



UNIVERSITY OF BIRMINGHAM

A PERSON-CENTRED APPROACH TO UNDERSTANDING ATHLETE MENTAL HEALTH AND EMOTIONAL REGULATION

By

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Abstract

The aim of this thesis was to investigate student-athletes' complete mental health and how emotion regulation relates to key indicators of mental health: sport mental well-being and symptoms of mental illness. Following an overview of the mental health and emotional regulation literature in sport and broader psychology in Chapter 1, Chapter 2 narratively synthesized findings from a systematic review investigating the performance and mental health correlates of emotion regulation strategy use for athletes. With 13 studies meeting the inclusion criteria, key gaps were identified: (1) limited consistency in the conceptualization and measurement of mental health and emotion regulation, (2) a lack of literature investigating mental health from a complete state perspective, and (3) limited research on the exploration of a range of emotion regulation strategies. Chapter 3 began to address these gaps and investigated student-athletes' complete mental health by exploring latent mental health profiles based on patterns in mental well-being, anxiety, and depressive symptoms using latent profile analysis (LPA). The chapter also explored differences in behavioral emotion regulation strategy use and alexithymia between profiles. Chapter 4 replicated the findings of the LPA from Chapter 3, but extended knowledge on differences in other cognitive and behavioral emotion regulation strategies. Chapter 5 furthered knowledge on student-athletes' complete mental health by longitudinally investigating the stability of mental health profile membership and the associations with emotion regulation use to help explain why and how some student-athletes experienced changes and others remained stable in their profile membership. Finally, Chapter 6 included a research note that occurred as an unexpected consequence of the COVID-19 pandemic. The pandemic provided an opportunity to explore student-athletes' symptoms of mental illness when key features of the sport environment were removed. Overall, this thesis makes novel contributions to the sport mental health literature by exploring student-athlete mental health from a complete state perspective and

providing evidence for the association of a wider range of emotion regulation strategy use on indicators of mental well-being, anxiety, and depressive symptoms in this unique population.

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List of Abbreviations

Theories

PMER	Process Model of Emotion Regulation
PPCT	Process-Person-Context-Time

Questionnaires

BERQ	Behavioral Emotion Regulation Questionnaire
CERQ	Cognitive Emotion Regulation Questionnaire
DASS-21	Depression, Anxiety, and Stress Scale - 21
ERQ	Emotion Regulation Questionnaire
SMHC-SF	Sport Mental Health Continuum – Short Form
TAS-20	Toronto Alexithymia Scale-20

Analysis

AIC	Akaike Information Criteria
ANOVA	Analysis of Variance
BIC	Bayesian Information Criteria
BLRT	Bootstrapped Likelihood Ratio Test
EM	Expectation Maximization
LL	Log Likelihood
LPA	Latent Profile Analysis
MANOVA	Multivariate Analysis of Variance
MCAR	Missing Completely at Random
SABIC	Sample-adjusted Bayesian Information Criteria

SPSS	Statistical Product and Service Solutions
Other	
COVID-19	Coronavirus
T1	Time 1
T2	Time 2
NCAA	National Collegiate Athletic Associate
NHS	National Health Service
NGO	National Governing Organizations
UK	United Kingdom
WHO	World Health Organization

Chapter 1

General Introduction

A person-centred approach to exploring athlete mental health and emotional regulation

General Introduction

This thesis focuses on student-athlete mental health and the ways in which they regulate their emotions during sport performance. To set up the thesis, this chapter first explores mental health broadly by highlighting the problem with poor mental health and defines how mental health is operationalized for the remainder of the thesis. Considering an ecological systems approach to mental health, the importance of contextualizing mental health is introduced and key groups who are at a heightened risk for experiencing problems with their mental health are highlighted, such as student-athletes. To best support student-athletes, it is important to explore risk and protective factors for their mental health and this thesis argues for the importance of emotional regulation. The chapter then introduces the notion of emotions and emotion regulation and provides a clear definition, that is distinguishable to coping, with key findings from within and outside of sport. Finally, the chapter provides an overview of some broader approaches adopted in the thesis that inform the overarching aims of the thesis and then provides an outline of the empirical chapters.

What is mental health?

Mental health is something we all have. Whether our mental health is high or low, it is something we all must strive to support in the same way we do our physical health. Mental health disorders are a prevalent global problem and are a high priority on the National Health Service (NHS) Long Term Plan (Long Term Plan, 2019). In the UK, it is estimated that 1 in 6 adults have a diagnosable mental illness and that figure has increased over the COVID-19 pandemic (Daly et al., 2022; McManus et al., 2016). With the COVID-19 pandemic, the increased focus on mental health, and how best to support mental health, the investigation of mental health in this thesis could not be timelier.

The World Health Organization (WHO) defines mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stressors of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (WHO, 2004, p. 12). This definition has also been adapted to the sport context, whereby Breslin et al. (2019, p. 4) state “mental health is not merely the absence of illness, but a state of well-being in which those involved in competitive sport realize their purpose and potential, can cope with competitive sport demands and normal life stressors, can work productively and fruitfully, can act autonomously according to their personal values, are able to make a contribution to their community and feel they can seek support when required.”

Despite the provision of definitions of mental health both within and outside of sporting contexts, mental health is poorly understood, and this is particularly apparent in athlete populations and the sport psychology literature (Lundqvist & Andersson, 2021). To advance understanding of mental health in the field of sport psychology, it is imperative to clarify the conceptualization, operationalization, and underpinning theoretical framework used to explore athlete mental health (Lundqvist & Andersson, 2021; Vella et al., 2021).

The dual-continua model of mental health

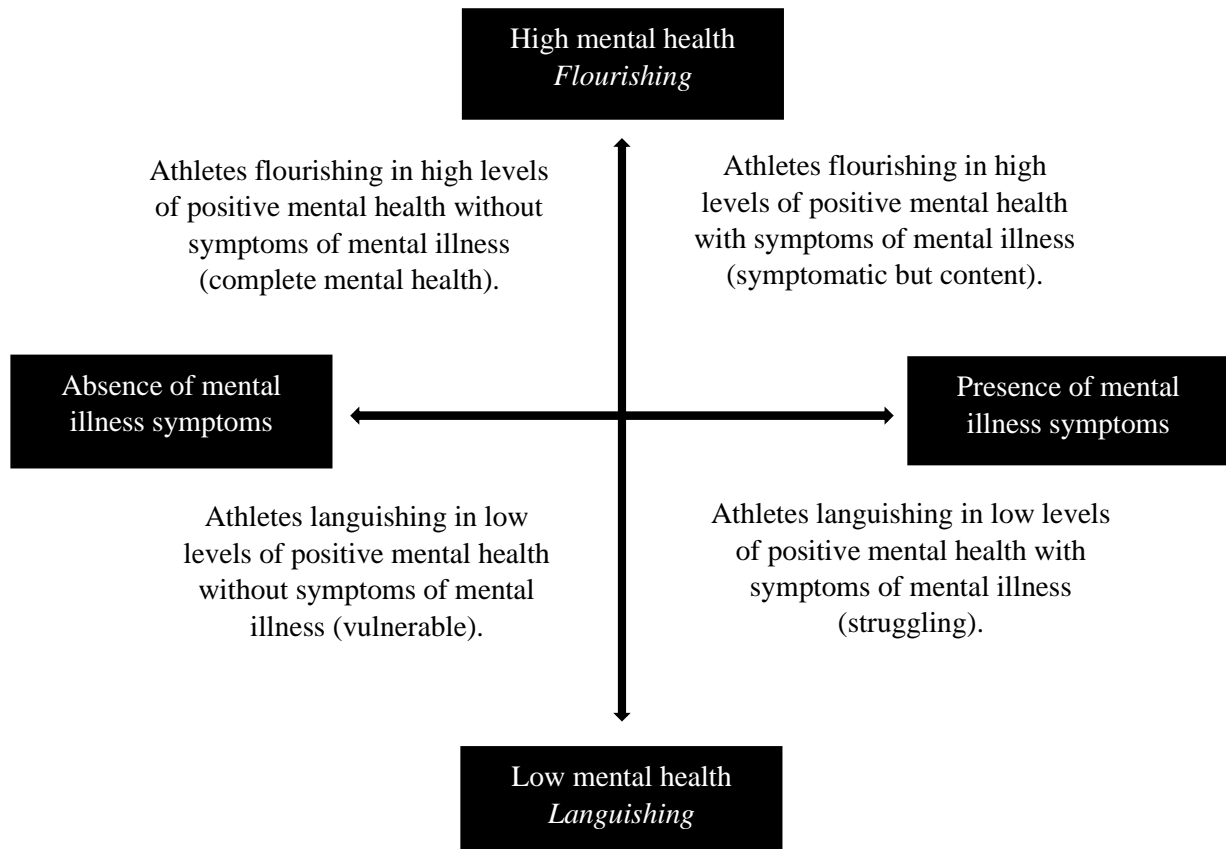
Understanding of mental health has developed in recent years from a singular continuum indicating a presence (mental illness) or absence (mental health) of mental illness, to a dual-continuum signifying both an absence or presence of mental illness in combination with good to poor levels of positive mental health (or well-being) (Keyes, 2002). This shift from a bipolar model of mental health where mental health and illness existed on the same continuum, to a dual-continua model where mental health and illness exist on their own

continuums, has provided important advancement in understanding of one's complete mental health (Iasiello et al., 2020).

The notion of a complete state of mental health is exemplified in a key theory underpinning this thesis, the “dual-continuum model of mental health”, also known as the complete state model of mental health (Figure 1.1 [Keyes, 2005, 2014]). Several dual-factor models have been proposed in the literature (e.g., for a review, see Iasiello et al., 2020), however, this thesis adopts the perspective and terminology of Keyes’ (2002), whose influential work has been critical in transforming the way mental health is conceptualized and researched. That is, understanding mental health from a holistic and salutogenic perspective that moves from a unipolar view of mental health (mental health and illness existing on the same continuum) to a bipolar way of thinking (mental health and illness existing on separate continuums). The model signifies how an individual’s overall mental health can be implicated by symptoms of mental illness and mental well-being (Eklund et al., 2010). That is, mental health and illness are considered distinct but related constructs (Keyes, 2005). The model postulates that an individual with symptoms of mental illness is still able to experience heightened levels of mental well-being, or positive mental health (Keyes, 2005). Conversely, an absence of symptoms of mental illness does not mean an individual will be experiencing high levels of mental health and well-being (Keyes, 2002). Within this view, positive mental health (well-being) and mental illness are important components of mental health that should be investigated together in studies if the aim is to understand individuals’ mental health. A further key feature of the dual-continua model is the notion that mental health is not stable. In fact, our position on each continua fluctuates and changes over time depending on individual and contextual influences.

Figure 1.1

The dual-continua model of mental health adapted from Keyes (2002) and sub-groups labelled according to Iasiello et al. (2020)



Using the dual-continua model as a framework for exploring athlete mental health in this thesis allows for a holistic understanding of student-athlete mental health by exploring the uniqueness but also relatedness between mental health and illness in addition to the stability of their mental health. Research suggests mental health can be better differentiated when including both measures, as opposed to measuring mental illness alone (Kelly et al., 2012). Conceptualizing mental health in this way extends our knowledge within sport psychology as often, mental health and illness have been investigated in isolation (see Chapter 2). In line with arguments proposed by Iasiello et al. (2020), there are a number of

benefits to taking a complete view of mental health for this thesis. Within the context of sport, this thesis presents avenues for promoting mental health within sport rather than relying on interventions that tackle mental health problems after they have occurred. That is, adding to literature that considers the role of promoting well-being rather than just focusing solely on reducing symptoms of mental illness within the context of sport (Uphill et al., 2016).

The mental illness continuum. The mental illness continuum reflects an absence of symptoms of mental illness through to a diagnosable condition. This thesis focuses on the highly prevalent common mental disorders (CMD) of symptoms of depression and anxiety. Chapter 5 also considers student-athletes' levels of stress pre- and post-COVID-19 pandemic. Depression and anxiety are internalizing disorders and thus, are experienced within the individual (Adams et al., 2021). Depression is characterized by low mood and feelings of worthlessness, accompanied by disturbances to normal sleep and eating behaviors, and the potential for suicidal thoughts (Grant et al., 2013). It is generally considered that depression is an associated outcome of emotional regulation problems (Gross & Muñoz, 1995). Grant et al. (2013) argue that it is important to understand a person's risk for developing depressive symptoms and that low levels of well-being could be a contributing risk factor for depressive symptoms, highlighting the need to explore both continuums in research. Generalized anxiety disorder (GAD) is characterized by excessive worry (Watson & Greenberg, 2017) and is often comorbid with depression (Melton et al., 2016). Slee et al. (2021) found that generalized anxiety has dramatically increased in the UK in recent years and that this increase is more pronounced in young adults. Problems with emotion regulation are also prevalent in anxiety related conditions, particularly GAD (Cisler et al., 2010), suggesting an increase in awareness of emotion regulation use may help to understand the associated risk or protectiveness of such use.

The mental health or well-being continuum. The notion of positive mental health and well-being has garnered interest over recent decades (Tennant et al., 2007). Within the last 25 years, researchers have moved towards positive psychology that focuses on well-being and the notion of flourishing (Diener, 2009; Keyes, 2007). Historically, definitions and conceptualizations of well-being have been varied and inconsistent, particularly within the field of sport psychology, where there has been a lack of appropriate measures (Lundqvist, 2011; Ryan & Deci, 2001).

Two key well-being perspectives have advanced within research: hedonic and eudaimonic. Hedonic well-being (or subjective well-being) is unidimensional and includes moods, emotions (i.e., happiness), and increased life satisfaction (Lundqvist, 2011; Ryan & Deci, 2001). The hedonic perspective, therefore, accounts for affective states and unique perceptions whereby positive affect, negative affect, and life satisfaction are key indicators of subjective well-being (Ryan & Deci, 2001; Ryff et al., 2021). The eudaimonic perspective includes psychological and social well-being. High levels of eudaimonic well-being are characterized by personal growth and striving to maximize and reach one's potential (Díaz et al., 2015), or self-actualization (Maslow, 1968). Psychological well-being is a multidimensional construct that is thought to comprise of six key components: self-acceptance, positive relations with others, environmental mastery, autonomy, purpose in life, and personal growth (Keyes & Ryff, 1999; Ryff, 1989; Ryff et al., 2021). Keyes (1998) argues that positive mental health and well-being include more than solely subjective (emotional) and psychological well-being and that social well-being should also be considered. The five areas reflecting social well-being include: social coherence, social actualization, social integration, social acceptance, and social contribution and these multiple dimensions explain an individuals' level of functioning with other people in society (Keyes,

1998; Keyes, 2002). Where subjective (emotional) well-being describes “emotional vitality”, psychological and social well-being describe “positive functioning” (Keyes, 2002; p. 210).

Keyes suggests that an individual’s emotional, psychological, and social well-being should be considered when classifying someone as flourishing (high mental well-being), languishing (low mental well-being), or moderately mentally healthy (neither high nor low mental well-being). Flourishing individuals display signs and symptoms of hedonic well-being and positive functioning, those languishing display low levels of these constructs, whilst moderately mentally healthy individuals do not meet the criteria for either (Keyes, 2007). The exact diagnosable criteria are explained in further detail in Chapter 3. Keyes (2007) argues that flourishing with an absence of mental illness (complete mental health) is the definition of mentally healthy and that anything less than flourishing is associated with further complications. Consequently, a state of flourishing is considered to be a protective factor, whereas states of moderately mentally healthy and languishing are risk factors for overall mental health (Keyes, 2007). Although a distinct but related concept, positive mental health has been found to be a protective factor in of itself for mental illness. That is, heightened levels of mental health predict reduced symptoms whilst lowered levels of mental health predict increased symptoms over time (Keyes et al., 2010).

Researchers also suggest that emotional well-being encompasses more than just striving for pleasant emotions, in fact, emotional goals can be context dependent. Diener et al. (2003) pointed out that perceptions of well-being are related to contextual circumstances an individual deems as important in their life. For example, a study conducted by Tamir and Ford (2012), found that pursuing anger was associated with poorer levels of well-being unless it was in a context where anger may be deemed useful and then it was associated with heightened well-being. Consequently, considering the context is important to have a more

holistic understanding of mental health. A key example of a context in which well-being has been contextualized and considered is sport (Foster & Chow, 2019; Lundqvist, 2011).

Sport as a context for mental health research

It is important to consider the sport context to better understand athletes' experiences of well-being within their sports to better understand the relationship between the two and support their global well-being also (Foster & Chow, 2019). An athlete's level of sport well-being can contribute towards their levels of global well-being due to the large emphasis athletes often place on sports participation in their lives (Foster & Chow, 2019; Lundqvist, 2011). Consequently, Foster and Chow (2019) provided a sport specific measure of mental well-being, based on the Mental Health Continuum (Keyes et al., 2008), to explore how sports participation impacts emotional, psychological, and social well-being. Beyond the importance of increasing sport well-being for promoting global well-being, higher levels of well-being supports athletes to thrive in sport (Jones et al., 2009), is considered a resource for better athletic performance (Henriksen et al., 2020), and can also protect against rates of mental illness (Keyes et al., 2010). Indeed, empirical support for the dual-continua model has been expressed by sport psychology scholars (e.g., Kuettel, Durand-Bush, et al., 2021; Kuettel, Pedersen, et al., 2021; Prior et al., 2022) and supports the notion that mental health and illness are distinct but related in the sport context. Investigating complete state mental health (mental well-being and mental illness) in the context of sport is, therefore, important and can serve multiple goals. That is, participation in sport has the potential to be both a risk and protective factor for complete mental health and it is important to explore the mechanisms underpinning these relationships to promote preventative factors and mitigate risks. It is important for research to consider how sport may be both a risk and protective factor for complete mental health to better inform interventions. It is necessary to know what factors to promote or enhance within the sport context and which to minimize or remove, as

just taking away the risk factors does not necessarily mean an athlete will flourish. Current perspectives on the risk and protective factors associated with sports participation will now be explored.

Firstly, understanding the factors that promote mental health in sport is important. It is widely considered that participating in sport and physical activity provides several physical and psychological benefits (Stubbs & Rosenbaum, 2018), and can promote mental health and well-being (Schinke et al., 2018). Kuettel and Larsen (2020) identified in their scoping review a range of protective factors for elite athlete mental health which could be differentiated by sport-environmental and personal factors, example protective factors included mental health literacy and support, positive sporting relationships, and basic psychological needs.

Despite the benefits sports participation can afford, athletes are also exposed to risk factors that can contribute to poorer mental health outcomes and thus, it is also important to understand the factors that reduce mental health. Participating in competitive sports places athletes under a wide variety of stressors (Lundqvist, 2011). In fact, Arnold and Fletcher (2012) found athletes to be exposed to over 640 unique stressors. It is not surprising then that there are high prevalence rates of mental health concerns in elite athlete populations (e.g., Gouttebarga et al., 2019; Kuettel, Pedersen, et al., 2021; Reardon et al., 2019; Rice et al., 2019). Not only are athletes at risk for mental health concerns such as depression and anxiety, but these conditions are also associated with other issues such as injury (Putukian, 2016), poor performance, and reduced academic achievement (Chang et al., 2020). Due to the high number of stressors and associated issues, athletes, regardless of level, are at risk for mental health difficulties and require support with their mental health (Vella & Swann, 2021). Kuettel and Larsen (2020) identified in their scoping review example risk factors of stigma

towards help-seeking, ineffective coping, maladaptive personality traits, sport-specific stressors, and low social support.

Within athlete populations broadly, there is a general lack of understanding and awareness of mental health problems, coupled with negative perceptions of mental health, high levels of perceived stigma, and low levels of help-seeking (Gulliver et al., 2012; Purcell et al., 2019). Amongst athletes, mental health literacy is, therefore, low and can contribute to poorer mental health outcomes (Gorczyński et al., 2019). Consequently, it is important to not only understand athletes' mental health, but the risk and protective factors associated with their mental health so that lessons can be learnt from those with high levels of mental health and interventions can be provided to those who are struggling. This thesis examined mental health specifically in the case of student-athletes. Before looking at this sub-group in detail, it is necessary to first consider why young adults are an at-risk age group. In the next sub-section, a developmental approach is taken to provide context to why young adults, who are also students and also athletes, are an important sub-group to research.

Young adulthood

A risk factor for symptoms of mental illness and poor mental health is age. Young adulthood (aged 16-24) reflects a period of dramatic change and development and is described as the peak age for onset of mental health concerns (Kessler et al., 2007). This age group also often makes the transition to university (Duffy et al., 2020). Whilst at university, students have to contend with various risk factors for poor mental health. During this time, young adults develop greater independence but with this independence comes stressors that may put them at heightened risk for mental health difficulties. For example, students move away from family for potentially the first time, have to make new friends, and manage their finances (Adams et al., 2021). It is considered that 25% of university students struggle with

symptoms of depression (see Sheldon et al., 2021 for meta analysis). Despite this marked increase in rates, limited mental health support is accessed in this population (Mental Health Taskforce, 2016). Young people are often considered to be physically healthier than older populations, however, risk factors in adolescence and young adulthood could contribute to greater disease burden in later life (Gore et al., 2011). Similar to athletes, young adults who are university students have low help-seeking intentions, high levels of perceived stigma, poor mental health literacy, and limited awareness of mental health difficulties (Chow et al., 2023; Eisenberg et al., 2009; Gorczynski et al., 2017; Hunt & Eisenberg, 2010). Much of the literature has focused on such risk factors for mental disorders, yet various individual, social, and environmental protective factors also exist for reducing the onset or severity of mental disorders, such as depression (Grant et al., 2013). Consequently, an understanding of risk and protective factors for young adults' mental health is an important line of enquiry.

