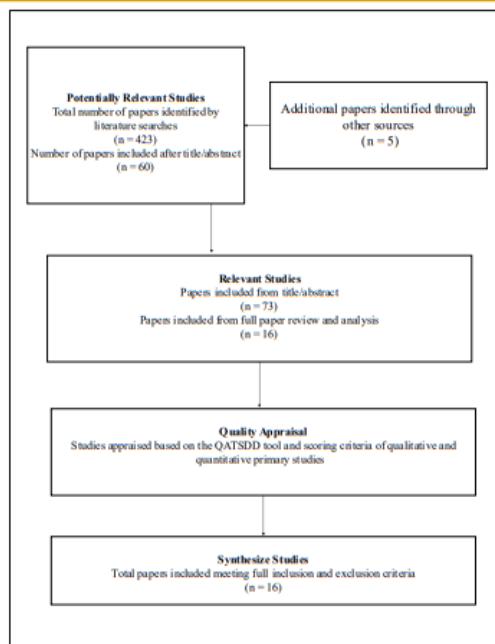
Inclusion criteria

- English language papers.
- Peer-reviewed articles.
- Studies examining team resilience.
- Qualitative and quantitative studies where team or group resilience is the key area of discussion.

Exclusion criteria

- Non-English language paper.
- Non-peer-reviewed papers.
- Studies examining personal resilience and non-team related resilience.
- Papers with no empirical evidence.

Search Strategy

Potentially Relevant Studies
Total number of papers identified by literature searches
(n = 423)
Number of papers included after title/abstract
(n = 60)

Additional papers identified through other sources
(n = 5)

Relevant Studies
Papers included from title/abstract
(n = 73)
Papers included from full paper review and analysis
(n = 16)

Quality Appraisal
Studies appraised based on the QATSDD tool and scoring criteria of qualitative and quantitative primary studies

Synthesize Studies
Total papers included meeting full inclusion and exclusion criteria
(n = 16)

Results

Study Characteristics

- The screening process yielded 16 studies from business (n = 8; 50%), education (n = 1) (6%), healthcare (n = 1) (6%), and sports (n = 6) (38%) contexts.
- These studies also had varying methods of conducting empirical research, with most studies opting for a quantitative approach (n = 12) (75%), while others opted for a qualitative approach (n = 4) (25%).
- The 16 studies contained 6844 participants where 3326 participants were male, 2906 were female, and 613 were not specified.
- Quality assessment results indicate a strong presentation of findings and an overall "good" rating.

Correlates:

- The 16 studies reviewed identified 52 different correlates which were themed by cognitive, motivational, behavioural, affectual, and group characteristics. Studies were coded for whether the correlate represented an antecedent or outcome of team resilience.
- Behavioural correlates were most represented and positive associations kreported in the studies (n = 10; 62.5%).

Measurement :

- 10 out of 16 studies led to the development of 8 original measures of team resilience. Further, two studies have either translated an existing measure into another language (Gorgulu et al., 2018) or further examined an existing measure (Meneghel et al., 2014; 2016).
- The oldest resilience measures was published in 2009

a) Dimensionality:

- Of the nine measures reviewed, four are unidimensional and five are multi-dimensional tools
- The studies in both business and sports settings, is the development of multidimensionally structured questionnaires (n = 4) and recent researchers have employed relatively advanced procedures seches as structural equation modelling and confirmatory factor analysis, to achieve their aims.

b) Psychometric properties:

- The the Characteristics of Resilience in Sports Teams Inventory (CREST) is most developed with support for content, concurrent, discriminant, predictive, and factorial validity (Decroos et al. 2017).

c) Conceptual suitability

- Out of eight measures, two measures contained items and dimensions linked well with the definition of team resilience (West et al., 2009; Decroos et al., 2017).

d) Social-cultural context:

- Most studies were published in Western cultures (e.g., in North American and European countries). The lack of cross-cultural research on team resilience precludes an understanding of how other cultures conceptualize team resilience.
- The researchers from the business and sports domains are dominant in their efforts to construct inventories tapping team resilience.
- There is a tendency for measures to only be utilized within their "home" contexts (i.e., sport with sport), limiting the cross pollination of ideas and findings from outside of their own domains.

Future Research

- The incomplete description of samples undermines our ability to fully appreciate nuances in the team resilience literature.
- There is a lack of studies examining team resilience through an exclusive female lens precluding a firm appreciation of how females view, experience, and respond to team adversity.
- Most studies are coming from western cultures, therefore, there is a lack of cross-cultural research on team resilience precludes an understanding of how other cultures conceptualize it.
- Most studies do not have a strong causal designs and the interested researcher might want to look at (Morgan et al., 2019) which develop team resilience in professional rugby union team by using narrative design.
- Future research might want to develop a measure with applicability across domains to aid the sharing of knowledge.

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