Student-athletes¹

Young adults who are also athletes are a specific subgroup at a heightened risk for mental illness. The peak age for the onset of mental health concerns (16-24, Kessler et al., 2007) coincides with young people continuing their education as well as sporting involvement. Indeed, the peak age of elite competitive performance for many sports and disciplines is also occurring when student-athletes face the transition to University (Adams et al., 2021; Åkesdotter et al., 2020; Allen & Hopkins, 2015). On top of the demands of being a

¹ For the purpose of this thesis and being contextualized to the UK, student-athletes refers to young adults aged 18-25 who are attending university and also participating in sport during their studies. This distinction is important because much of the literature on student-athletes has emerged from North American samples where university student-athletes are often referred to as college athletes and high school student-athletes are referred to as student-athletes. For example, Heikura et al. (2023), explored high school student-athletes mood profiles and concluded that more support is needed for student-athletes when balancing sport and academics.

student, student-athletes, who are an example of dual-career athletes, face additional challenges and pressures such as balancing academic and sporting demands (Drew & Matthews, 2019; van Slingerland et al., 2018; Kegelaers et al., 2022). There also exist high levels of stigma towards mental health in student-athletes (M. D. Bird et al., 2018; Delenardo & Terrion, 2014), and thus, research has aimed to understand the risk of stigma on mental health outcomes and develop interventions that aim to reduce stigma and improve mental health literacy and help-seeking in student-athletes (Chow et al., 2020). Due to the risk associated with being a student-athlete, there has been an increased focus on student-athletes' mental health in the literature.

A range of studies exist exploring prevalence rates of student-athlete mental health, the majority of studies report similar or lower risk for mental health concerns compared to non-athletes but some report higher risk, highlighting mixed evidence as to their comparative risk to other populations (for a review, see Kegelaers et al., 2022). This mixed evidence is likely due to the variety in definitions and measurement methods used. In their recent scoping review, Kegelaers et al. (2022) concluded that more research is needed that explores student-athlete mental health from a complete state perspective. In fact, they surmise that the literature is predominantly characterized by un-diverse samples that are cross-sectional in nature, focus heavily on mental illness, and have been conducted with student-athletes from North America. Drew and Matthews (2019) also argue that whilst understanding prevalence rates of mental illness are important and should be continued, researchers should also explore protective factors that reduce the risk of symptoms.

There are also associated benefits of having a dual-career (Stambulova & Wylleman, 2019), and these can also help to explain the mixed findings on prevalence rates of student-athlete mental health (Kegelaers et al., 2022). Participation in sport may serve a protective factor by reducing the risk of mental illness due to increased social support and self-esteem

(Babiss & Gangwisch, 2009), promoting well-being through increased mental toughness (M. D. Bird et al., 2021), increased psychological resilience (Drew & Matthews, 2019), and promoting well-being by providing opportunities for developing emotional regulatory skills (G. A. Bird et al., 2021). This latter protective factor was the main motivation for exploring emotional regulation within this thesis. This is because it is well-established outside of sport that emotion regulation is a mechanism associated with mental well-being (Gross & John, 2003) and mental illness (Aldao et al., 2010), and could be a protective factor when dealing with stressors (Troy & Mauss, 2011). Research is needed to move beyond simply examining risks vs. protective factors, to understanding for whom and under what conditions such factors influence indicators of mental health. Considering both indicators of mental illness and well-being is important not only for having a more nuanced and complete understanding of student-athlete mental health, but also because the emotion regulation strategies that are adaptive or maladaptive for mental illness may have differing functions with well-being (Uphill et al., 2016).

Despite the associated risk and protective factors of being a student-athlete, in a systematic review, Vella et al. (2021) found 20 position statements on mental health in sport with the majority focusing on elite athletes and just 3 on ‘collegiate’ athletes (NCAA, 2017; Klenck, 2014; Neal et al., 2015), but rarely from a complete state perspective. Approximately 95% of people who engage with sport are recreational level athletes, but recreational sport environments lack the resources or knowledge to provide mental health support (Vella et al., 2021; Vella & Swann, 2021). Mirroring the call for improved mental health promotion in the general population, there is a clear gap for exploring young adults, who are student-athletes, mental health from a complete state and person-centred approach. It is also important to consider the full range of student-athletes from recreational to elite within research. Therefore, this thesis included student-athletes of all competitive levels. Universities may

provide a context for enhanced support for recreational (and all) level athletes during this peak developmental period. Understanding the mechanisms by which this can be done is important and so far underexplored mechanism in student-athletes is how they attempt to deal with stressors through emotion regulation. Emotion regulation will be explored in the next subsection by explaining firstly what emotions are and their importance in the sport context, then providing a conceptual distinction between coping and emotion regulation to then make clear the operational definition adopted in this thesis. The section then defines emotion regulation and describes a key model of emotion regulation underpinning the thesis.

Emotion regulation

To understand emotion regulation, we must first understand emotions. Emotions are a key part of life and are experienced continuously as positively or negatively valenced and high or low in intensity (Kashdan et al., 2015). Individuals are continuously exposed to emotion-generating stimuli every day (Koole, 2009). An emotion starts to unfold when appraisals are formed in response to relevant stimuli. In line with Gross (1998b), emotions can be viewed as response tendencies. This suggests that some element of control can be exerted over our emotions to alter how this response appears. Emotions are characterized by their fluctuating and temporary nature and differ to moods in that moods are long lasting emotional episodes. Emotions are key components of many mental health conditions. It follows, that the processes by which individuals regulate their emotions is a key component of mental health (Gross & Muñoz, 1995).

According to Berking and Wupperman (2012), the study of emotion regulation and mental health outcomes has seen a surge in popularity in broader psychology, stemming from its roots in the developmental field. They also argue that there is a lack of consensus on how emotion regulation and associated outcomes are measured and defined. This thesis, therefore,

adopts a definition of emotion regulation as “the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (Gross, 1998a, p. 275). These processes can be implemented at any stage of the emotion generating process and can be conscious or unconsciously used as well as spontaneous or controlled (Gross, 1998b). The definition highlights that individuals can exert some control over their emotions. Importantly, emotion regulation involves the up-or down-regulation or maintenance of both positive and negative emotions (Gross, 1998b; Koole, 2009). There are several ways an individual can attempt to regulate emotions. That is, it is also possible to regulate the emotions of others, referred to as inter-personal emotion regulation (e.g., Campo et al., 2017), as well as self-regulation. Efforts can also be cognitive or behavioral. This thesis, however, focuses on how an athlete regulates their own emotions, both cognitively and behaviorally.

Within the field of sport psychology, the study of emotion regulation and mental health is in its relative infancy. To best provide value to the field and important knowledge that has clear practical implications for supporting athletes’ mental health, a clear theoretical underpinning is imperative. There are a few frameworks that help to understand emotion regulation (for a review, see Koole, 2009); however, this thesis has adopted the Process Model of Emotion Regulation (PMER) to frame the research (Gross, 1998b). The PMER has a number of advantages for understanding emotion regulation which will be discussed in the next section and throughout the thesis, however, it also has utility for comparing the findings from this thesis to other fields of psychology as one of the most popular models across fields (Webb et al., 2012).

Emotions are also a key component of sport (Furley et al., 2023). Before, during, and after sport participation, athletes experience a variety of different emotions that can have an impact on their competitive performance (Uphill et al., 2012). Ruiz and Robazza (2020),

provide an example of an athlete being angry at a referee's decision. Models for understanding sport emotions have long existed, for example The Individual zones of Optimal Functioning (IZOF) model was introduced to help understand emotions in the sport context (Hanin, 2000). The study of emotions in sport is a complex issue (Hanin, 2000). Emotions such as anxiety may be perceived as negative in many contexts but for an athlete, may positively facilitate their performance. Consequently, if an athlete perceives an emotion will promote performance, then they are more likely to upregulate it. Lane et al. (2011) discovered that 15% of athletes in their study upregulated anxiety in an effort to improve performance. Nevertheless, this would require enhanced regulatory skills as excessive anxiety can debilitate performance (Röthlin et al., 2016). Despite the relationship between emotions (and thereby emotion regulation) and mental health being well established (Gross & Muñoz, 1995; Hu et al., 2014), and the relationship between emotion and sport performance (Stanley et al., 2012; Furley et al., 2023), there is a lack of empirical research that specifically explores the relationship between emotion regulation used by athletes in the sport context and their mental health outcomes (see Chapter 2 for systematic review). Particularly when considering their complete mental health.

Before discussing emotion regulation further, there is a need to first look at the difference between coping, emotion regulation, and other related constructs, as these have often been conflated in the literature (Gross, 2015a). This endeavor is to make clear the operationalization of emotion regulation in this thesis. Constructs related to emotion regulation include, but are not limited to, mood regulation, resilience, mental toughness, and coping. To elaborate, resilience and emotion regulation are considered as connected topics (Kay, 2016; Polizzi & Lynn, 2021; Troy & Mauss, 2011). In fact, Polizzi and Lynn (2021) argue that emotional regulation relates to coping which in turn relates to enhanced resilience. Furthermore, heightened levels of resilience and mental toughness are associated with

improved sporting performance via emotion regulation, highlighting the complexity and interconnectedness of these psychological constructs. Indeed, coping, mood regulation, and emotion regulation form part of affect regulation and although may overlap in some regard, are distinguishable from one another (Gross, 2015a). For example, mood regulation is achieved through behavioral or cognitive regulation of moods, whereas emotion regulation is the behavioral or cognitive regulation of emotions (Totterdell & Leach, 2001; Gross, 2002). Consequently, aligned with the PMER and aims of the thesis, the scope of this thesis is on emotion regulation strategies described by the PMER as related to mental health outcomes and adopts this line of enquiry to enhance understanding of emotional regulation strategies specifically with a view for future research to explore moderating and mediating variables within the student-athlete population. Although investigating these constructs within the present thesis would delimit the scope, focusing on emotional regulation strategies in particular is important as limited research exists specifically exploring student-athletes use of emotion regulation strategies as related to indicators of mental health. To enhance this argument further, distinctions between coping and emotion regulation will next be discussed as these constructs are often used interchangeably.

Coping vs emotion regulation

The seminal work of Lazarus (1966) introduced the notion of coping with a particular focus on dealing with stress. Coping is defined as "cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). Coping efforts can be problem- or emotion-focused (attempts to problem solve and decreasing negative emotions). Emotion regulation is therefore associated with coping, and both fall under an umbrella term known as "affect regulation" (Gross, 2015a). These two methods of affect regulation, although related, are distinct from one another (Gross, 1998b). Gross (1998b) distinguishes coping from

emotion regulation by highlighting that coping focuses on stress responses and how one can ‘cope’ for long periods of time. Emotion regulation, on the other hand, deals specifically with emotions and can involve upregulating and downregulating both positive and negative emotions. Coping is used to respond to stress that is purposeful in nature (Lazarus & Folkman, 1984). Whereas emotion regulation focuses on the emotions aspect of affect and can be conscious or unconscious attempts. Although coping and emotion regulation are often used interchangeably in the literature, this has presented conceptual inconsistencies and a lack of clarity.

Within sport, Kim and Tamminen (2022) argue that coping may form part of an athlete’s emotional regulatory efforts due to sharing similar characteristics, but these concepts are different in function. Further, Furley et al. (2023), explain how emotion regulation and coping are differentiated in line with Gross (1998). Although the concepts of coping and emotion regulation are related (Koole, 2009), this thesis focuses explicitly on the regulation of emotion. To avoid “conceptual and definitional chaos” (Buck, 1990, p. 330; Gross, 2015a) in this thesis a definition and perspective of emotion regulation based on the conceptualization made by Gross (1998a; p. 275) has been adopted and is; “the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions”. This definition provides a foundation for understanding a key model of emotion regulation, the PMER (Gross, 1998b).

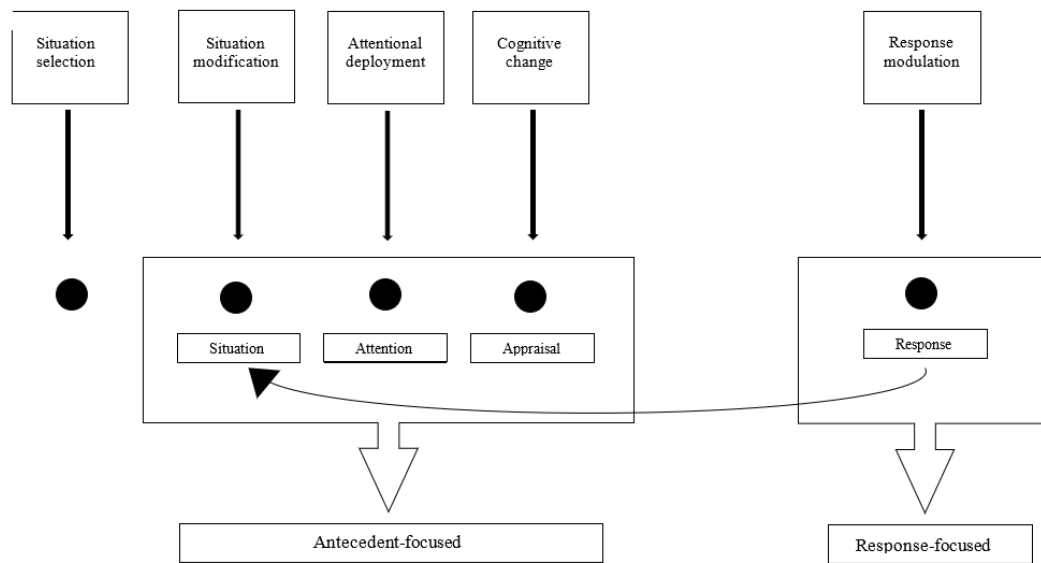
The Process Model of Emotion Regulation

The PMER was developed to help understand the literature on emotion regulation and related constructs, and to conceptualize the plethora of strategies an individual can use into a set of processes (Gross, 1998b). The PMER posits the sequence of 5 key processes in which an individual can attempt to regulate their emotions as an emotion unfolds, these are: situation selection, situation modification, attentional deployment, cognitive change, and

response modulation (Figure 1.2). The first 4 are antecedent-focused. That is, they occur before an emotion is fully generated. The final process is response-focused and occurs after an emotion has fully generated.

Figure 1.2

The Process Model of Emotion Regulation (PMER) adapted from Gross & Thompson (2007)



The majority of research investigates emotion regulation from a start place of attentional deployment and rarely considers situation selection and modification (Webb et al., 2012). This thesis, however, includes strategies from across the full emotion generating process (Table 1.1). Including a broad range of strategies, reflecting different stages of the PMER, is important because research suggests athletes use multiple strategies to upregulate or downregulate emotions dependent on their regulatory goals (Martinent et al., 2015). Whilst this framework does not provide all the answers, it allows for a complex issue to be simplified into a set of processes to begin to understand the use and impact of different strategies (Gross, 2015a). Each process will now be discussed in turn with emotion regulation strategies relevant to this thesis and a sport specific example.

Table 1.1

Emotion regulation strategies explored in data studies (Chapters 3, 4, & 5) mapped to PMER

Antecedent-focused				Response-focused
Situation		Attention	Appraisal	Response
Situation Selection	Situation Modification	Attentional Deployment	Cognitive Change	Response Modulation
Actively approaching (3)	Withdrawal (3)	Seeking distraction (3)	Catastrophizing (4)	Expressive suppression (4 & 5)
	Seeking social support (3)	Ignoring (3)	Cognitive reappraisal (4 & 5)	
		Rumination (4)	Refocus on planning (4)	
		Positive refocusing (4)		

Situation selection. *A netball player has an upcoming match against a team who had one player that got particularly aggressive in their previous game. This situation is likely to elicit an emotional response. The athlete has a choice, do they play the match or sit this one out? Do they listen to feel good music before the match? (situation selection).*

Situation selection is behavioral in nature and includes strategies that involve avoiding or approaching emotion eliciting situations (Gross, 1998b). As described by Gross and Thompson (2007), situation selection is pre-emptive in that an athlete would select situations that are more likely to result in favorable emotional outcomes, however, this suggests an individual would need a level of emotional awareness and understanding about how situations are likely to affect them. Often, the selection is based on previous experiences and occurs before the onset of emotions. University may be one of the first times a student-athlete has the opportunity to fully, independently, select their own situations. For example,

choosing to participate in sport if the activity is perceived as pleasant. However, athletes avoiding social situations may provide short-term benefits and emotional relief at a consequence of increased loneliness in the long-term (Gross & Thompson, 2007). ‘Actively approaching’ is a situation selection strategy explored in this thesis (Chapter 3). It involves behavior that directly addresses dealing with the stressor and has been shown to relate to fewer symptoms of depression and anxiety in the general population (Kraaij & Garnefski, 2019).

Situation modification. *There’s no one else to play and the team would be a person down if the athlete did not play. Perhaps the athlete decides they could play on the other side of the netball court or seek advice from teammates before the match (situation modification).*

The second stage of the emotion generating process affords an opportunity for an individual to modify the situation in an attempt to change the effect an emotion may have (Gross, 1998b). Gross and Thompson (2007) argue that modifying a situation has the potential to begin a new situation and thus, the boundaries between selection and modification are blurred and closely related. Situation modification is purely an external form of emotion regulation (i.e., the modification of one’s internal world is cognitive change; Gross & Thompson, 2007). Situation modification strategies included in this thesis are withdrawal and seeking social support (Chapter 3). Withdrawal involves removing oneself from the stressor as well as other people (Kraaij & Garnefski, 2019). Seeking social support, on the other hand, involves sharing one’s emotions with others coupled with seeking advice (Kraaij & Garnefski, 2019). Withdrawal is associated with greater symptoms of depression and anxiety whilst seeking social support is associated with fewer symptoms in adults (Kraaij & Garnefski, 2019). Within sport, some researchers have found seeking social support to be related to enhanced ‘negative’ emotions (Doorley et al., 2022), perhaps due to the stigma

associated with mental health in sport. However, it is not yet well understood how situation modification strategies relate to athletes' mental health outcomes from a complete state perspective.

Attentional deployment. *The coach disagrees, the athlete may need to concentrate on the ball and ignore the aggressive player or perhaps they keep going over their concerns in their head (attentional deployment).*

Attentional deployment involves a shift of attention either onto or away from the emotion eliciting stimuli or event (Gross & Thompson, 2007). During a competitive match, it may not be possible to change or modify the situation physically, however, Gross and Thompson (2007) postulate that attentional deployment strategies may be used as an attempt to change the situation cognitively. Key examples of attentional deployment strategies included in this thesis are rumination, distraction, ignoring, and positive refocusing (Chapters 3 & 4). Although these strategies reflect cognitive efforts to regulate emotions, it is also possible for an individual to make behavioral efforts at deploying attention such as covering ones' eyes (McRae, 2016).

Rumination has been defined as “repetitively focusing on the fact that one is depressed; on one's symptoms of depression; and on the causes, meanings, and consequences of depressive symptoms” (Nolen-Hoeksema, 1991, p. 569). Research suggests strong associations between rumination and depressive symptoms (Schäfer et al., 2017; Tahtinen et al., 2020; Treynor, 2003), and that athletes are likely to ruminate, particularly following ‘failed’ athletic performance (Kröhler & Berti, 2019). Although the response styles theory definition of rumination discusses depression, rumination is also related to conditions such as anxiety (Olatunji et al., 2013). It has been considered that rumination may have utility in certain contexts and may be associated with improved sport performance, but equally could

low levels of rumination (Roy et al., 2016). Providing a paradox in the adaptiveness of rumination for sport performance and pointing to some individual and contextual differences in the use and influence of emotion regulation. It has been argued that there are benefits to rumination if used as a tool for reflection. That is, if rumination promotes a dedication to improved performance, then it could be viewed as an adaptive strategy for athletes within the context of sport (Roy et al., 2016). Nevertheless, substantial research points to the maladaptiveness of rumination in relation to mental health.

Distraction involves a shift of attention to focus on something less emotionally stimulating such as by diverting ones internal or external focus (Gross, 2015a; Kraaij & Garnefski, 2019). This strategy is typically considered adaptive for reducing symptoms of depression and anxiety in adults (Kraaij & Garnefski, 2019). However, distraction could be used maladaptively as a form of avoidance (Kashdan et al., 2015). Distraction type strategies, such as the attentional style of dissociation, have been looked at previously in sport and exercise with findings that dissociation is related to lower levels of positive psychological outcomes and reduced sport performance (Connolly & Janelle, 2003; Jones et al., 2017). Within sport, Balk et al. (2013) found distraction to be a helpful strategy for dealing with pressure, and more so than reappraisal; a cognitive change strategy discussed in the following sub-section.

Ignoring involves acting as though nothing has happened and is related to elevated symptoms of depression and anxiety in adults (Kraaij & Garnefski, 2019), whilst positive refocusing involves casting one's mind to positive experiences rather than focusing on what has happened and is associated with more favorable mental health outcomes in non-clinical samples (lower depression and anxiety, enhanced mental well-being) (Garnefski & Kraaij, 2006). There is limited research on ignoring and positive refocusing in the literature in sport. However, such strategies may be theorized to be used in sport, that is, athletes often need to

continue performing and so a swimmer could for example, ignore the fact they just lost their last race or refocus on their happiness for their friends win. Research on refocusing in sport typically focuses on refocusing on the immediate task at hand through mindfulness techniques (e.g., Thienot et al., 2014). Wagstaff et al. (2013), found they could increase positive refocusing in sport, highlighting utility of this strategy in the sport context.

Cognitive change. *Ultimately the athlete has come up against the aggressive player and they are indeed playing aggressively, the athlete now cannot change the situation and must attempt to change their appraisal of the situation, perhaps this is an opportunity to feel pride in their own sportsmanship and remember that they will play their best regardless (cognitive change).*

The process of cognitive change is the final opportunity for antecedent-focused regulation. It “refers to changing how we appraise the situation we are in to alter its emotional significance, either by changing how we think about the situation or about our capacity to manage the demands it poses” (Gross & Thompson, 2007; p.14). Three strategies explored in this thesis include cognitive reappraisal, refocus on planning and catastrophizing (Chapters 3 & 4).

A frequently researched cognitive change strategy is cognitive reappraisal. This strategy is defined as “cognitively transforming the situation so as to alter its emotional impact” (Gross, 1998b; p.284). Reappraisal is a strategy that is frequently used to underpin psychotherapies such as cognitive behavioral therapy (Aldao et al., 2014) and has typically been considered adaptive for mental health (Webb et al., 2012). It is also associated with adaptive outcomes in sport (G. A Bird et al., 2021). For example, Stanger et al. (2018) found that reappraisal was a beneficial strategy for badminton players when attempting to control competitive anxiety. Martinent et al. (2015) concluded that antecedent-focused strategies

were more adaptive than response-focused strategies during competitive matches for table tennis athletes. Whilst such studies provide insight into the strategies used by athletes in sport, their narrow focus on one sport limits the ability to generalize to athletes more broadly. An athlete might reappraise an unfavorable competitive outcome by viewing it as an opportunity for development and to improve the outcome next time. Although a strategy that is repeatedly investigated, Brockman et al. (2017) concluded that reappraisal was not the most frequently used in daily life. Consequently, this thesis explores two other forms of cognitive change in addition to reappraisal, these are: refocus on planning and catastrophizing (Chapters 3 & 4).

Refocus on planning involves planning out the steps needed to deal with a stressor (Garnefski & Kraaij, 2006). Refocus on planning is a relatively understudied emotion regulation strategy, however, within the context of the COVID-19 pandemic, Sacchi and Dan-Glauser (2021) found that those who used this strategy reported fewer symptoms of depression along with fewer negative and more positive emotions. They argue that this strategy has utility in other stressful situations and not just the pandemic. Planning has also been found to relate to small improvements in sport performance for table tennis players (Kubiak et al., 2019), has been found to relate to higher levels of emotional and psychological well-being in an adult population (Balzarotti et al., 2016), and is considered a beneficial strategy for promoting mental toughness and subsequently sport performance (Araújo, 2022).

Catastrophizing involves “thoughts of explicitly emphasizing the terror of what you have experienced” (Garnefski & Kraaij, 2006). Catastrophizing and rumination share similar characteristics in that they both involve negative thought patterns but differ in that rumination is more focused on the past whilst catastrophizing is more future focused. This strategy is frequently explored in the sport literature but in relation to injury and pain (e.g., Sciascia et al., 2020) and has been found to be associated with higher symptoms of depression and

anxiety (Garnefski & Kraaij, 2006; Mannes et al., 2020). Furthermore, research suggests it shares a small relationship with worsened performance (Kubiak et al. 2019). Consequently, it is plausible that athletes would catastrophize in sport, and it is important to be aware of their use of this strategy if outcomes are maladaptive. Wagstaff et al. (2013) found increases in refocus on planning and decreases in catastrophizing following an intervention, highlighting that such strategies can be used, and taught, within the context of sport for improvements at both the individual and organizational level.

Response modulation. *The aggressive player points their aggression towards the athlete and unfairly shoves the athlete resulting in the generation of an emotion. They have an opportunity to decide how they respond. Do they outwardly express their emotional reaction to the shove or do they suppress their emotion and keep a neutral expression (response modulation).*

Response modulation is a response-focused process. As an emotion has formed at this point of the emotion generating process, the process involves modifying or controlling the experience or expression of the emotion (e.g., facial expressions, physical expressions, verbal expressions; McRae, 2016). This can involve suppressing the expression of an emotion, or enhancing the outward expression (e.g., showing happiness at your teams' victory despite feeling like you played poorly). A frequently researched response modulation strategy is expressive suppression which describes an athletes' attempt to inhibit the outward expression of the emotions they are experiencing (Gross, 1998a). Expressive suppression is a strategy that has received a great deal of attention in the broader psychology literature and has been found to be associated with symptoms of mental illness such as depression and anxiety (Aldao et al., 2010), and reduced mental well-being (Gross & John, 2003). This body of work has frequently described suppression as maladaptive for mental health (Hu et al., 2014). Within sport, Uphill et al. (2012) found expressive suppression was not related to emotions in

university student-athletes, however, Kim and Tamminen (2022) found reduced use of expressive suppression (with an enhanced use of reappraisal) was associated with outcomes such as more favorable emotions and sport enjoyment for adolescent athletes, highlighting the diversity of findings in the literature. A potential explanation for this is if regulatory attempts align with individual and contextual goals then more positive outcomes are likely to ensue (Eldesouky & Gross, 2019; Tamir et al., 2020). With a lack of empirical research on emotion regulation strategies in general in the sport literature, and a diversity of findings, more research is needed that explicitly aims to explore the relationship with complete mental health.

In summary, this section summarized the different emotion regulation strategies that were investigated in this thesis and explained how they map onto the PMER. Emotion regulation strategies have been shown to be related to mental health outcomes, with a key focus on symptoms of mental illness (Hu et al., 2014). There exists a clear gap for exploring athletes use of emotion regulation strategies with mental health from a salutogenic perspective. There are many emotion regulation strategies that are out of the scope of the thesis, however, the included strategies in Chapters 3 and 4 can be seen in Table 1.1. In general, these strategies have been typically considered as adaptive or maladaptive for mental health outcomes.

Adaptive vs maladaptive emotion regulation

The terms ‘adaptive’ and ‘maladaptive’ are often used to classify whether strategies relate to positive or negative mental health outcomes. That is, adaptive strategies are those that relate to favorable mental health outcomes whereas maladaptive strategies relate to unfavorable outcomes. Overall, emotional regulation strategies such as reappraisal have been labelled as adaptive whilst those such as rumination and suppression have been labelled as

maladaptive (Paul et al., 2023). As suggested by Aldao and Nolen-Hoeksema (2010), maladaptive emotion regulation may have a greater effect on symptoms of mental illness than a lack of using adaptive strategies. Further, Schäfer et al. (2017) concluded that adaptive strategies serve as a protective factor against mental illness and are related to increased well-being. Whilst useful, this taxonomy misses the key consideration of context. It is important for athletes to understand their emotional regulation and know when it is suitable to use certain strategies over others. Gross (2002) did not discuss whether a strategy is inherently good or bad in his original conception of emotion regulation. However, the literature has predominantly adopted a main effects approach to emotion regulation and focused on whether strategies are good or bad. This body of work has highlighted that certain strategies are typically considered to be adaptive or maladaptive, but predominantly in other fields of psychology (Webb et al., 2012). Considering context is important as what is adaptive in one may not be adaptive in another (McRae, 2016). This will provide evidence for future interventions that consider the context so that athletes use emotion regulation strategies that are appropriate for them and the sport context (Kobylińska & Kusev, 2019).

Why context matters

Recent research is questioning under what circumstances and for whom strategies are adaptive or maladaptive (Paul et al., 2023). As argued by (Grazt & Roemer, 2004; p. 42), “knowledge of the specific emotion regulation strategies used by an individual, in the absence of information on the context in which they are used, may provide little information about the individual’s ability to regulate her or his emotions effectively”. Personality traits constitute an example of an individual difference that are a key factor in understanding emotion regulation use. A particularly relevant characteristic is alexithymia. This trait is defined by deficits in emotion processing and difficulties in understanding and communicating emotions (Ferguson et al., 2023; Taylor, 1984). Due to its role in affecting emotional regulation, alexithymia is

considered a risk factor for mental illness (Preece et al., 2023). It is necessary for an individual to identify the emotions they are experiencing in order for them to be regulated effectively (Morie et al., 2022). Empirical evidence suggests alexithymia helps explain the variance in emotion regulation use (49.5% suppression and 15.6% reappraisal, Morie et al., 2024). Results from the same study indicate alexithymia to also be predictive of depression, anxiety, and stress (Morie et al., 2024). Consequently, alexithymia is considered in chapter 3 to further understand nuances in emotional regulation and mental health. Alexithymia is an important variable to consider, not just because of its links with emotion regulation and consequently mental health, but because authors theorize individuals with alexithymia may be inclined to participate in sport, particularly high-risk sports where expected emotions are clearer (Barlow et al., 2015).

Theories of emotion regulation suggest individuals predominantly regulate their emotions for hedonic purposes, to feel better. This, however, is not always the case and is very much dependent on the context (Kashdan et al., 2015). In the same vein that well-being can be hedonic or eudaimonic, as can emotional regulation. That is, an athlete can aim to increase positive and decrease negative emotions in order to feel better (hedonic). When considered the other way around, i.e., increasing negative and decreasing positive emotions, this describes regulation for eudaimonic, or instrumental goals (Lane et al., 2011). According to McRae (2016), the majority of research explores regulatory attempts that are used to reduce ‘negative’ emotions. However, there are many contexts and circumstances in which an individual may want to up-regulate ‘negative’ and downregulate ‘positive’ emotions and sports participation is one of those examples. Often, individuals may sacrifice experiencing positive emotions in the short term in order to promote positive emotions in the long term (Kashdan et al., 2015). Consider an athlete who finds their performance improves by upregulating anger or anxiety, although this would induce short term feelings of ‘negative’

emotions, if it promotes performance, it may produce longer lasting positive emotions. But the regulatory skills may need to be there to prevent sustained periods of negative emotions. Furthermore, it is likely that an athlete who feels their coach will perceive their performance negatively may opt for sadness to elicit a more favorable response from the coach. Equally, a coach may upregulate their happiness to avoid demotivating their athletes before their next event.

Sport is its own unique context which warrants investigation (Uphill et al., 2012). Unique contextual demands and social norms exist in sport and just like everybody, athletes must constantly regulate their emotions to align with contextual goals (Haga et al., 2009). For example, social contexts (such as sport) may influence a strategies' inherent 'adaptiveness' (Paul et al., 2023). Thus, individuals must be flexible with their emotion regulation strategy use to align with their goals in a certain context (Lane et al., 2014). Authors have argued that flexible emotion regulation is vital for meeting contextual demands and promoting well-being (Aldao et al., 2015). In broader fields of psychology, research on emotional regulation has propelled forward onto these notions of regulatory flexibility and polyregulation (Ford et al., 2019). Within sport, however, we do not yet know enough about athletes' emotional regulation in relation to their complete mental health. Multiple emotion regulation strategies can be used, either simultaneously or in succession (Gross, 2015a), and so understanding athlete's emotional regulatory repertoire is important for understanding how strategies interact and relate to various outcomes in this unique context.

In summary, it is understood that athletes use emotion regulation strategies to facilitate performance (instrumental) (Lane et al., 2012). Consequently, emotion regulation is an important skill for athletes to develop (Lane et al., 2014). However, there can be an additional benefit or drawback to emotion regulation use as is evident in broader psychology. That is, emotion regulation strategies are related to mental health outcomes in other

populations (Webb et al., 2012). A gap exists in the sport literature for understanding how strategies used for performance purposes relate to athletes' mental health. There exists an opportunity for understanding the role of emotion regulation in promoting mental well-being and reducing the risk of mental illness through a mechanism that athletes already use and thus, may be less stigmatizing.

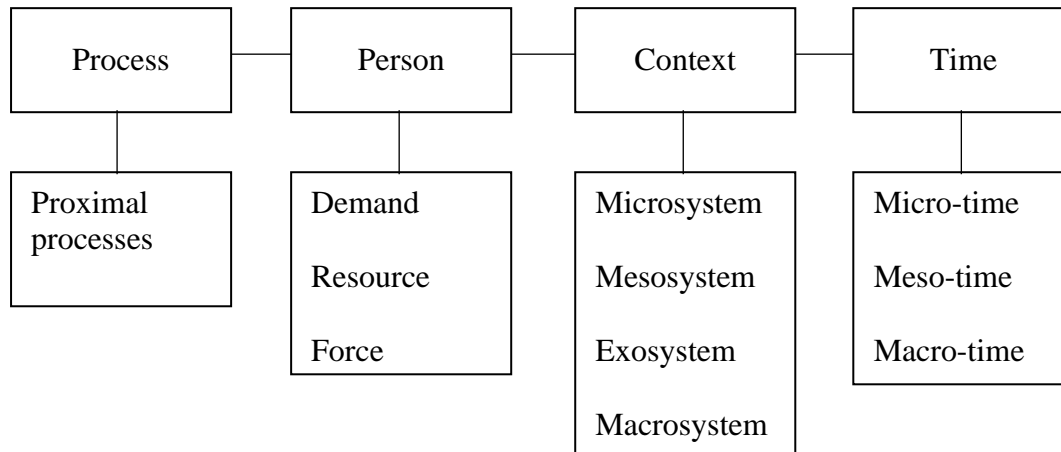
Broader approaches underpinning the thesis

Before providing an overview of the thesis and chapter aims, it is important to note the overarching approach and broader underpinning model that also informed this thesis in addition to what has already been described above. Firstly, the thesis adopts a person-centred approach which explores relationships between people rather than variables (variable-centred approach) (Bauer & Curran, 2004). Such an approach provides an opportunity for a more tailored approach to mental health support, depending on the needs of the athletes (Kusurkar et al., 2021). Despite arguments for considering individual differences in emotion regulation use, authors have rarely adopted person-centred approaches to explore such differences and research is instead often variable-centred (Brewer et al., 2016). Whilst exploring the relationships between emotion regulation strategies and mental health outcomes is important, it is necessary to understand the emotion regulation use between student-athletes with distinct characteristics to better inform intervention and holistic mental health support. Adopting a person-centred approach for this thesis recognizes the diverse individual experiences of mental health and emotion regulation. It has also framed the design of studies and analysis of data. That is, rather than 'confirm' athletes fit into preconceived mental health profiles, the aim of Chapters 3 and 4 was to discover mental health profiles within the data. Further, the thesis aims to understand for who (which athletes) emotion regulation strategies may relate to mental health outcomes and this is achieved by investigating mental health profiles.

The design of this thesis and future considerations are implicated by the process, person, context, and time (PPCT) model (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 1998). This model is underpinned by Bronfenbrenner's bioecological theory (Bronfenbrenner, 1979). This is in line with recent calls for considering the broader ecological sport system in mental health research (Purcell et al., 2019) and supports a holistic and person-centred approach. Such a model highlights the need to consider the entire context beyond just the individual athlete when considering mental health. To elaborate, the model provides a framework for exploring how contextual factors (sport) interact with person characteristics (demographics, emotion regulation, alexithymia) during different elements of time to help explain athletes' mental health outcomes. Process is explored to a lesser degree than other components of the PPCT model but can be seen in Chapter 3 where seeking social support can be considered a proximal process. The most evident component is person, whereby individual characteristics, and person resources such as sport characteristics, complete mental health, emotion regulation, and alexithymia have been investigated. Context is explored across all chapters in regard to considering athletes broadly in the review in Chapter 2, and then narrowing the focus further to dual-career university student-athletes. Although the micro-system is predominantly explored, context also includes mesosystems, exosystems, and macrosystems. Time is particularly apparent in Chapters 5 and 6. Chapter 5 considers ontogenetic time by longitudinally exploring mental health profiles across two time points reflecting early and late competitive seasons and stressful periods for students. In Chapter 6, historical macro-time is considered by investigating student-athletes' symptoms of mental illness pre- and post-COVID-19 pandemic. Time can also be explored ontogenetically and in micro-time and meso-time.

Figure 1.3

Conceptualization of the Process-Person-Context-Time model (Bronfenbrenner & Morris, 1998; Bronfenbrenner, 2005)



A note on COVID-19

The research within this thesis was conducted and written during the COVID-19 pandemic. Evidence shows a marked increase in the prevalence of mental health problems during the pandemic (Daly et al., 2022), particularly for young people (Daly et al., 2022). This increase in people requiring mental health support indicates a need for research to tackle the mental health crisis. One way this thesis addresses this issue is by investigating ways of promoting and protecting mental health by understanding the risk and protective factors that exist within the sport context. It is thought that the COVID-19 pandemic may have exacerbated mental health concerns as many of the potential protective factors associated with sports participation were taken away during this time (Cheng et al., 2023). Chapter 6 of this thesis explores this issue in further detail.

Events such as the COVID-19 pandemic are a stark reminder that athletes need support systems and to develop coping strategies to manage stress. In fact, emerging adulthood and the COVID-19 pandemic are considered two key factors impacting athlete

mental health (Reardon, 2023). During the pandemic, researchers found that student-athletes' mental health was impacted in North America (Chandler et al., 2021). Student-athletes need to be aware of the mental health support available to them and those who work with them need enhanced awareness of mental health concerns and an enhanced ability to monitor mental health. Chandler et al. (2021) argue that lessons learnt from the COVID-19 pandemic could also be applicable to other periods of interruptions in normal sporting activities (e.g., injury). Authors suggest that developing skills for adaptive emotion regulation would be important during this time (Sacchi & Dan-Glauser, 2021; Tambling et al., 2023). The pandemic presented an unexpected opportunity to explore differences between two cohorts of student-athletes pre- and post-pandemic. This led to a research note (Chapter 6) being included in this thesis that was not planned at the outset.

Thesis outline

Underpinned by Keyes' (2002) dual-continua model of mental health, the PMER (Gross, 1998b), and PPCT model (Bronfenbrenner & Morris, 1998; Bronfenbrenner, 2005), the overarching aim of the thesis was to investigate individual emotional regulation use as a risk or protective factor for mental health and to enhance understanding of student-athletes' complete mental health using a person-centred approach. This aim was achieved across 5 chapters including a final short report highlighting the need for supporting student-athletes as an important subgroup of athletes (Table 1.2). Specifically, the overall aim was achieved by: (1) synthesizing current knowledge on the relationships between emotional regulation use and indicators of mental well-being, mental illness, and performance, (2) taking a person-centred approach that considers student-athletes' complete mental health and explores differences in emotion regulation strategy use, and (3) longitudinally exploring the stability of student-athletes' mental health profiles between two key time points and investigating differences in emotion regulation use. Taking a holistic approach to athlete mental health

should involve the investigation of promotive (protective) factors for mental health simultaneous to preventative (risk) factors for mental illness and poor mental health (Purcell et al., 2019). This knowledge could have applied implications by helping athletes and those who work with them to understand how their attempts to regulate sport emotions could influence their mental health outcomes. Across the 3 major contributions to athlete mental health research is an exploration of emotion regulation across all 5 processes described by the PMER as risk and protective factors for mental health outcomes.

Table 1.2*Thesis outline and summary of chapter aims and study design*

Characteristics	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6
Study aim(s)	To determine the relationship between athletes' use of emotion regulation strategies and indicators of mental well-being, mental illness, and performance.	a) To identify latent mental health profiles that includes symptoms of mental illness and indicators of positive mental health. b) To understand whether profiles differ by student-athletes use of behavioral emotion regulation strategies and alexithymia.	a) To replicate chapter 3 and identify latent mental health profiles that includes symptoms of mental illness and indicators of positive mental health. b) To extend Chapter 3 and understand whether profiles differ by student-athletes use of cognitive and behavioral emotion regulation strategies reflecting more of the PMER.	a) To assess the stability of student-athletes' mental health status over time. b) to explore whether emotion regulation strategies help explain stability or change in mental health.	To explore student-athletes' symptoms of depression, anxiety, and stress pre-vs. post-COVID-19.
Study design	Systematic review: narrative analysis	Cross-sectional	Cross-sectional	Longitudinal	Cross-sectional (multiple cohort)

Together, these chapters address multiple gaps in the literature. Firstly, to my knowledge, there is no systematic review synthesizing relationships between emotion regulation strategies and sport outcomes, therefore, Chapter 2 addresses this gap to gain conceptual clarity and understanding on how emotion regulation has been studied within the field (Bird et al., 2022). Secondly, there is extensive evidence of prevalence rates of mental illness in athletes (Åkesdotter et al., 2020; Poucher et al., 2021), however, it is necessary to also explore the prevalence of mental well-being to have a holistic understanding of student-athlete mental health and the underpinning mechanisms (Simons & Bird, 2022). Thirdly, to best support student-athletes, it is imperative to understand how emotion regulation could predict changes or stability in student-athlete mental health over time, which will provide a more nuanced understanding of student-athlete mental health and emotion regulation. In conclusion, the thesis aims to explore whether sport can provide opportunities for developing emotion regulation that promotes mental health. This thesis will contribute to the literature by exploring what emotion regulation protective factors athletes already use that can be implemented and encouraged by coaches, along with risk factors that they should be aware of and used with caution.

Chapter 2 narratively synthesizes what is currently known on emotion regulation use in sport and highlights key areas for future consideration. Chapter 3 takes on what is learnt from Chapter 2 and ensures student-athlete mental health is explored holistically and from a salutogenic perspective (mental well-being, anxiety, and depressive symptoms) using a person-centred approach to address key gaps in the literature. The chapter also considers the role of behavioral emotion regulation as a potential mechanism for understanding mental health status. Replicating and extending Chapter 3, Chapter 4 explores student-athletes mental health by again using a person-centred approach to explore latent mental health profiles and explores differences in cognitive (Chapter 4) and behavioral (Chapters 3 & 4)

emotion regulation strategies between profiles. Chapter 5 assessed mental health status longitudinally and considers the stability of mental health according to the use of emotion regulation strategies. Chapter 6 highlights some important statistics on the prevalence of depression, anxiety, and stress pre- and post-COVID-19 pandemic and considers the historical macro-time element of the PPCT model and what happens when their ‘normal’ sporting context gets removed.

Chapter 2

A version of this chapter is under review in International Review of Sport and Exercise Psychology

A systematic review of performance and mental health correlates of emotion regulation in sport

Introduction

Throughout our daily lives, humans are continuously exposed to potentially emotion-generating stimuli (Koole, 2009). Sometimes, emotions are pleasant or unpleasant and helpful or unhelpful. Therefore, humans possess a capacity to exert control over their emotions through emotion regulation. Emotion regulation is “the processes by which an individual influences which emotions they have, when they have them, and how they experience and express their emotions” (Gross & John, 2003; p. 175). Within broader psychology, multiple reviews have compiled evidence regarding the relationship between emotion regulation and mental health outcomes (e.g., Aldao et al., 2010; Hu et al., 2014; Inwood & Ferrari, 2018; Schäfer et al., 2017; Webb et al., 2012). Collectively, this research argues that some emotion regulation strategies are adaptive (i.e., a protective factor), whilst others are maladaptive (i.e., a risk factor) for mental well-being and mental illness. For example, reappraisal, problem-solving, and acceptance are typically considered as adaptive, whereas evidence shows suppression, rumination, and avoidance to be more maladaptive and predictive of symptoms of mental illness, such as anxiety and depression (Aldao et al., 2010), and lower well-being (Fischer et al., 2021).

The study of emotions in sport is not new and has seen an increase in publications in recent years (Robazza & Ruiz, 2022). However, an understanding of the relationship between emotion regulation strategies and indicators of mental well-being and illness are scarce. Additionally, despite evidence to suggest emotions are associated with performance (Robazza & Ruiz, 2022), exploration of emotion regulation and performance outcomes are also limited. Therefore, a review that synthesizes the relationship between emotion regulation and indicators of performance, mental illness, and mental well-being is warranted because it is

important to view athletes holistically and consider their performance as well as their mental health. This review will advance the field by considering both performance and mental health outcomes (mental well-being and mental illness) to provide clearer evidence for applied practitioners when addressing athletes use of emotion regulation. That is, knowledge on the benefits and drawbacks of strategy use in relation to important athletic outcomes more holistically and ensure mental health is promoted simultaneously to performance.

Defining mental health is important for informing the present review and progressing the field. Keyes' (2002) dual continuum model posits that mental health is a complete state wherein mental illness and positive mental health exist on two distinct yet correlated continuums, with positive mental health and well-being consisting of higher levels of psychological, emotional (subjective), and social well-being. Conceptualizing mental health as this complete state is important because individuals can be flourishing with high levels of well-being whilst experiencing symptoms of mental illness; conversely, they could be free of symptoms of mental illness but experience less than optimal well-being. Further, it is probable that emotion regulation strategies may be adaptive, or maladaptive, for one component of mental health but not the other (G. A. Bird et al., 2021).

Sport as a context for emotion regulation development

Athletes are not immune to poor mental health; therefore, it is important to understand the risk and protective factors for athlete mental health. One such factor is emotion regulation, as emotions are an important element of sport performance (Robazza & Ruiz, 2022). Kuettel and Larsen (2020) found nine reviews exploring mental health in sport, but none of these synthesized the relationship between emotion regulation and athlete mental health. Such a review would provide a valuable contribution to literature because athletes experience emotions during training and competition and thus, must regulate them

accordingly (Lane et al., 2012). This regulation could be for hedonic or instrumental purposes. As demonstrated from a British Association of Sport and Exercise Sciences (BASES) expert statement, athletes regulate their emotions instrumentally to facilitate performance goals (Lane et al., 2012). For example, athletes may upregulate anxiety if they believe it facilitates performance. However, solely considering performance goals narrows the view of how emotion regulation relates to mental health outcomes. As shown in other fields of psychology, strategies also relate to mental health outcomes and thus, regulation can serve different functions (Webb et al., 2012).

With substantial evidence supporting emotion regulation as related to indicators of mental health and illness (e.g., Sheppes et al., 2015), understanding emotion regulation in the unique sport context is important for promoting athlete mental health simultaneously to performance. Despite evidence that emotions influence performance (Robazza & Ruiz, 2022), there is scarce research investigating the relationship between the regulation of these emotions and performance outcomes (Hanin, 2010), and even less research between emotion regulation and indicators of well-being and illness. Within sport psychology, research is starting to consider the role of emotion regulation on performance, and more recently on mental well-being and illness (e.g., G. A. Bird et al., 2021). Thus, it is important to collate this literature to synthesize what is currently known and where the gaps in evidence exist to inform future research and applied practice.

Study purpose

This review considered emotion regulation as risk or protective factors for performance and mental health outcomes. It also considered these relationships for a range of athletes (i.e., recreational, student, elite) to provide insights into whether knowledge on emotion regulation can be generalized broadly to athlete populations or whether these

populations are unique and require individualized recommendations and intervention. Further, this review synthesized sport and emotion regulation research to understand how these constructs are conceptualized and make recommendations for models of mental health and emotion regulation, and an operational definition for the sport context in future research. Understanding what measures are being used, what models are underpinning this research, and the consequences of strategy use will develop understanding and advance the field and mental health promotion within sport.

The purpose of this review was to produce a synthesized analysis of emotion regulation in sport. To promote conceptual clarity, this review was underpinned by the process model of emotion regulation (PMER; Gross, 1998b). This temporal model differentiates five distinct processes that are either antecedent-focused (occurring before or during the generation of emotion) or response-focused (occurring after the full emotion has been generated). The first four processes are antecedent-focused: situation selection, situation modification, attentional deployment, and cognitive change. The final process is response-focused and is known as response-modulation. The PMER has been evidenced as a useful model for understanding emotion regulation across the emotion generating process (Gross & Thompson, 2007) and enhanced conceptual clarity for the narrative analysis of this review.

To propel the study of emotion regulation forwards in sport psychology, it is necessary to understand how authors have conceptualized emotion regulation and associated outcomes, as well as what theories underpin the research, and which measurements have been used. The aims of this study were three-fold:

- (1) What is the relationship between emotion regulation use and indicators of mental well-being, mental illness, and performance in sport?

- (2) What type of emotion regulation strategy (based on the PMER) is related to which domain of mental health (i.e., emotional, psychological, and social well-being), mental illness symptomatology, and performance?
- (3) Which measures are used to assess athletes' use of emotion regulation strategies?

Methods and Materials

Search strategy

Following PRISMA guidelines, a systematic literature search of five databases including Web of Science, SPORTDiscus, Scopus, PsychINFO (OVID Interface), and MEDLINE (OVID Interface) was conducted. Due to limited research focusing on emotion regulation in sport, there was no date restriction for published articles. To capture the literature, key search terms were kept broad and were emotion regulation AND athlete OR sport, using Boolean operators. The search and selection process was finalized in January 2024, details of which can be seen in Figure 2.1.

Study selection

For a study to be included in the review, the following criteria had to be met: (1) published in English and peer reviewed; (2) emotion regulation was included as a predictor variable and operationalized as a strategy employed for the purpose of regulating one's emotions (Gross, 1998a); (3) explored an indicator of mental well-being (i.e., indices of emotional, psychological, and social well-being; Keyes, 2002), mental illness (i.e., conditions such as depression and anxiety), and/or performance (i.e., either an objective or subjective indicator, such indicated by self-report measures by significant others (coaches), and measured during either training or competition) as an outcome of emotion regulation use; and (4) taken an empirical quantitative methodological approach and used a measure of emotion

regulation (i.e., self-report, experimental, physiological, or other quantitative measure of emotion regulation). Studies were excluded if they were qualitative, included athletes that were injured or retired, grey literature such as dissertations, intervention studies, or studies conducted in the context of COVID-19 confinement. Participants could be any age so long as they were currently training and/or competing in sport.

Data extraction

The PhD student screened the title and abstracts of all studies to determine their inclusion or exclusion in the present study, this was reviewed by the secondary supervisor. The PhD student then screened the full texts of studies selected to be included, any discrepancies between the first author and secondary supervisor, who screened 50%, were discussed (23.5%), and an agreement reached. Covedence was used to record this process. The following data was extracted by the PhD student: study details; inclusion and exclusion criteria; participant demographics and characteristics; study design and methodology; emotion regulation strategies measured; mental health, mental illness, or performance outcomes; measurement methods of emotion regulation strategies and outcomes; statistical relationships, (i.e., regressions, Pearson r correlations, beta weights); p values and confidence intervals if available; and any additional comments. Where relevant data were not reported (e.g., location, probability values), the corresponding authors were contacted to obtain this information. The primary supervisor extracted a subset of 50% of included papers.

Quality assessment

To consider the strength of evidence, the PhD student coded all included studies using the National Institute of Health's Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, and the primary supervisor completed a sub-set of 50%. Any

discrepancies were discussed ($n = 1$) and resolved. This tool provides a rating of quality that is poor, fair, or good.

Data analysis

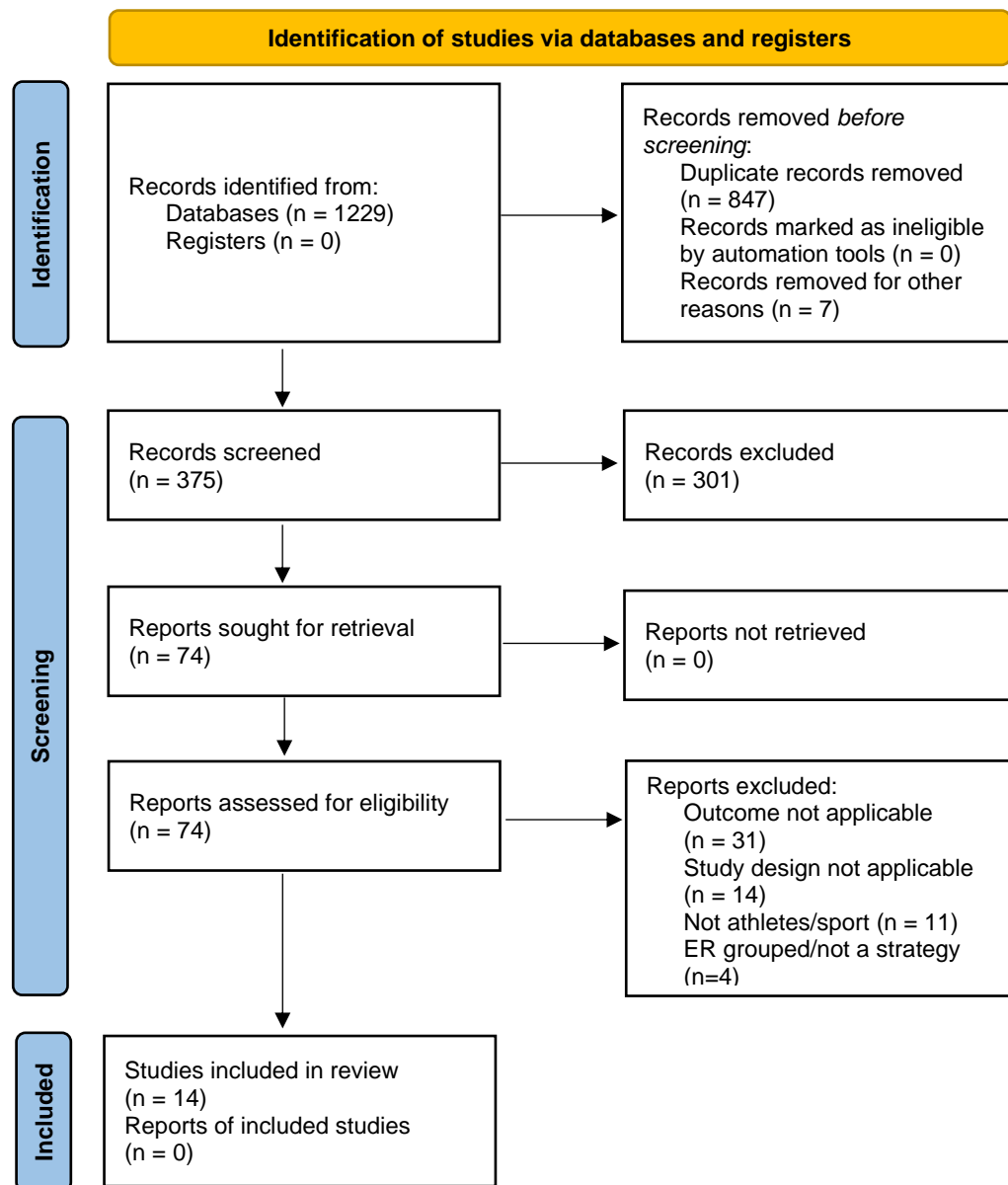
This review was in the form of a narrative synthesis; due to the limited data, a meta-analytic approach was not possible (Cheung & Vijayakumar, 2016). To address the primary research question and in support of the narrative synthesis approach, data pertaining to a relationship between an emotion regulation strategy and a mental well-being (Table 2.2, $n = 10$), mental illness (Table 2.3, $n = 3$), or performance (Table 2.4, $n = 3$) outcome were reported. For consistency, correlational and regression data have been reported in the tables. Due to inconsistencies across studies in the reporting of structural equation modelling, where emotion regulation strategies were mediators, these results are presented in supplementary material.

Based on the secondary research question, studies were also synthesized by how types of emotion regulation strategy according to the PMER (i.e., each strategy was classed as situation selection, situation modification, attentional deployment, cognitive change, or response modulation)² were related to indicators of mental well-being, mental illness symptomatology, and performance outcomes in sport. Further, based on the tertiary research question to understand how emotion regulation has been measured in sport, measurements used in included studies can also be seen in Table 2.5.

² This should be interpreted with caution as the lead author has synthesized strategies based on their own understanding of emotion regulation processes' and may not fully represent how the manuscripts authors intended for the strategy to be interpreted. It does, however, highlight important gaps in the literature.

Figure 2.1

PRISMA flow diagram of study selection process



Results

Study and sample characteristics

As indicated by Figure 2.1, the database and additional searches produced 1229 records, reduced to 844 after duplicates were removed. Following title and abstract screening,

382 records were excluded for not meeting the inclusion criteria, resulting in 81 records for full-text screening. 67 articles were subsequently excluded, providing 14 relevant studies for the review. The majority of studies were published in the last 10 years, with the exception of (Castanier et al., 2011). This suggests emotion regulation and its relationship with mental well-being, illness, and performance is an emerging field of enquiry within sport.

Studies included only individual sports ($n = 4$), only team sports ($n = 1$), a combination of both ($n = 7$), or did not specify ($n = 2$). Of these studies, 4 focused on student or collegiate athletes. Studies were conducted in Europe ($n = 6$), North America ($n = 2$), Asia ($n = 2$), and South America ($n = 1$). Three studies did not specify location. Two of the studies focusing on performance outcomes had comparably older populations than those exploring psychological outcomes (Kubiak et al., 2019, M age = 39.07; Monaci & Veronesi, 2019, M age = 36).

Strategies as described by the Process Model of Emotion Regulation

As highlighted in Table 2.1, and in line with a vast proportion of emotion regulation literature, the majority of studies considered cognitive change and response modulation strategies (Brockman et al., 2017). Eleven studies explored the cognitive change strategy of reappraisal and eight explored the response modulation strategy suppression, making these strategies the most frequently explored. The least explored process was situation selection with three studies exploring just two strategies.

Table 2.1

Strategies as described by the Process Model of Emotion Regulation (Gross & Thompson, 2007).

Author(s)	Situation Selection	Situation Modification	Attentional Deployment	Cognitive Change	Response Modulation
Bird et al. (2021)				Cognitive reappraisal*	Expressive suppression*
Castanier et al. (2011)	Escape	Compensation			
Doorley & Kashdan (2021)	Behavioral avoidance	Social support, problem-solving	Cognitive avoidance	Cognitive reappraisal, acceptance	
Doorley et al. (2022)	Behavioral avoidance	Social support, problem-solving	Cognitive avoidance	Cognitive reappraisal, acceptance	
Kubiak et al. (2019)		Physical preparation*	Distraction*	Reappraisal*, Positive self-talk*, planning*, catastrophizing*, self-blame*, rumination* ³	Expressive suppression*, impression management*
Molina et al. (2018)				Reappraisal	Suppression
Monaci & Veronesi (2019)				Anger control in, anger control out	Anger expression in, anger expression out
Potoczny et al. (2022)				Reappraisal*	Suppression*
Robazza et al. (2022)				Reappraisal*	Suppression*
Robazza et al. (2023)				Reappraisal*	Suppression*
Stanger et al. (2018)				Reappraisal*	
Stenseng & Phelps (2016)					Self-suppression, self-expansion
Wang et al. (2022)				Reappraisal*	
Yamaguchi et al. (2022)		Problem-solving, social support		Cognitive reinterpretation	Emotional expression

Note *author specified process

³ Much of the literature classifies rumination as an attentional deployment strategy (e.g., see Webb et al., 2012), however, rumination has been classified as a cognitive change strategy in the present review because the authors (Kubiak et al., 2019) specified it as such.

Emotion regulation and mental well-being

Emotion regulation strategies were found to relate to these indicators of mental well-being (Table 2.2). That is, reappraisal related to higher overall mental well-being, higher positive emotions, and to reduced negative emotions. Problem-solving, acceptance, and self-expansion also related to increased emotional well-being but there was no data to explore other facets of well-being (psychological and social). When compared to other cognitive change strategies, reappraisal was a stronger predictor of increased positive emotions compared to acceptance, but acceptance was a stronger predictor of decreased negative emotions than reappraisal (Doorley & Kashdan, 2021). Strategies related to reduced emotional well-being included: suppression, escape, social support, behavioral avoidance, and cognitive avoidance. Suppression also related to reduced overall well-being.

The intention for this narrative analysis was to describe and analyze studies based on whether they investigated emotional, social, or psychological well-being, in line with Keyes, (2002). However, one study considered overall well-being (G. A. Bird et al., 2021) and the remainder of studies explored emotions, along with life satisfaction, and affect as indicators of emotional (subjective) well-being. Therefore, due to the conceptualization of well-being in the included studies, it was not possible to differentiate studies based on facets of well-being and consequently will be reported and discussed together.

The majority of studies ($n = 10$) measured indicators of well-being, but with great heterogeneity. One study measured overall well-being using the Warwick Edinburgh Mental Well-being Scale (G. A. Bird et al., 2021) and another measured life satisfaction, a form of emotional (subjective) well-being, using the Satisfaction with Life Scale (Potoczny et al., 2022). A further seven studies focused on emotional well-being, by either considering general levels of positive and negative affect ($n = 3$; Doorley & Kashdan, 2021; Doorley et al., 2022;

Stenseng & Phelps, 2016), general emotions ($n = 1$; Molina et al., 2018) or sport-specific emotions ($n = 3$; Robazza et al., 2022, Robazza et al., 2023; Stanger et al., 2018).

Table 2.2

Studies investigating the relationship between emotion regulation and indicators of mental well-being

Author(s)	Sample Characteristics (N, age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
Bird et al. (2021)	<i>N</i> = 427, <i>M</i> age = 20.18, <i>SD</i> = 1.52 <i>N</i> male = 188, <i>N</i> female = 239, Student-athletes, range of sports, team and individual, UK	Cross-sectional	Reappraisal	Mental well-being (WEMWBS)	Multivariate regression	$\beta = .21$	<.001	N/A
			Suppression	Mental well-being (WEMWBS)		$\beta = -.08$.028	N/A
Castanier et al. (2011)	<i>N</i> = 105 <i>M</i> age = 29.07, <i>SD</i> = 5.46, Male, mountaineers, Individual	Short term longitudinal	Escape	Joy (PANES) T2*	Correlation	<i>r</i> = .12	NS	.01
			Escape	Affection (PANES) T2		<i>r</i> = .05	NS	.00
				Anxiety (PANES) T2		<i>r</i> = .04	NS	.00
				Anger (PANES) T2		<i>r</i> = .06	NS	.00
				Shame (PANES) T2		<i>r</i> = .18	NS	.03
				Sadness (PANES) T2		<i>r</i> = .18	NS	.03
				Negative affectivity (PANEI) T2		<i>r</i> = .41	<.05	.17
			Compensation	Joy (PANES) T2		<i>r</i> = .09	NS	.01
			Compensation	Affection (PANES) T2		<i>r</i> = .04	NS	.00
				Anxiety (PANES) T2		<i>r</i> = .03	NS	.00
				Anger (PANES) T2		<i>r</i> = .09	NS	.01

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
Doorley & Kashdan (2021)	<i>N</i> = 67, <i>M</i> _{age} = 19.85, <i>SD</i> = 1.25, 89% women, various sports, team and individual, collegiate athletes, 91.1% White, 3.5% Hispanic/Latinx, 2.4% Asian/Pacific Islander, and 2.9% Other	Cross-sectional	Problem-solving	Shame (PANES) T2		<i>r</i> = .12	NS	.01
				Sadness (PANES) T2		<i>r</i> = .03	NS	.00
				Negative affectivity (PANEI) T2		<i>r</i> = .13	NS	.02
				Positive emotions: happy, joyful, cheerful, grateful & content (PANAS-X)	Multilevel regression, controlling for intensity of negative events	β = .06	<.05	N/A
						β = .14	<.05	N/A
				Cognitive reappraisal		β = .06	<.05	N/A
				Acceptance		β = -.03	NS	N/A
				Social support		β = -.02	NS	N/A
				Behavioral avoidance		β = -.04	NS	N/A
				Cognitive avoidance		β = -.03	NS	N/A
				Problem-solving	Negative emotions: sad, angry, & annoyed (PANAS-X)			
						β = -.05	<.05	N/A
				Cognitive reappraisal		β = -.07	<.05	N/A
				Acceptance		β = .15	<.05	N/A
				Social support		β = .10	<.05	N/A
				Behavioral avoidance		β = .19	<.05	N/A
				Cognitive avoidance				
Doorley et al. (2022)	<i>N</i> = 67, <i>M</i> _{age} = 19.85, <i>SD</i> = 1.25, 89% women, various sports, team and individual, collegiate athletes, 1 public university and 1 private university in mid-Atlantic	Cross-sectional	Cognitive reappraisal	Positive emotions: happy, grateful, content (PANAS-X)	Between-person correlation	<i>r</i> = .53	<.05	.28

Author(s)	Sample Characteristics (N, Study Design age, gender, sport(s), location)	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
	region of US, 91.1% White, 3.5% Hispanic/Latinx, 2.4% Asian/Pacific Islander, and 2.9% Other	Problem solving			<i>r</i> = .37	<.05	.14
		Acceptance			<i>r</i> = .13	NS	.02
		Social support			<i>r</i> = .16	NS	.03
		Cognitive avoidance			<i>r</i> = .04	NS	.00
		Behavioral avoidance			<i>r</i> = .25	NS	.06
		Cognitive reappraisal	Negative emotions: sad, angry, annoyed (PANAS-X)		<i>r</i> = -.08	NS	.01
		Problem solving			<i>r</i> = .06	NS	.00
		Acceptance			<i>r</i> = -.04	NS	.00
		Social support			<i>r</i> = .33	<.05	.11
		Cognitive avoidance			<i>r</i> = .43	<.05	.19

Author(s)	Sample Characteristics (<i>N</i> , Study Design age, gender, sport(s), location)	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
Molina et al. (2018)	<i>N</i> = 300, <i>M</i> age = 15.5, <i>SD</i> = 2.38, aged 11-18 years, range of sports, individual (<i>n</i> = 139) and collective (<i>n</i> = 161) sports, Chile	Behavioral avoidance			<i>r</i> = .19	NS	.04
		Reappraisal	Amusement (PANAS)	Correlation	<i>r</i> = .13	<.022	.02
			Gratitude (PANAS)		<i>r</i> = .15	<.008	.02
			Hope (PANAS)		<i>r</i> = .24	<.000	.06
		Suppression	Anger (PANAS)		<i>r</i> = .29	<.001	.08
			Overwhelm (PANAS)		<i>r</i> = .13	<.019	.02
			Fear (PANAS)		<i>r</i> = .12	<.028	.01
Robazza et al. (2022)**	<i>N</i> = 459, <i>M</i> age = 21.13, <i>SD</i> = 6.29, 16-35 years of age, <i>N</i> males = 258, <i>N</i> females = 201, <i>M</i> years experience=9, <i>SD</i> = 5.55, 73% regional, 17% national, 10% international, <i>N</i> individual = 158, <i>N</i> team = 301, range of individual and team sports, Italy	Reappraisal	Excitement (SEQ)	Pearson product-moment correlation	<i>r</i> = .32	<.05 ^a	.10
			Happiness (SEQ)		<i>r</i> = .31	<.05 ^a	.10
		Suppression	Excitement (SEQ)		<i>r</i> = -.09	<.05	.01

Author(s)	Sample Characteristics (<i>N</i> , Study Design age, gender, sport(s), location)	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
Robazza et al. (2023)	<i>N</i> = 424, <i>N</i> male = 246, <i>N</i> female = 178, <i>M</i> age = 23.08, <i>SD</i> = 7.65, range = 16-36, <i>M</i> yearsexperience = 9.71, <i>SD</i> = 7.65, range = 1-21 years, regional, national, international, team and individual	Reappraisal	Happiness (SEQ)		<i>r</i> = -.10	<.05	.01
			Anxiety (SEQ)		<i>r</i> = -.10	<.05	.01
		Suppression	Dejection (SEQ)		<i>r</i> = -.09	<.05	.01
			Anger (SEQ)		<i>r</i> = .00	<.05	.00
			Anxiety (SEQ)		<i>r</i> = .04	<.05	.00
			Dejection (SEQ)		<i>r</i> = .21	<.05 ^a	.04
			Anger (SEQ)		<i>r</i> = .24	<.05 ^a	.06
		Reappraisal	Excitement (SEQ)	Correlation	<i>r</i> = .38	<.05	.14
		Suppression	Happiness (SEQ)		<i>r</i> = .36	<.05	.13
			Excitement (SEQ)		<i>r</i> = -.16	NS	.03
Stanger et al. (2018)	<i>N</i> = 105, <i>N</i> male = 58, <i>N</i> female = 47, <i>M</i> age = 20.62, <i>SD</i> = 1.54, Club, county/regional, national/international team sports: hockey, soccer,	Reappraisal	Happiness (SEQ)		<i>r</i> = -.16	NS	.02
			Anxiety (SEQ)		<i>r</i> = -.15	NS	.02
		Suppression	Dejection (SEQ)		<i>r</i> = -.14	NS	.02
			Anger (SEQ)		<i>r</i> = -.04	NS	.00
			Anxiety (SEQ)		<i>r</i> = .07	NS	.01
			Dejection (SEQ)		<i>r</i> = .24	<.05	.06
		Reappraisal	Excitement (SEQ)	Correlation	<i>r</i> = .13	NS	.02

Author(s)	Sample Characteristics (<i>N</i> , Study Design age, gender, sport(s), location)	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
	rugby, lacrosse, water polo, cricket, American football, tchoukball, volleyball, netball, and basketball, Study 1						
		Reappraisal	Anxiety (SEQ)		<i>r</i> = -.01	NS	.00
		Reappraisal	Happiness (SEQ)		<i>r</i> = -.01	NS	.00
	<i>N</i> = 166, <i>N</i> male = 108, <i>N</i> female = 58, <i>M</i> age = 32.25 <i>SD</i> = 12.53, university and club teams, participated in sport <i>M</i> years = 14.73 <i>SD</i> = 10.99, club, county/regional, and national/international, Study 2	Reappraisal	Excitement (SEQ)	Correlation	<i>r</i> = .13	NS	.02
		Reappraisal	Happiness (SEQ)		<i>r</i> = .19	<.05	.04
			Anxiety (SEQ)		<i>r</i> = .11	NS	.02
			Anger (SEQ)		<i>r</i> = .09	NS	.01
			Dejection (SEQ)		<i>r</i> = .03	NS	.00
Stenseng & Phelps (2016)	<i>N</i> = 207, <i>N</i> men = 115, <i>N</i> women = 92, <i>M</i> age = 27.9, Average time participating = 11.4hrs per week	Self-expansion	Positive affect (PANAS-X)	Zero-order correlation	<i>r</i> = .37	<.01	.14

Author(s)	Sample Characteristics (N, Study Design age, gender, sport(s), location)	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
		Self-suppression			<i>r</i> = .05	NS	.00
		Self-expansion	Negative affect (PANAS-X)		<i>r</i> = -.03	NS	.00
		Self-suppression			<i>r</i> = .33	<.01	.11

Note Warwick Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant et al., 2007), Positive and Negative Emotions Scale (PANES; Pélissolo et al., 2007), Positive and Negative Emotionality Inventory (PANEI; Pélissolo et al., 2007), Positive and Negative Affectivity Scale (PANAS; Fredrickson, 2009), Sport Emotion Questionnaire (SEQ; Jones et al., 2005), Positive and Negative Affect Schedule (PANAS-X; Watson et al., 1988; Watson & Clark, 1999). NS= non-significant. Measures have been cited as per reported in included studies.

*Only T2 data has been reported here, but see the original paper for T1 correlations

**This author did not report *p* values, however, through personal communication it was found that *p* <.05 for all correlations. ^a Low correlation.

Emotion regulation and mental illness

Only three studies included indicators of mental illness: depression (Bird et al., 2021), cognitive anxiety (Molina et al., 2018), and vulnerability (Yamaguchi et al., 2022) (Table 2.3). There was little evidence to support the relationship between emotion regulation and indicators of mental illness, likely due to the limited sample size. However, suppression was related to increased cognitive anxiety whilst problem-solving, emotional expression, and social support related to increased vulnerability; a negative predisposition that is susceptible to stress and one which influences people to display maladaptive behaviors when dealing with stressors and to also be more at risk of stress. Mixed, but limited, evidence was found for suppression and mental illness. For example, G. A. Bird et al. (2021) found no statistically significant relationship with depressive symptomatology and Molina et al. (2018) found suppression predicted increased cognitive anxiety.

Table 2.3

Studies investigating the relationship between emotion regulation and indicators of mental illness

Author(s)	Sample Characteristics (N, age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Mental illness (measure)	Statistical test for association	Coefficient	p	R ²
Bird et al. (2021)	N = 427, Mage = 20.18, SD = 1.52 Nmale = 188, Nfemale = 239, Student-athletes, range of sports, team and individual, UK	Cross-sectional	Reappraisal	Depression (DASS-21)	Multivariate regression	$\beta = .03$.525	N/A
			Suppression	Depression (DASS-21)		$\beta = .06$.114	N/A
Molina et al. (2018)	N = 300, Mage = 15.5, SD = 2.38, aged 11-18years, range of sports, individual (n = 139) and collective (n = 161) sports, Chile	Cross-sectional	Reappraisal	Cognitive anxiety (CSAI-2R)	Correlation	$r = -.07$	NS	.01
			Suppression	Cognitive anxiety (CSAI-2R)		$r = .35$	<.001	.12
Yamaguchi et al. (2022)	N = 487 Nmale = 334 Nfemale = 154 Mage = 19.9		Problem-solving	Vulnerability (VSUA)	Correlation	$r = .11$	<.05	.01

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Mental illness (measure)	Statistical test for Coefficient association	<i>p</i>	R ²
	<i>SD</i> = .99 Japanese university student-athletes International, national, and district levels 24 competitive sports Team and individual		Cognitive reinterpretation		<i>r</i> = .07	NS	.01
			Emotional expression		<i>r</i> = .20	<.01	.04
			Social support		<i>r</i> = .39	<.01	.15

Note Depression, anxiety, and stress scale (DASS-21; Lovibond & Lovibond, 1995), Competitive State Anxiety Inventory-2 Revised (CSAI-2R; Andrade Fernández et al., 2007; Cox et al., 2003), Vulnerability Scale for University Athletes (VSUA; Yamaguchi et al., 2019). NS= non-significant.

Emotion regulation and performance

Emotion regulation strategies were related to performance outcomes (Table 2.4). That is, physical preparation, positive self-talk, planning, expressive suppression, impression management, anger control in (females), anger expression out (females and males), and anger expression in (males) related to improved performance. Conversely, cognitive reappraisal, catastrophizing, anger expression in (females and males), and anger control out (females and males) related to worsened performance.

Three studies explored varied performance outcomes across table tennis, recreational tennis, and archery (Table 2.4). Although these studies provided important insight into how emotion regulation strategies may relate to performance outcomes, their focus on one sport limits the generalizability of these findings to athletes more broadly.

Table 2.4*Studies investigating the relationship between emotion regulation and indicators of performance*

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study design	Emotion regulation strategy	Performance (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
Kubiak et al. (2019)	<i>N</i> = 310, <i>N</i> male = 240, <i>N</i> female = 70, <i>M</i> age = 39.07, <i>SD</i> = 15.99, Table tennis (<i>M</i> years = 23.86, <i>SD</i> = 14.19), Germany	Longitudinal	Physical preparation	Performance status (table tennis rating scores 2014- 2015) T2*	Partial correlations (controlling for age & gender)	<i>r</i> = .24	<.001	.06
			Distraction	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = -.05	NS	.00
			Reappraisal	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = -.04	NS	.00
			Positive self-talk	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = .21	<.001	.04
			Planning	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = .15	<.01	.02

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study design	Emotion regulation strategy	Performance (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
			Catastrophizing	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = -.12	<.05	.01
			Self-blame	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = -.00	NS	.00
			Rumination	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = .05	NS	.00
			Expressive suppression	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = .11	<.10	.01
			Impression management	Performance status (table tennis rating scores 2014- 2015) T2		<i>r</i> = .12	<.05	.01
Monaci & Veronesi (2019)	<i>N</i> = 180, <i>N</i> male = 92, <i>N</i> female = 88, Aged 15-70 years, <i>M</i> age = 36, <i>SD</i> = 12.8, recreational tennis, Minimum 2 years' experience, Individual sport athletes	Cross- sectional	Anger control in - females	Worsened performance	Correlation	<i>r</i> = .14	NS	.02

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study design	Emotion regulation strategy	Performance (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
			Anger control in - females	Improved performance		$r = .38$	<. 05	.14
			Anger control out - females	Worsened performance		$r = .39$	<. 05	.15
			Anger control out - females	Improved performance		$r = .15$	NS	.02
			Anger expression in - females	Worsened performance		$r = .32$	<. 05	.10
			Anger expression in - females	Improved performance		$r = .15$	NS	.02
			Anger expression out - females	Worsened performance		$r = .04$	NS	.00
			Anger expression out - females	Improved performance		$r = .32$	<. 05	.10

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study design	Emotion regulation strategy	Performance (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
			Anger control in – males	Worsened performance		$r = .20$	NS	.04
			Anger control in – males	Improved performance		$r = .16$	NS	.02
			Anger control out - males	Worsened performance		$r = .24$	<. 05	.06
			Anger control out - males	Improved performance		$r = .07$	NS	.01
			Anger expression in- males	Worsened performance		$r = .13$	NS	.02
			Anger expression in- males	Improved performance		$r = .30$	<. 05	.09
			Anger expression out- males	Worsened performance		$r = .07$	NS	.01

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study design	Emotion regulation strategy	Performance (measure)	Statistical test for association	Coefficient	<i>p</i>	R ²
			Anger expression out - males	Improved performance		$r = .33$	<. 05	.11

Note NS= non-significant.

* Only T2 data has been reported here, but see the original paper for T1 and change in performance scores.

Measures

As shown in Table 2.5, all studies used self-report scales, sub-scales, or adaptations of such, to measure emotion regulation. The most commonly used measure was the ERQ which has been validated for use in athlete populations (Uphill et al., 2012).

Table 2.5

Measures of emotion regulation used in included studies

Scale	Variables/sub-scales	Version	Author(s)
Emotion Regulation Questionnaire (ERQ; Gross & John, 2003)	Reappraisal, suppression	Original	Bird et al. (2021), Robazza et al. (2022)
		Spanish	Molina et al. (2018)
		Polish	Potoczny et al. (2022)
	Suppression Reappraisal	Italian	Robazza et al. (2023)
		3-items inspired by ERQ	Kubiak et al. (2019)
		Chinese revised	Stanger et al. (2018) Wang et al. (2022)
Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski & Kraaij, 2007)	Planning, distraction, positive reappraisal, catastrophizing, self-blame, rumination	3-items per sub-scale inspired by CERQ	Kubiak et al. (2019)
Physical preparation		3-items developed for study	Kubiak et al. (2019)
Self-talk		3-items developed for study	Kubiak et al. (2019)
Impression management		3-items developed for study	Kubiak et al. (2019)
Risk and Excitement Inventory (Taylor & Hamilton, 1997)	Risk, escape	French	Castanier et al. (2011)

Scale	Variables/sub-scales	Version	Author(s)
Daily Coping Scale (Aldridge-Gerry et al., 2011)	Problem-solving, cognitive reappraisal, acceptance, social support, behavioral avoidance, cognitive avoidance, problem-solving	Original	Doorley and Kashdan (2021), Doorley et al. (2022)
State Trait Anger Expression Inventory 2 (STAXI-2; Spielberger, 1999)	Anger control in, anger control out, anger expression in, anger expression out (State-Anger feelings subscale)	Italian	Monaci & Veronesi (2019)
Escapism Scale (Stenseng et al., 2012)	Self-expansion, self-suppression	Original	Stenseng & Phelps (2016)
General Coping Questionnaire (Sasaki & Yamasaki, 2002)	Problem-solving, cognitive reinterpretation, emotional expression, social support	Japanese	Yamaguchi et al. (2022)

Quality assessment

Most studies were rated ‘fair’ ($n = 12$) due to their cross-sectional design and correlational data. Further, most studies scored ‘no’ on question 2 as they did not describe their sample in sufficient detail, where key information such as time frame and location were missing (Table 2.6).

Table 2.6

Quality assessment of included studies used the NIH 'Quality Assessment Tool for Observational and Cohort Studies'

Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Rating
Bird et al. (2021)	yes	no	nr	yes	yes	no	no	n/a	yes	no	yes	n/a	n/a	yes	fair
Castanier et al. (2011)	yes	no	nr	nr	yes	no	no	n/a	yes	yes	yes	n/a	yes	yes	fair
Doorley & Kashdan (2021)	yes	no	nr	yes	no	no	no	n/a	yes	yes	yes	n/a	n/a	yes	fair
Doorley et al. (2022)	yes	no	nr	yes	no	no	no	n/a	yes	yes	yes	n/a	n/a	yes	fair
Kubiak et al. (2019)	yes	yes	yes	yes	yes	no	no	n/a	yes	no	yes	n/a	yes	yes	fair
Molina et al. (2018)	yes	no	nr	yes	no	no	no	n/a	yes	no	yes	n/a	n/a	yes	fair
Monaci & Veronesi (2019)	yes	no	nr	yes	yes	no	no	n/a	yes	no	yes	n/a	n/a	yes	fair
Potoczny et al. (2022)	yes	no	nr	yes	yes	no	no	n/a	yes	no	yes	no	n/a	yes	fair
Robazza et al. (2022)	yes	no	yes	yes	yes	no	no	n/a	yes	no	yes	n/a	n/a	yes	fair
Robazza et al. (2023)	yes	no	nr	yes	yes	no	no	n/a	yes	no	yes	n/a	n/a	yes	fair
Stanger et al. (2018)	yes	no	nr	yes	nr	no	no	n/a	yes	no	cd	n/a	n/a	cd	poor
Stenseng & Phelps (2016)	yes	no	nr	cd	no	no	no	n/a	yes	no	yes	n/a	n/a	nr	poor
Wang et al. (2022)	yes	no	nr	yes	yes	no	no	n/a	yes	no	yes	n/a	n/a	no	fair
Yamaguchi et al. (2022)	yes	yes	nr	cd	yes	no	no	n/a	yes	no	yes	n/a	n/a	no	fair

Discussion

The review aimed to synthesize literature examining the relationship between emotion regulation strategies and indicators of mental well-being, mental illness, and performance in athlete populations. The review also aimed to understand which type of emotion regulation strategy, based on the PMER, related to the outcomes as well as understand the measures used to assess athletes' use of emotion regulation strategies. There was insufficient data to describe the relationships between strategies and the different domains of mental well-being (i.e., emotional, psychological, and social) as originally planned and so the findings will be synthesized based on the PMER only, with a discussion of the relationships with mental health, mental illness, and performance included under each process. Finally, the measures used to assess athletes' use of emotion regulation strategies will be discussed.

Outcomes explored in relation to emotion regulation

Overall, the findings suggest athletes use of emotion regulation strategies relates to indicators of their mental well-being, mental illness, and performance outcomes. Consequently, it is important for athletes, and those who work with them, to be aware of how the strategies used for performance relate to their experiences of mental well-being and illness. Despite this, no study included indicators of mental well-being, mental illness, and performance in the same study and thus, future research should explore the strategies athletes are using for performance and how this relates to their mental health outcomes (well-being and illness) and to understand the strategies that support both. Researching these outcomes simultaneously is vital as all are important to the athlete experience and context and may interact with each other.

Despite an increase in sport psychology research underpinned by the dual-continua model of mental health (Keyes, 2002; Kuettel, Durand-Bush, et al., 2021; Kuettel, Pedersen,

et al., 2021) just two studies assessed mental health as well as illness by considering depression and mental well-being (G. A. Bird et al., 2021) and affect and cognitive anxiety (Molina et al., 2018). Furthermore, studies that looked at well-being mostly explored the relationship between emotion regulation strategies and emotions (e.g., emotional well-being; $n = 7$). Most studies included in the review did not state the exploration of well-being as an aim of their study; however, emotions are a key indicator of emotional well-being and so were included in the present review. Consequently, the sport emotion regulation literature is missing a holistic view and is limited by a lack of research explicitly exploring multiple facets of well-being (e.g., emotional, psychological, social) as well as symptoms of mental illness, with just three exploring symptoms of mental illness. Aligned with Keyes' (2002) two-continuum model of mental health, researchers should consider indicators of mental well-being and illness, as strategies that promote one may not support the other. It would be detrimental to promote the use of a strategy that supports well-being without understanding whether it also reduces mental illness rather than increasing symptoms (Bird et al., 2021; Molina et al., 2018). The use of theoretical frameworks such as the dual-continua model are therefore necessary for achieving the best understanding of the relationship between emotion regulation and mental health outcomes to capture a complete state picture of mental health (Keyes, 2005).

Using the PMER to synthesize relationships

Strategies reflecting all five stages of the PMER were included in the present review. Strategies were mapped to the PMER where authors explicitly stated the process they were investigating. Otherwise, strategies were mapped based on the PhD students' interpretations. Two distinct situation selection strategies, four situation modification, two attentional deployment, 10 cognitive change, and six response modulation strategies were explored across studies.

Situation selection

Two situation selection strategies were investigated: behavioral avoidance and escape. Results suggest that a greater use of behavioral avoidance and escape relates to increased experiences of negative emotions and thus, poorer emotional well-being (Table 2.2). These avoidant type strategies, therefore, have adverse consequences on emotions and more research is needed to explore strategies that involve approaching a situation. No studies considered situation selection strategies in relation to mental illness or performance.

Situation selection can be consciously implemented. That is, athletes would have greater control over whether they use strategies in this process and, as it is the start of the emotion generating process, it presents an ideal opportunity to prevent ‘negative’ emotions by avoiding or approaching the situation based on how they expect to feel (Webb et al., 2018). To help athletes achieve desirable mental health and performance outcomes, situation selection could be an opportune point in the PMER for encouraging athletes to reflect on their goals and regulate in a way that aligns with such goals. For example, if an athlete wants to feel anger to feel more ‘pumped up’, then selecting music that elicits this emotion may be beneficial (Tamir et al., 2008). Anger as a ‘positive’ emotion in the sport context raises a conceptual issue in referring to emotions as positive or negative indicators of well-being and is beyond the scope of the present review but may be important to consider when exploring ‘positive’ and ‘negative’ emotions in contexts such as sport (Lane et al., 2011). It is possible that athletes may want to increase ‘negative’ emotions (instrumental regulation) if they believe it facilitates performance (Lane et al., 2011). Importantly Lane et al. (2011), recommend the use of ‘unpleasant’ as opposed to ‘negative’ emotions, however, the term

negative has been used when authors have used scales such as Sport Emotions Questionnaire (Jones et al., 2005). Consequently, it would be important for future research to explore how closely related unpleasant emotions are to reduced well-being in the sport context.

Situation modification

Four situation modification strategies were explored: problem solving, compensation, social support, and physical preparation. Results suggest situation modification strategies to be beneficial for performance, but mixed evidence was found for being adaptive for mental health in sport. Attempting to modify a situation by problem-solving appears beneficial for increasing an athletes' experience of positive emotions and may be more adaptive for mental health than behavioral avoidant type strategies. However, if an athlete has a predisposition to vulnerability, then they may need guidance on using this strategy adaptively.

Results further suggest that a greater use of social support relates to increased experiences of negative emotions (Doorley & Kashdan, 2021; Doorley et al. 2022). The relationship between social support and positive emotions (happy, grateful, content) was not statistically significant and direction was mixed. For example, Doorley and Kashdan (2021) observed a negative trend whilst Doorley et al. (2022) observed a positive trend, however, the statistical analysis used by Doorley and Kashdan (2021) was more robust and controlled for potentially confounding variables (Table 2.2). This strategy would be expected to improve well-being and reduce the risk for mental illness and thus, it is possible that social relationships in sport are not set up for promoting positive outcomes. The studies exploring social support were all investigating student-athletes, consequently, the social support systems at universities may need addressing to reduce the negative implications of seeking social support on emotions and vulnerability.

Attentional deployment

Three attentional deployment strategies were explored: cognitive avoidance, tolerating, and distraction. Results suggest cognitive avoidance to be maladaptive for emotional well-being and no statistically significant relationship of attentional deployment strategies (tolerating and distraction) with performance were found (Kubiak et al., 2019). Similar to behavioral avoidant strategies, cognitive avoidance related to higher negative emotions, suggesting that a greater use of these strategies related to increased experiences of negative emotions (Doorley & Kashdan, 2021; Doorley et al. 2022). As indicated by Table 2.1, few studies explored attentional deployment strategies and so further research is required to better understand this part of the PMER for athletes. Nevertheless, the present findings suggest, both cognitive and behavioral avoidance strategies should be discouraged for athletes and by those who work with them.

It may be beneficial for athletes to develop attentional deployment strategies as research in other fields has found that attending to negative information may place an individual at risk for mental illness and attending to emotional information too much may also have performance consequences (Ferri et al., 2013). However, research in sport is required to substantiate such claims. The first three stages of the PMER (situation selection, situation modification, and attentional deployment) were scarcely investigated and require further exploration.

Cognitive change

Cognitive change was the most frequently investigated process, with studies exploring a range of strategies: cognitive reappraisal/reappraisal, acceptance, positive self-talk, planning, catastrophizing, self-blame, rumination, and anger control. In summary, acceptance appears most beneficial for reducing negative emotions and reappraisal most beneficial for

promoting more positive mental health and thus, these strategies would be useful for athletes to develop and use adaptively in their regulatory repertoire since evidence suggests individuals use multiple strategies. Mixed evidence was found for the relationship between cognitive change strategies and performance, but cognitive reappraisal was the only strategy in this process to be explored across indicators of mental health, illness, and performance. Athletes are using a range of cognitive change regulatory strategies for performance and future research needs to explore how these strategies also relate to athletes' mental health outcomes so that we can ensure athletes are using strategies for performance purposes that do not have a deleterious effect on their mental health.

Cognitive reappraisal was investigated by 10 studies in total and thus, was the most frequently investigated strategy. It was found to positively relate to indicators of higher overall mental well-being, higher positive emotions, and reduced negative emotions (Table 2.2). Reappraisal appears adaptive for promoting well-being, but no significant relationships were found with indicators of mental illness (Table 2.3). As just 3 studies explored the relationship between reappraisal and indicators of mental illness, more studies are required to understand these nuances. Nevertheless, reappraisal appears to be a strategy that athletes would benefit from using to support their mental health since it promotes well-being and does not appear to have a detrimental relationship with indicators of mental illness. Results provide mixed evidence for the benefits of reappraisal on sport performance, however, the two studies used samples with different characteristics and adopted different study designs, which may have influenced their findings. Consequently, further investigation into who and under what circumstances reappraisal is adaptive is necessary.

Response modulation

Response modulation was the second most frequently investigated process, with a total of 6 strategies explored: suppression/expressive suppression/self-suppression, self-

expansion, emotional expression, impression management, anger expression in, and anger expression out. Regarding the strategies athletes employ after an emotion has been generated (response modulation), mixed results were found. Overall, results suggest suppression to be maladaptive for mental well-being and mental illness in athlete populations and thus, is a strategy that should be avoided by athletes. Other response modulation strategies were much less frequently researched than suppression and require further investigation. For example, self-expansion (“promotion focused”) related to positive affect (Stenseng & Phelps, 2016), suggesting response modulation strategies can be adaptive for athletes even when a full emotion has been generated. Response-modulation strategies (besides suppression) used to explore performance were not investigated in regard to mental health outcomes and require further investigation. In fact, expressive suppression was one of the only strategies to be looked at in terms of performance, mental illness, and mental wellbeing (besides reappraisal).

Emotion regulation measures

The range of emotion regulation measures represents inconsistency across studies (Table 2.5), namely, only 7 studies used scales specifically designed for emotion regulation strategies (ERQ and CERQ; although Kubiak et al. (2019) used items inspired by the CERQ). Measures such as the CERQ that explore a broad range of strategies would benefit from being validated for use in athlete populations as, to my knowledge, this has yet to be done beyond the ERQ (Uphill et al., 2012). The range of measures used also presents conceptual issues. That is, definitions of emotion regulation vary between studies. As argued by Gross (2015a), the definition and purpose of emotion regulation warrants clearer explanation. When considering implications for the sport context, for sport psychology to progress in the field of emotion regulation, we must first reach a consensus on what exactly emotion regulation is for athletes but to also be clear about the terms used in research and exactly how they are defined.

Strengths, limitations, and future directions

As shown in Table 2.1, there is a large focus on cognitive change and response modulation strategies, particularly reappraisal and suppression. Performance focused studies indicated a broader range of strategies used by athletes which warrant further investigation (e.g., rumination, distraction, catastrophizing). Furthermore, the standardized beta weights for reappraisal compared to other strategies indicate that reappraisal may not always contribute the largest variance. For example, Doorley and Kashdan (2021) found stronger relationships for acceptance, social support, behavioral, and cognitive avoidance compared to cognitive reappraisal when predicting negative emotions. Consequently, it is necessary to explore strategies beyond the frequently investigated reappraisal and suppression.

In addition to using the dual-continua model for exploring mental health, it is important for future studies to underpin their research with models such as the PMER so we can understand how strategies reflecting different processes influence important outcomes and advance our understanding of emotion regulation and related outcomes in sport psychology. In broader psychology, it has been found that a greater use of situation selection and reappraisal, coupled with reduced use of distraction and suppression, relates to more favorable mental health outcomes (Guassi Moreira et al., 2024). Strategies may, however, have differential consequences in other contexts and thus, individual and contextual influences of the sport context should be explored (Aldao, 2013). This highlights a need for studies to explore how strategies are used together across different stages of the PMER. It is important to investigate the full emotion generating process because strategies are often not used in isolation and this knowledge would help provide a more tailored approach to supporting athletes' emotion regulation use across the emotion generating process.

Finally, from the quality assessment results, it is evident that authors should use standardized reporting tools to advance the transparency of findings across this body of

literature. Furthermore, few studies had the relationship between emotion regulation and indicators of mental health, illness, and performance as a primary aim of their study. This is not a criticism of quality but highlights a need for sport studies that explicitly address this aim with longitudinal designs and more robust methods.

Limitations of the review

With 14 studies meeting the inclusion criteria but exploring 24 unique strategies, there was insufficient data for a meta-analysis and more research is needed to increase the knowledge base (Cheung & Vijayakumar, 2016). Studies also assessed a range of populations within the sport context which also inhibits generalizability. The inclusion and exclusion criteria meant many studies investigating emotion regulation were excluded. For example, studies that grouped strategies together were excluded because the review explored the relationship between individual strategies and outcomes. Studies using emotion regulation as an outcome variable were also excluded and only empirical studies included (e.g., the BASES expert statement on emotion regulation in sport was not included but provides valuable insight into emotion regulation in sport) (Lane et al., 2012). Qualitative studies were also not included but would be a beneficial next step for future reviews. Finally, studies conducted in the context of COVID-19 were not included but provide novel insight into strategy use during a particularly stressful time (Costa et al., 2020).

Conclusion

Taken together, these studies indicate that emotion regulation strategy use is related to performance and mental health outcomes in athlete populations. However, research conceptualized emotion regulation and mental health differently across studies and little is known about the relationship between emotion regulation and other indicators of performance, mental health (e.g., psychological and social well-being), and mental illness. To

progress the field of emotion regulation in sport, conceptual clarity is required, and authors should adopt models such as the PMER and measures that explicitly explore emotional regulatory strategies. It is evident that athletes are using regulatory strategies and that this has consequences for their mental health. Thus, we need to enhance understanding on these relationships to ensure athletes are best supported whilst in their sports, but also so that the regulatory skills developed during their athletic careers are adaptive for other aspects of their lives. That is, we should not encourage the use of strategies that benefit performance if they have maladaptive consequences on their mental health. Due to the limited evidence base, it was beyond the scope of this review to synthesize the adaptive or maladaptive nature of strategies in sport, but key areas for future research were highlighted.

Chapter 3

Exploring student-athletes' mental health profiles through a person-centred approach

As indicated by results of the systematic review in Chapter 2, there is a clear gap in the literature for exploring mental health from a complete state perspective and to explore emotion regulation strategies across the stages of the PMER. The following chapter begins to address these gaps by exploring student-athletes' mental health and emotion regulation. Student-athletes are an at-risk population and universities may provide a valuable context for supporting their mental health.

Introduction

Understanding of mental health has developed in recent decades to be more than just an absence of mental illness (Keyes, 2002). That is, mental health is a uniquely measurable construct that is related to, but distinct from mental illness. This theory has been described as a complete state of mental health and is depicted by the dual-continua model of mental health (Keyes, 2002). This dual-continua model extends original bipolar thinking that mental illness and mental health existed at opposite ends of the same continuum. With this in mind, an individual can experience a varying degree of symptoms of mental illness (low to high) and also have symptoms of mental well-being (poor to good positive mental health) (Keyes & Lopez, 2002). Further, it is possible for someone to have high levels of positive mental health whilst experiencing symptoms of a mental illness, or a full diagnosis (Keyes, 2005).

Regarding positive mental health, Keyes (2002) describes three dimensions of emotional, psychological, and social well-being. Emotional well-being encapsulates the hedonic tradition which includes happiness and life satisfaction (Ryan & Deci, 2001). The psychological and social well-being dimensions form the eudaimonic tradition. Psychological well-being is multi-dimensional and includes components such as, but not limited to, personal growth and self-acceptance (Ryff, 1989). Keyes (1998) introduced the third dimension of

social well-being which is also multi-dimensional and includes components that explain an individual's level of functioning with others. Together, these dimensions explain three levels of functioning: “flourishing”, “moderately mentally healthy”, and “languishing”. An athlete who is “flourishing” is experiencing high levels of positive mental health, whilst an athlete who is “languishing” is experiencing low levels, both with or without mental illness. In extension, Keyes (2014) argues that flourishing is optimal for overall functioning whilst moderate and languishing levels of mental health are linked to physical, social, and psychological impairment. There has been substantial empirical support for the dual-continua model. For example, according to a recent scoping review, research that has conducted confirmatory factor analysis found the two-factor model to be the best fit, indicating mental health and illness as two distinct constructs that are related to some extent (Iasiello et al., 2020). Consequently, it is important for researchers to consider the complete state of mental health to ensure mental health and well-being is being promoted for student-athletes. This holistic approach would allow for the provision of interventions that not only target those experiencing symptoms of mental illness (e.g., anxiety and depression), but also focuses on mental health promotion for all.

Application of Keyes’ model to sport

Sport research has begun adopting the dual-continua model when researching athlete mental health (e.g., Uphill et al., 2016; Kuettel et al., 2021). As stigma towards help-seeking for mental health has been acknowledged as an important intervention consideration for student-athletes (Chow et al., 2023), Uphill et al. (2016) argue that the dual-continua model approach to athlete mental health may be less stigmatizing as it highlights that everyone, regardless of symptom severity, would benefit from mental health support. Indeed, the strategies that promote positive mental health (e.g., flourishing) may be different to those that help to reduce symptoms of mental illness (e.g., anxiety and depression). Nevertheless, there

is a clear gap in knowledge on UK student-athletes mental health taking a complete mental health lens.

Athletes are exposed to over 640 unique stressors that may put them at risk for experiencing difficulties with their mental health (Arnold & Fletcher, 2012). Further, Kuettel and Larsen (2020) identified personal (e.g., maladaptive personality traits, identity and feeling of autonomy) and sport-environmental (e.g., stigma towards help-seeking, mental health literacy and support) risk and protective factors for elite Dutch athletes. Less research, however, has examined risk and protective factors of student-athletes complete mental health (mental illness and well-being). Despite conflicting evidence on student-athletes comparative mental health risk to other populations, it is clear they are a sub-group that require support and are often at a similar level of risk, or sometimes more so, than non-student-athletes (Brown et al., 2022; Kegelaers et al., 2022). Even for studies that found student-athletes were at less risk than their non-student-athlete counterparts (Edwards & Froehle, 2021), everyone can continually work to promote their well-being as a protective factor for their mental health. Pankow et al. (2021) looked at protective factors for flourishing Canadian female student-athletes aged 18-22 years and found they had effective personal protective factors (e.g., looking for positives, reflecting on their season, and planning) to maintain their sport flourishing, indicating that strategies used by flourishing athletes are worth investigating to inform intervention to those not flourishing. Van Slingerland et al. (2019) also examined Canadian student-athletes aged 18-26 years but considered mental health functioning to include flourishing, moderately mentally healthy, and languishing and found, on average, student-athletes experienced moderate-high mental health. They also asked participants whether they had a previous mental illness diagnosis, however, it would be beneficial to investigate student-athletes mental illness simultaneously using validated measures. Although such work, mainly drawn from North American samples, provides important implications for

understanding and supporting student-athlete mental health, generalizations should be made with caution as the academic and sporting systems can be unique between countries. Consequently, research that considers the complete state of UK student-athletes' mental health would fill an important gap in the literature to gain a more holistic understanding of their mental health. Student-athletes are a unique group of athletes who not only experience various risk and protective factors for their mental health but also exist within a context in which protective factors could be promoted. As argued by Reardon (2023), the optimization of athletes' protective factors along with the reduction of risk factors would help to safeguard athletes against mental health difficulties and foster a positive sport environment.

Student-athletes' risk and protective factors

Student-athletes face additional risk factors compared to student non-athletes that involve balancing the demands of being both a student and an athlete. Broader Student-athlete risk factors include performance pressures in multiple aspects of life, transitioning to adulthood, and increased independence (Moreland et al., 2018). Some sport-specific risk factors include “risk behaviors and ineffective coping”, “stigma towards help-seeking”, and “low social support” (Bird et al., 2020; Kuettel & Larsen, 2020; p. 20). Such risk factors expose student-athletes to a broader range of antecedents to common mental disorders such as depression and anxiety (Van Slingerland et al., 2019). Consequently, it is important for athletes to develop skills, such as emotion regulation, to effectively manage the potential risks associated with being a student-athlete that they can also transfer into their wider lives. Understanding UK student-athletes emotional regulation and how this relates to their mental health profiles remains a clear gap in the literature.

Despite exposure to wider risks, sport can also support student-athletes' well-being and serve as a protective factor by providing opportunities for developing emotion regulation

(G. A. Bird et al., 2021) As found by G. A. Bird et al. (2021), UK student-athletes' use of reappraisal predicted an increase in mental well-being whilst suppression predicted a decrease in mental well-being. This finding is important because studies suggest athletes' use of suppression may facilitate performance (Kubiak et al., 2019). Although the association found by Kubiak et al. (2019) between suppression and performance status at Time 1 was small, it was statistically significant ($r = .01, p < .05$), highlighting that the strategies athletes use for performance may not be conducive to support their mental health and well-being.

Optimal performance is a clear goal for student-athletes, but to best support them, this should not be at the expense of their mental health. It is, therefore, important to support their mental health as the transition into adulthood coincides with moving to university, peak athletic years (Allen & Hopkins, 2015), and peak onset for mental illness (Kessler et al., 2007). Understanding the risk and protective factors for their mental health can contribute to informing preventative initiatives and interventions for student-athletes that promote mental health. One such mechanism through which mental health could be promoted is to improve understanding on student-athletes use of emotion regulation strategies and how this relates to their symptoms of mental illness and well-being.

Emotion regulation

Emotion regulation is defined as “the processes by which an individual influences which emotions they have, when they have them, and how they experience and express their emotions” (Gross, 1998a, p.275). This definition is depicted by the Process Model of Emotion Regulation (PMER) which exemplifies how emotions are generated and how different strategies can be implemented at different stages of the emotion generating process (Gross, 1998b). A greater ability to cope with stress and regulate their emotions accordingly has been substantially evidenced to be related to lower symptoms of mental illness (Aldao et

al., 2010) and higher levels of well-being (Gross & John, 2003) in other fields of psychology, but remains a clear gap within sport psychology (G. A. Bird et al., 2021).

An athlete may use dispositional coping strategies in the form of behavioral emotion regulation when responding to stressful events and are typically considered adaptive (favorable towards mental health outcomes) and maladaptive (unfavorable towards mental health outcomes) (Kraaij & Garnefski, 2019). Behavioral emotion regulation strategies such as distraction, or dissociation, and social support seeking have previously been identified as strategies used by athletes in preparation for performance (Connolly & Janelle, 2003; Jones et al., 2017; Stanley et al., 2012). Less is known, however, about how strategies used for performance relate to student-athletes' mental health outcomes. The present study focused on five such behavioral strategies: seeking distraction (doing something else to distract from the emotions), withdrawal (avoiding people and situations), actively approaching (behavior that directly deals with the stressor), seeking social support (requesting support, advice, and sharing emotions with someone), and ignoring (acting like nothing happened) (Kraaij & Garnefski, 2019). This approach will help to uncover whether UK student-athletes are using behavioral strategies as well as determine whether their use is a risk or protective factor for mental health profile membership. This more nuanced understanding of how strategies relate to mental health could help inform interventions that support athletes to use strategies adaptively to suit the context and their individual needs.

Since athletes regulate their emotions for performance purposes (Stanley et al., 2012; Wagstaff, 2014), and strategy use is associated with mental health outcomes (Aldao et al., 2010) it is important to understand athletes' strategy use to determine its potential relationship with their mental health experiences. Other individual factors, such as personality traits, may also influence an athletes' mental health. Alexithymia is a trait involving deficits in emotion processing. This trait makes it difficult for an individual to

identify and describe their emotions and they also have externally orientated thinking, away from their emotions (Ferguson et al., 2023). Alexithymia has been evidenced to be a risk factor for symptoms of mental illness because of its role in influencing emotion regulation in general population adults (Preece et al., 2023). For example, individuals high in alexithymia used more ignoring and withdrawal, and less seeking of social support, highlighting the link between alexithymia and behavioral emotion regulation (Preece et al., 2023). It is suggested that those high in alexithymia experience impaired emotion regulation due to poor decision making, a reduced ability to choose adaptive emotion regulation strategies that are appropriate for the context, have less experience at effective emotion regulation implementation, and have a reduced ability to understand the impact of their chosen strategy, which then feeds back to poor decision making (Preece et al., 2023). Little is known, however, about alexithymia in student-athletes and how this could be a risk factor for mental health concerns.

A person-centred approach

To my knowledge, the complete state of UK student-athlete mental health using a person-centred approach in the form of latent profile analysis (LPA) has yet to be examined. This analysis will advance our understanding on Keyes' model and UK student-athletes mental health by understanding the relationship between symptoms of well-being, depression, and anxiety from a person-centered rather than a variable-centered approach, as well as provide new knowledge on how the different latent mental health profiles differ in use of behavioral emotion regulation strategies and alexithymia. That is, LPA will show whether mental health and illness are distinct from each other. Modelling the data using LPA allows for identification of profiles of student-athletes with similar mental health and illness scores and for further analysis of differences between profiles. A strength of this person-centered approach is that it will allow deeper exploration of who exactly is in each profile to enhance

understanding of student-athlete mental health and highlight any individual needs for targeted intervention. Those in the sporting environment can then shape the context to promote more favorable mental health profiles by understanding the risk and protective antecedents of student-athlete mental health.

Aims and hypotheses

Underpinned by the dual-continua model of mental health (Keyes, 2002) and using a person-centred approach, the present study aimed to: (1) identify the number and characteristics of latent profiles of UK student-athletes complete mental health by patterns in symptoms of mental well-being, depression, and anxiety, and (2) understand whether profiles differed by student-athletes' use of behavioral emotion regulation strategies and alexithymia. Based on existing literature (Kraaij & Garnefski, 2019; Preece et al., 2023), it was hypothesized that athletes reflecting more favorable profiles (i.e., higher well-being, lower anxiety and depressive symptoms) would score higher on adaptive (e.g., seeking distraction, seeking social support, and actively approaching) and lower on maladaptive behavioral emotion regulation (e.g., withdrawal and ignoring), and would score lower on alexithymia. Those reflecting less favorable profiles (i.e., poorer well-being, higher anxiety and depressive symptoms) would score lower on adaptive and higher on maladaptive behavioral emotion regulation and higher on alexithymia.

Methods and materials

Participants and procedures

Following a cross-sectional design, UK based university student-athletes aged between 18-26 years ($M = 19.64$, $SD = 1.34$) completed a multi-section questionnaire pack between November 2021 and December 2022. Data was collected throughout this period, but

the majority was collected in two key periods of the year (the first semester of the academic year and around exams) where student-athletes would typically be exposed to several risk factors. Following ethical approval, participants completed questionnaires related to their mental health and various risk or protective factors such as emotion regulation and alexithymia. Following cleaning and screening procedures, the final sample size was 333 (Tabachnick & Fidell, 2019). Of this final sample, 93 identified as male, 239 identified as female, and 1 did not specify. Full demographic information can be seen in appendix 9, including breakdowns of sport type, competitive level, and self-reported mental illness.

Measures

Mental health

The Sport Mental Health Continuum – Short Form (SMHC-SF; Foster & Chow, 2019) was used to assess student-athletes mental well-being. This 14-item instrument contains sub-scales measuring emotional (subjective) (3-items; e.g., “Interested in your sport”), psychological (6-items; e.g., “That you liked most parts of your athletic personality”), and social (5-items; e.g., “That you belonged to your team or sport community”) well-being. Emotional (subjective) well-being is also known as hedonic whilst social and psychological well-being are referred to as eudaimonic. An athlete can be described as flourishing if they have high scores on the hedonic and eudaimonic subscales and languishing if scores are low on these scales. An athlete who meets neither criterion may be described as moderately mentally healthy (Keyes, 2002). Participants responded to each item by indicating how their sport participation has made them feel over the past month against a Likert-type scale from *never* (0) to *everyday* (5). Scores were summed to have a possible range of 0-70, with higher scores indicating higher levels of overall mental well-being. The SMHC-SF has been shown to have strong psychometric properties with Cronbach

alphas (α 's) of .89 (sport subjective well-being), .88 (sport social well-being), and .90 (sport psychological well-being) (Foster & Chow, 2019). Alpha coefficients for the present study were .85 (subjective), .85 (social), and .87 (psychological), demonstrating good internal consistency.

Mental illness

The Depression, Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995) was used to assess student-athletes' symptoms of depression (7-items; e.g., "I felt that I had nothing to look forward to") and anxiety (7-items; e.g., "I was aware of dryness in my mouth"). The stress subscale was not used for analysis in the present study. Participants rated how they have felt over the past week against a Likert-type scale from *did not apply to me at all* (0) to *applied to me very much or most of the time* (3). Scores were summed and multiplied by 2 to align with the categories of severity outlined by Lovibond and Lovibond (1995) (normal, mild, moderate, severe, and extremely severe; see appendix 8). Cronbach alphas for the present study were .83 for anxiety and .90 for depression, demonstrating good and excellent internal consistency respectively. Previous studies have also demonstrated good levels of internal consistency in athlete and non-athlete samples (Vaughan et al., 2020).

Risk and protective factors for student-athletes' mental health

Behavioral emotion regulation

The Behavioral Emotion Regulation Questionnaire (BERQ; Kraaij & Garnefski, 2019) is a 20-item instrument used to measure student-athletes use of behavioral emotion regulation strategies, these are: seeking distraction (4-items; e.g., "I engage in other, unrelated activities"), withdrawal (4-items; e.g., "I avoid other people"), actively approaching (4-items; e.g., "I try to do something about it"), seeking social support (4-items; e.g., "I look for someone to comfort me"), and ignoring (4-items; e.g., "I move on and pretend that

nothing happened”). Respondents scored their answer to how they generally respond to unpleasant events against a Likert-type scale from *almost never* (1) to *almost always* (5). A total score was created for each subscale, with higher scores indicating greater use of strategies. Cronbach α coefficients for the subscales of the BERQ ranged from .86-.93 in a general population of adults (Kraaij & Garnefski, 2019). For the present study, the coefficients ranged from .74-.88, suggesting acceptable to good internal consistency.

Alexithymia

The Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994) consists of 20-items with subscales of: difficulty identifying feelings (7-items; e.g., “I am often confused about what I feel exactly”), difficulty describing feelings (5-items; e.g., “It is difficult to describe my feelings easily”), and externally oriented thinking (8-items; e.g., “I would rather solve problems than just describe them”). Participants rated their response against a Likert-type scale from *strongly disagree* (1) to *strongly agree* (5). The total score was obtained by summing the items, 5 of which are reverse scored. Possible scores range from 20-100 with higher scores indicating higher levels of alexithymia. In particular, scores ≤ 51 reflect low levels of alexithymia and scores of ≥ 61 reflect high alexithymia (Parker et al., 2003). Alpha coefficients for the total scale have been found to show good reliability (.81; Kooiman et al., 2002). The present study found an α coefficient of .85, also demonstrating good internal consistency in a UK student-athlete sample population.

Data analysis

Data was input, coded, and analyzed using SPSS v.29 and cleaned and screened in accordance with Tabachnick and Fidell (2019). Missing data was analyzed using Little’s (1988) missing completely at random (MCAR) test to determine the approach for handling missing data.

Preliminary analyses involved exploring Pearson correlations to understand the relationships between variables, where coefficients were interpreted as $< .3$ ‘weak’, $.3$ to $.5$ ‘moderate’, and $> .5$ ‘strong’ (Table 3.1). Preliminary analyses also involved exploring descriptive statistics for mental health and emotion regulation strategies and describing sample demographics.

For the main analyses, Latent Gold 6.0 (Vermunt & Magidson, 2021) was used to conduct LPA to identify groups of student-athletes and create profiles based on the psychological constructs of mental well-being, depression, and anxiety. The mean scores were used as continuous indicators for identifying mental health profiles. Although based on Keyes’ (2002) dual-continua model which proposes 4 distinct mental health profiles, an exploratory method was adopted aligned with a person-centered approach for determining the optimal number of mental health profiles within the data. Up to 10 models were considered (see Table 2.2 for the first 7) using the Bayesian information criteria (BIC) as the primary indicator of fit, where a lower score indicates the best fitting model. The Bootstrapped likelihood ratio test (BLRT) was also assessed to compare the models with the model with one fewer profile (Spurk et al., 2020). When the p value became statistically non-significant ($p > .05$) the model with $k-1$ profiles was considered. That is, the BLRT was used to compare the more parsimonious model (fewer profiles) to models with additional profiles (Marsh et al., 2009). As argued by Nylund et al. (2007), BLRT is the best indicator for selecting a model. The models were further evaluated on profile size and parsimony (Vermunt & Magidson, 2021). Classification error and entropy were also considered, where an entropy of $.60$ to $.80$ is considered acceptable (Jung & Wickrama, 2008). Student-athletes were assigned to profiles with the highest posterior probability. Latent profiles were validated by investigating firstly, the difference in the proportions of gender, sport type, competitive level, and self-reported mental illness by means of a chi-squared test. Secondly, mean differences in

total mental well-being using a one-way analysis of variance (ANOVA), mental well-being sub-scales using a multivariate analysis of variance test (MANOVA), and mental illness also using a MANOVA were explored. Post-hoc analysis was conducted using Bonferroni adjustment.

Results

Preliminary analyses

Data was MCAR for all study variables ($p > .05$), except anxiety ($\chi^2 = 64.46$, $df = 40$, $p = .008$) and alexithymia ($\chi^2 = 213.12$, $df = 171$, $p = .016$). However, as less than 5% of data (2.6% and 3.1% respectively) were missing, expectation maximization values were used to replace the missing data (Tabachnick & Fidell, 2019).

Table 3.1 shows the bivariate correlations for the variables included in the study. Of note, mental well-being shared a small, negative correlation with anxiety ($r = -.19$, $p < .001$) and depression ($r = -.24$, $p < .001$). For emotion regulation, hypothesized maladaptive strategies shared a small, negative correlation with mental well-being (withdrawal $r = -.29$, $p < .001$; ignoring $r = -.13$, $p = .02$) and moderate, positive associations with anxiety (withdrawal $r = .41$, $p < .001$; ignoring $r = .34$, $p < .001$) and depression (withdrawal $r = .53$, $p < .001$; ignoring $r = .37$, $p < .001$), suggesting stronger associations with mental illness than mental health. Regarding hypothesized adaptive strategies, actively approaching shared a moderate and positive relationship with mental well-being ($r = .36$, $p < .001$) and small but negative relationships with anxiety ($r = -.13$, $p = .02$) and depression ($r = -.21$, $p < .001$). Associations with mental well-being were small and positive for seeking social support ($r = .16$, $p = .003$) and seeking distraction ($r = .12$, $p = .03$) and there was just a small and negative relationship between seeking social support and depression ($r = -.12$, $p = .03$). Furthermore, alexithymia shared moderate positive correlations with the maladaptive

strategies withdrawal ($r = .54, p < .001$) and ignoring ($r = .43, p < .001$). It also shared moderate, negative correlations with the adaptive strategies actively approaching ($r = -.33, p < .001$) and seeking social support ($r = -.30, p < .001$).

Table 3.1

Bivariate correlations between mental well-being, mental illness, and risk and protective factors

	α	1	2	3	4	5	6	7	8	9
1. Mental Well-being	.93	1								
2. Anxiety	.83	-.19***	1							
3. Depression	.90	-.24***	.74***	1						
4. Withdrawal	.84	-.29***	.41***	.53***	1					
5. Actively approaching	.78	.36***	-.13*	-.21***	-.22***	1				
6. Seeking social support	.88	.16**	-.05	-.12*	-.24***	.34***	1			
7. Ignoring	.80	-.13*	.34***	.37***	.48***	-.08	-.25***	1		
8. Seeking distraction	.74	.12*	-.01	-.02	.06	.19***	.17***	.33***	1	
9. Alexithymia	.85	-.21***	.58***	.62***	.54***	-.33***	-.30***	.43***	.01	1

Note. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Main analyses

Latent profile analysis

Using the BIC as the indicator of fit, 4 profiles existed within the data. Although the fit indices of sample-adjusted Bayesian information criteria (SABIC) and Akaike information criteria (AIC) suggested 5 or 6 profiles would better fit the data, these models had higher classification errors compared to 4 profiles. A closer look at the distribution of student-athletes across the profiles highlighted that there was also insufficient sample size for 5 profiles (3.8%, $n = 12.65$). As suggested by Lubke and Neale (2006), an additional profile that has less than 25 people or is <1% of the total sample should not be included. This 5th profile would classify athletes who have extremely severe symptoms of anxiety ($M = 26.34$)

and depression ($M = 37.11$) and below average levels of well-being ($M = 36.40$). Although the BLRT suggests 5 profiles would be better than 4 ($p = .014$), when considering 4 profiles (BLRT $p < .001$), there was a profile that also captured those extremely severe symptoms of mental illness combined with low levels of well-being. In the interest of parsimony, the 4-profile model was selected as it accounted for the associations among the indicators whilst using fewer profiles (Spurk et al., 2020). This 4-profile model had low classification error (13.38%) and respectable entropy R^2 (74%), indicating classification accuracy and so was considered an appropriate model fit to the data.

Table 3.2

Fit indices for Latent Profile Analysis

Model	-LL	BIC	SABIC	AIC	BLRT (p)	Class. Err.	Entropy R^2
Model 1	-3735.08	7505.00	7485.97	7482.15		.0000	1.0000
Model 2	-3526.59	7128.69	7087.46	7079.19	<.001	.0419	.8440
Model 3	-3490.39	7096.95	7033.51	7020.79	<.001	.1066	.7557
Model 4	-3468.39	7093.60	7007.95	6990.78	<.001	.1338	.7442
Model 5	-3456.41	7110.29	7002.44	6980.81	.014	.1786	.7135
Model 6	-3448.58	7135.29	7005.23	6979.06	.214	.2167	.6885
Model 7	-3440.04	7158.87	7006.61	6984.28	.258	.2089	.7039

Note, Log likelihood (-LL), Bayesian Information Criteria (BIC), Sample Adjusted Bayesian Information Criteria (SABIC), Akaike Information Criteria (AIC). Bootstrapped Likelihood Ratio Test (BLRT), Classification Error (Class. Err.).

An ANOVA and two MANOVA's were conducted to confirm significant differences existed between the latent mental health profiles based on their well-being, anxiety, and depression scores, which were used to create the profiles. Results of the ANOVA indicated differences in overall well-being scores between profiles, $F(3, 329) = 10.61$, $p < .001$, $\eta_p^2 = .09$, observed power = 99.9%. Post-Hoc analysis revealed differences between profiles 1 and

3 ($p < .001$), 2 and 3 ($p = .012$), and 3 and 4 ($p < .001$). Results of a MANOVA indicated significant differences in the sub-scales of the SMHC-SF, Pillai's trace = .13, $F(9, 987) = 4.75$, $p < .001$, $\eta_p^2 = .04$, observed power = 99.9%. At the univariate level, there were statistically significant differences in emotional, $F(3, 329) = 11.23$, $p < .001$, $\eta_p^2 = .09$, observed power = 99.9%, social, $F(3, 329) = 5.67$, $p < .001$, $\eta_p^2 = .05$, observed power = 94.5%, and psychological well-being, $F(3, 329) = 10.42$, $p < .001$, $\eta_p^2 = .09$, observed power = 99.9%. (see Table 3.3) A second MANOVA revealed statistically significant differences in mental illness scores between profiles, Pillai's trace = .95, $F(6, 658) = 98.90$, $p < .001$, $\eta_p^2 = .47$, observed power = 100%. At the univariate level these differences existed for depression, $F(3, 329) = 406.53$, $p < .001$, $\eta_p^2 = .79$, observed power = 100%, and anxiety, $F(3, 329) = 338.31$, $p < .001$, $\eta_p^2 = .76$, observed power = 100%. Further, these differences existed between all profiles (post-hoc p values $< .001$). These results can be seen in Table 3.3.

Table 3.3*Profile scores for indicators of mental health and mental illness (clustering variables)*

Variable(s)	Profile 1: lowest well-being, severe symptoms <i>M (SD)</i>	Profile 2: moderate well-being, normal symptoms <i>M (SD)</i>	Profile 3: highest well-being, normal symptoms <i>M (SD)</i>	Profile 4: moderate well-being, extremely severe symptoms <i>M (SD)</i>	Total <i>M (SD)</i>
Mental well-being					
Overall	40.91 (11.68) ³	44.32 (12.03) ³	50.26 (11.30) ^{1,2,4}	41.42 (16.65) ³	44.41 (12.64)
Emotional	9.05 (2.51) ³	9.98 (2.62) ³	11.15 (2.63) ^{1,2,4}	9.21 (3.45) ³	9.89 (2.77)
Social	14.08 (4.91) ³	15.17 (5.33)	17.09 (4.98) ¹	15.00 (6.86)	15.26 (5.33)
Psychological	17.79 (5.65) ³	19.17 (5.57) ³	22.01 (5.34) ^{1,2,4}	17.21 (7.83) ³	19.26 (5.97)
Mental illness					
Anxiety	17.16 (5.38) ^{2,3,4}	6.14 (3.33) ^{1,3,4}	2.32 (2.18) ^{1,2,4}	25.92 (7.04) ^{1,2,3}	10.63 (8.71)
Depression	16.19 (5.90) ^{2,3,4}	7.09 (3.74) ^{1,3,4}	1.56 (1.24) ^{1,2,4}	32.56 (5.87) ^{1,2,3}	10.87 (9.61)

Note. Range of possible scores for overall well-being (0-70), emotional (0-15), social (0-20), psychological (0-25), anxiety and depression (0-42). Superscript denotes where significant differences exist between profiles based on results of ANOVAs and MANOVAs

¹ = significantly different to profile 1

² = significantly different to profile 2

³ = significantly different to profile 3

⁴ = significantly different to profile 4

The largest latent profile (profile 1, lowest well-being, severe symptoms) contained 36.3% of the student-athletes and was defined by severe symptoms of anxiety ($M = 17.16$, $SD = 5.38$) and moderate symptoms of depression ($M = 16.19$, $SD = 5.90$), but the lowest level of total well-being in the entire sample ($M = 40.91$, $SD = 11.68$). Profile 2 (moderate well-being,

normal symptoms) was the second largest latent profile containing 30% of the sample. It was characterized by moderate levels of total mental well-being ($M = 44.32$, $SD = 12.03$), similar to the sample average ($M = 44.41$, $SD = 12.64$), along with normal levels of anxiety ($M = 6.14$, $SD = 3.33$) and depression ($M = 7.09$, $SD = 3.74$). Profile 3 (highest well-being, normal symptoms) was the third largest with 26.1% of the sample. This profile was characterized by the highest levels of total well-being ($M = 50.26$, $SD = 11.30$) and lowest symptoms of anxiety ($M = 2.32$, $SD = 2.18$) and depression ($M = 1.56$, $SD = 1.24$). This profile also had significantly higher overall, social, and psychological mental well-being scores compared to the other three profiles but only had a statistically significant difference in total score between 3 and 1 for social well-being. The final and smallest mental health profile included 7.5% of student-athletes (moderate well-being, extremely severe symptoms). This profile was characterized by extremely severe anxiety ($M = 25.92$, $SD = 7.04$) and depression ($M = 32.56$, $SD = 5.87$) and moderate levels of total well-being ($M = 41.42$, $SD = 16.65$). For greater detail on the level and severity of well-being and symptoms characterizing each profile, see Table 3.4.

Table 3.4

Level and symptom severity of mental health and illness between the mental health profiles where % shows distribution within the profiles (columns)

Variable(s)	Profile 1: lowest well-being, severe symptoms <i>n</i> (%)	Profile 2: moderate well-being, normal symptoms <i>n</i> (%)	Profile 3: highest well-being, normal symptoms <i>n</i> (%)	Profile 4: moderate well-being, extremely severe symptoms <i>n</i> (%)	Total <i>n</i> (%)
	121 (36.3%)	100 (30%)	87 (26.1%)	25 (7.5%)	
Mental well-being					
Flourishing	31 (25.6%)	42 (42%)	46 (52.9%)	9 (36%)	128 (38.4%)
Moderate	83 (68.6%)	56 (56%)	41 (47.1%)	14 (56%)	194 (58.3%)
Languishing	7 (5.8%)	2 (2%)	0 (0%)	2 (8%)	11 (3.3%)
Anxiety symptoms					
Normal	4 (3.3%)	60 (60%)	87 (100%)	0 (0%)	151 (45.3%)
Mild	3 (2.5%)	19 (19%)	0 (0%)	0 (0%)	22 (6.6%)
Moderate	36 (29.8%)	21 (21%)	0 (0%)	2 (8%)	59 (17.7%)
Severe	31 (25.6%)	0 (0%)	0 (0%)	2 (8%)	33 (9.9%)
Extremely severe	47 (38.8%)	0 (0%)	0 (0%)	21 (84%)	68 (20.4%)
Depression symptoms					
Normal	13 (10.7%)	72 (72%)	87 (100%)	0 (0%)	172 (51.7%)
Mild	18 (14.9%)	20 (20%)	0 (0%)	0 (0%)	38 (11.4%)
Moderate	65 (53.7%)	8 (8%)	0 (0%)	0 (0%)	73 (21.9%)
Severe	23 (19%)	0 (0%)	0 (0%)	7 (28%)	30 (9%)
Extremely severe	2 (1.7%)	0 (0%)	0 (0%)	18 (72%)	20 (6%)

Latent mental health profiles

Profiles were further validated based on demographic variables where the frequencies across profiles can be seen in Table 3.5. To partly address study aim 2, as well as provide further external validation for the 4-profile model, the profiles were compared based on emotion regulation strategies and alexithymia (Table 3.6). These variables were not included in the generation of the profiles.

Demographics. Four chi-squared tests were conducted and found no statistically significant differences between the profiles' proportions of gender ($\chi^2 = 2.08$ df = 3, $p = .557$), sport type ($\chi^2 = 1.16$, df = 3, $p = .763$), or competitive level ($\chi^2 = 7.32$, df = 9, $p = .604$). There was, however, a statistically significant difference in the proportion of student-athletes who self-reported a mental illness across the profiles ($\chi^2 = 32.22$, df = 3, $p < .001$), where there were more than expected reporting "yes" in profiles 1, 2 and 4, and more than expected reporting "no" in profile 3 (Table 3.5).

Table 3.5

Demographic characteristics of the latent mental health profiles where % shows distribution within the demographic variables (rows)

Characteristics	Profile 1: lowest well-being, severe symptoms <i>n</i> (%)	Profile 2: moderate well-being, normal symptoms <i>n</i> (%)	Profile 3: highest well-being, normal symptoms <i>n</i> (%)	Profile 4: moderate well-being, extremely severe symptoms <i>n</i> (%)	Total <i>n</i> (%)
	121 (36.3%)	100 (30%)	87 (26.1%)	25 (7.5%)	
Gender					
Female	85 (35.6%)	75 (31.4%)	59 (24.7%)	20 (8.4%)	239 (71.99%)
Male	35 (37.6%)	25 (26.9%)	28 (30.1%)	5 (5.4%)	93 (28.01%)
Sport type					
Team	55 (34%)	51 (31.5%)	45 (27.8%)	11 (6.8%)	162 (49.09%)
Individual	64 (38.1%)	49 (29.2%)	41 (24.4%)	14 (8.3%)	168 (50.91%)
Competitive level					
Recreational	43 (42.2%)	24 (23.5%)	25 (24.5%)	10 (9.8%)	102 (31.10%)
Club	36 (32.7%)	33 (30%)	33 (30%)	8 (7.3%)	110 (33.54%)
Regional	35 (25.4%)	37 (37.4%)	21 (21.2%)	6 (6.1%)	99 (30.18%)
Elite	6 (35.3%)	5 (29.4%)	5 (29.4%)	1 (5.9%)	17 (5.18%)
Self-reported mental illness status					
Yes	33 (42.9%)	24 (31.2%)	5 (6.5%)	15 (19.5%)	77 (23.26%)
No	86 (33.9%)	76 (29.9%)	82 (32.3%)	10 (3.9%)	254 (76.74%)

Risk and protective factors: Emotion regulation. Results of a MANOVA (Table 3.6) showed that, at the multivariate level, there were statistically significant differences in strategy use between the mental health profiles (Pillai's trace = .30, $F(15, 981) = 7.25$, $p < .001$, $\eta_p^2 = .10$, observed power = 100%). At the univariate level, these differences existed for

withdrawal ($F(3, 329) = 30.31, p < .001, \eta_p^2 = .22$, observed power = 100%) between profiles 1 and 2 ($p < .001$), 1 and 3 ($p < .001$), 1 and 4 ($p = .012$), 2 and 4 ($p < .001$), and 3 and 4 ($p < .001$), actively approaching ($F(3, 329) = 6.71, p < .001, \eta_p^2 = .06$, observed power = 97.4%) between profiles 1 and 3 ($p = .002$), and 3 and 4 ($p < .001$), and ignoring ($F(3, 329) = 16.92, p < .001, \eta_p^2 = .13$, observed power = 100%) between 1 and 2 ($p < .001$), 1 and 3 ($p < .001$), 2 and 4 ($p < .001$), and 3 and 4 ($p < .001$). There were no statistically significant differences in seeking social support ($F(3, 329) = 2.39, p = .07, \eta_p^2 = .021$, observed power = 59.4%), or seeking distraction ($F(3, 329) = .63, p = .60, \eta_p^2 = .01$, observed power = 18.1%) between any of the latent mental health profiles.

The “moderate well-being, extremely severe symptoms” profile (profile 4) used significantly more withdrawal ($M = 12.94, SD = 3.91$) than all other profiles. This profile also used more ignoring ($M = 11.35, SD = 4.21$) than the “moderate well-being, normal symptoms” ($M = 8.29, SD = 2.76$) and “highest well-being, normal symptoms” ($M = 7.99, SD = 2.97$) profiles. In fact, the “moderate well-being, normal symptoms” and “highest well-being, normal symptoms” profiles did not differ between each other in any of the behavioral emotion regulation strategies. The “highest well-being, normal symptoms” used more actively approaching ($M = 12.99, SD = 2.91$) than the “lowest well-being, severe symptoms” ($M = 11.55, SD = 2.82$) and “moderate well-being, extremely severe symptoms” ($M = 10.52, SD = 2.24$) profiles.

Risk factors: Alexithymia. Results of an ANOVA found statistically significant differences in alexithymia between profiles ($F(3, 329) = 65.77, p < .001, \eta_p^2 = .38$, observed power = 100%). According to post-hoc analysis, these differences existed between all profiles ($p < .001$). The “moderate well-being, extremely severe symptoms” profile had the highest alexithymia scores ($M = 67.08, SD = 9.14$) whilst the “highest well-being, normal symptoms”

profile had the lowest ($M = 43.40$, $SD = 9.41$). The trend was for more favorable profiles to have lower alexithymia scores.

Table 3.6

Profile scores for risk and protective factors

Variable(s)	Profile 1: lowest well-being, severe symptoms $M (SD)$	Profile 2: moderate well-being, normal symptoms $M (SD)$	Profile 3: highest well-being, normal symptoms $M (SD)$	Profile 4: moderate well-being, extremely severe symptoms $M (SD)$	Total $M (SD)$
Behavioral emotion regulation					
Withdrawal	10.72 (3.40) ^{2,3,4}	8.35 (3.04) ^{1,4}	7.45 (3.07) ^{1,4}	12.94 (3.91) ^{1,2,3}	9.32 (3.66)
Actively approaching	11.55 (2.82) ³	12.03 (2.97)	12.99 (2.91) ^{1,4}	10.52 (2.24) ³	11.99 (2.93)
Seeking social support	11.45 (3.88)	12.02 (3.79)	12.76 (3.91)	11.00 (4.54)	11.93 (3.94)
Ignoring	10.46 (3.43) ^{2,3}	8.29 (2.76) ^{1,4}	7.99 (2.97) ^{1,4}	11.35 (4.21) ^{2,3}	9.23 (3.41)
Seeking distraction	11.88 (2.93)	12.26 (3.02)	12.39 (2.30)	11.88 (3.11)	12.13 (2.97)
Alexithymia	57.25 (9.12) ^{2,3,4}	49.03 (8.67) ^{1,3,4}	43.40 (9.41) ^{1,2,4}	67.08 (9.14) ^{1,2,3}	51.90 (11.43)

Note. Range of possible scores for BERQ strategies (4-20) and alexithymia (20-100). Superscript denotes where significant differences exist between profiles based on results of ANOVAs and MANOVAs

¹ = significantly different to profile 1

² = significantly different to profile 2

³ = significantly different to profile 3

⁴ = significantly different to profile 4

Discussion

The purpose of the study was to understand student-athlete mental health by exploring patterns of depression, anxiety, and mental well-being to classify student-athletes into latent mental health profiles. The study also aimed to understand risk and protective factors for profile membership by investigating use of behavioral emotion regulation and student-athletes' levels of trait alexithymia, which had yet to be investigated in a student-athlete population.

Mental health profiles

In response to the first aim of the study, four latent mental health profiles were found. In line with the dual-continua model, our findings highlight that student-athletes have varying experiences with symptoms of mental well-being and illness along the two continua and that an absence of one does not mean the presence of the other (Keyes, 2002). Researchers often categorize participants into four groups: “complete mental health”, “vulnerable”, “symptomatic but content”, and “struggling” (Iasiello et al., 2020). The present profiles, however, do not fit neatly into these four quadrants. In fact, the data suggests student-athletes have neither “complete mental health” nor are “symptomatic but content”, but rather are “well-adjusted” (profile 3: highest well-being, normal symptoms) and “moderately mentally healthy” (profile 2: moderate well-being, normal symptoms) (Uphill et al., 2016). The descriptive classifications reflect student-athletes who are not necessarily flourishing in high levels of positive mental health but do have little to no symptoms of mental illness. A novel contribution of the present research is that the four groups found within the sample provide a nuanced image of UK student-athletes' mental health, as profiles were data driven rather than assigning student-athletes to predetermined profiles, emphasizing the importance of the person-centered approach undertaken.

A further important empirical contribution of the person-centred approach adopted is that the MANOVAs revealed the four latent mental health profiles were distinguishable by symptoms of anxiety and depression but not by overall levels of mental well-being. The profiles were also distinguishable by self-reported mental illness. That is, all profiles had significantly different anxiety and depression scores, but only student-athletes with the “highest well-being, normal symptoms” had significantly different mental well-being scores. Although with LPA it would be expected that profiles should be distinct from one another, this finding contributes to the dual-continua model by reflecting the notion that mental health and illness are distinct constructs (Keyes, 2002). Similar to Kuettel et al. (2021), the present depression and anxiety scores were more influential to profile membership than mental well-being scores. This finding offers some support to the dual-continua model by highlighting that, regardless of symptom severity, student-athletes’ levels of mental well-being are similar unless they are completely free of symptoms of anxiety and depression. That is, experiencing low levels of mental illness does not mean they will have high levels of mental well-being and thus, an overreliance on investigating symptoms of mental illness does not appropriately capture an individual’s levels of mental well-being. If solely negative indicators of mental health had been investigated, then the mental health of student-athletes in profiles such as “moderate well-being, normal symptoms” may have been overlooked and the large proportion with low levels of mental well-being would not receive the support needed. To provide some examples, “lowest well-being, severe symptoms” student-athletes had the lowest observed well-being score ($M = 40.91$, $SD = 11.68$), although not significantly different to profile 4 “moderate well-being, extremely severe symptoms”, whose symptoms of anxiety and depression were worse, or profile 2 “moderate well-being, normal symptoms”, whose symptoms were more favorable. Although “moderate well-being, extremely severe symptoms” student-athletes were no more likely to suffer with low mental well-being than

“lowest well-being, severe symptoms” and “moderate well-being, normal symptoms” student-athletes, they are, in contrast, “struggling” with extremely severe symptoms of anxiety and depression. Although 8% would be considered as languishing, surprisingly this profile does not have the least flourishers, supporting the propositions of Keyes’ (2002) model by highlighting that it is possible to flourish whilst experiencing symptoms of mental illness. That is, symptom severity does not ‘predict’ mental well-being. In further support, correlations indicated a small and negative statistically significant association between mental well-being and anxiety, as well as mental well-being and depression, suggesting they are related but distinct constructs for student-athletes.

Although the continuous variables were used to generate the latent mental health profiles, the categorical variables offer a more nuanced insight into the profiles and supports the person-centred approach by considering the individual and not just profile averages. For example, 3.3% and 10.7% of profile 1 had normal symptoms of anxiety and depression respectively. Anxiety appears a particular concern for student-athletes in this profile with the majority (38.8%) reporting extremely severe symptoms compared to 1.7% for depression. Although Keyes’ (2002) original classification for the four profiles included “complete mental health”, the profile with the best mental health that was found by LPA in the present study had a large proportion with moderate mental health (47.1%). The profile did, however, have 100% with normal symptoms of depression and anxiety. Consequently, it is important to investigate both in research and understand the risk and protective factors associated with increasing well-being and decreasing symptoms of mental illness.

Risk and protective factors

Overall, there was a trend that student-athletes in profiles with higher well-being (profile 3: highest well-being, normal symptoms) and normal symptoms of mental illness (profile 3, and profile 2: moderate well-being, normal symptoms) used more adaptive

emotion regulation, less maladaptive emotion regulation, and had lower alexithymia scores than the low well-being and high symptoms profiles (profile 1: lowest well-being, severe symptoms and profile 4: moderate well-being, extremely severe symptoms). Although this trend was expected, results of the MANOVA provide partial support for the hypotheses whilst the ANOVA fully supports the hypotheses. That is, some differences existed for actively approaching, withdrawal, ignoring, and alexithymia, but not for seeking social support or seeking distraction. A key finding is that the “moderate well-being, normal symptoms” and “highest well-being, normal symptoms” profiles did not significantly differ in any use of any behavioral emotion regulation strategies and thus, symptoms of mental illness may influence differences in emotion regulation use.

Protective factors: adaptive behavioral emotion regulation

When considering strategies theorized to be adaptive (actively approaching, seeking social support, and seeking distraction), actively approaching was the only strategy used differently between profiles. That is, the “highest well-being, normal symptoms” profile used this strategy more often than the “lowest well-being, severe symptoms” and “moderate well-being, extremely severe symptoms” profiles. When faced with stressors in their sport, the data suggests that “highest well-being, normal symptoms”, and “moderate well-being, normal symptoms” student-athletes will engage in behavior that attempts to address the stressor directly (Kraaij & Garnefski, 2019). On average, student-athletes in the sample had a mean actively approaching score of 11.99 ($SD = 2.93$) and thus, “moderate well-being, normal symptoms”, and “highest well-being, normal symptoms” student-athletes used this strategy more than the average student-athlete in the present sample population. Student-athletes in the “highest well-being, normal symptoms” profile also used this strategy similarly to general population adults ($M = 12.69$, $SD = 3.67$) (Kraaij & Garnefski, 2019). Consequently, student-athletes’ use of actively approaching may have a greater influence on symptoms of anxiety

and depression than on mental well-being because the profiles with mostly “normal” symptoms used this strategy the most. The hypothesis that the profiles with higher levels of well-being and lower symptoms of mental illness would score higher in adaptive strategies was therefore, only partially supported.

Two other strategies, seeking social support and seeking distraction, were expected to be used more by “highest well-being, normal symptoms” student-athletes but no statistically significant differences were found between any of the mental health profiles, despite a trend for “highest well-being, normal symptoms” student-athletes to use more and “moderate well-being, extremely severe symptoms” student-athletes to use less. Compared to previous literature, student-athletes appear to be using these strategies in similar amounts to other populations, regardless of profile membership (e.g., US adults; Preece et al., 2021; general population; Kraaij & Garnefski, 2019). Although there were statistically significant differences in overall well-being between “highest well-being, normal symptoms” athletes compared to other athletes, their mean social well-being score was not significantly different. The similar use of social support seeking between profiles may offer some explanation for the levels of social well-being. For example, Kuettel et al. (2021) demonstrated that social support was a key factor for student-athletes’ experiences of positive mental health. It may be suggested that seeking social support and seeking distraction have little influence on profile membership but encouragingly, student-athletes appear to be using these strategies frequently. Although, future research would benefit from understanding how and when these strategies are used to ensure student-athletes are using strategies appropriately for their individual and contextual needs.

Risk factors: maladaptive behavioral emotion regulation

For strategies theorized to be maladaptive (withdrawal and ignoring) and thus used more by those with “lowest well-being, severe symptoms” or “moderate well-being, extremely severe symptoms” compared to those with “moderate well-being, normal symptoms” and “highest well-being, normal symptoms”, the findings are mostly in line with the hypotheses. “Moderate well-being, extremely severe symptoms” student-athletes used withdrawal the most, whilst “moderate well-being, normal symptoms” and “highest well-being, normal symptoms” student-athletes used it the least. “Moderate well-being, normal symptoms” and “highest well-being, normal symptoms” student-athletes used withdrawal less than the average student-athlete in the sample ($M = 9.32$, $SD = 3.66$). There were, however, no statistically significant differences between the “moderate well-being, normal symptoms” and “highest well-being, normal symptoms” student-athletes in their use of withdrawal, although their usage was lower compared to other populations such as US adults ($M = 10.19$, $SD = 4.68$; Preece et al., 2021), and slightly lower than that of general population adults ($M = 8.56$, $SD = 3.47$; Kraaij & Garnefski, 2019). These findings suggest student-athletes with little to no symptoms of anxiety or depression used the least withdrawal whilst those with elevated symptoms use it most during their sport performance and thus, it is possible that increased use of withdrawal relates to less favorable profile membership. More research that explores use of strategies over time should be conducted to investigate this proposition further, such as longitudinal studies.

In contrast, ignoring was employed most by “lowest well-being, severe symptoms” and “moderate well-being, extremely severe symptoms” student-athletes and least by “moderate well-being, normal symptoms” and “highest well-being, normal symptoms” student-athletes. Furthermore, “lowest well-being, severe symptoms” and “moderate well-

being, extremely severe symptoms” student-athletes used it more than the average student-athlete in the present sample ($M = 9.23$, $SD = 3.41$). Similar to withdrawal, “moderate well-being, normal symptoms” and “highest well-being, normal symptoms” student-athletes used ignoring slightly less than a general population sample ($M = 8.36$, $SD = 3.59$) and US adults ($M = 9.06$, $SD = 3.85$) (Kraaij & Garnefski, 2019; Preece et al., 2021). Consequently, it can be inferred that student athletes who display the lowest symptoms of mental illness, “moderate well-being, normal symptoms” and “highest well-being, normal symptoms” use maladaptive strategies (withdrawal and ignoring) to a lesser extent than other populations, including student-athletes with higher symptomatology from the same population. An increased use of maladaptive strategies seems to be a risk factor for vulnerability or struggling. Hence, it is important for student-athletes, and those who support them, to target a reduction in use of avoidant-type strategies (withdrawal and ignoring) as they have also previously been found to be associated with lower well-being in sport (Rose et al., 2023).

Risk factors: alexithymia

In line with the hypotheses, the “moderate well-being, normal symptoms” and “highest well-being, normal symptoms” student-athletes scored low on alexithymia, the “lowest well-being, severe symptoms” profile scored moderately, and the “moderate well-being, extremely severe symptoms” profile scored high. Therefore, student-athletes in profiles with the highest symptoms of mental illness scored highest on alexithymia and differences existed between all profiles, suggesting alexithymia may influence mental health status. This finding was further supported by results from the correlation analysis which evidenced moderate relationships between alexithymia and mental illness, and a small relationship between alexithymia and mental well-being. Previous findings also suggest those high in alexithymia have a higher usage of maladaptive strategies (withdrawal and ignoring)

and a lower use of adaptive strategies (actively approaching and seeking social support) in general population adults (Preece et al., 2023). Further research into student-athletes' levels of alexithymia and its potential role in influencing emotion regulation and mental health status is required as there is limited knowledge within the field of sport psychology. Future research would benefit from investigating alexithymia as a potential moderator or mediator between behavioral emotion regulation and mental health outcomes for student-athletes.

Strengths, limitations, and future directions

A strength of the present study is in the person-centred approach. To my knowledge, this is the first study to examine mental health profiles of UK student-athletes. Taking such an approach has provided further insight than just reporting the sample mean. Although providing important information on average scores, just considering the mean limits our understanding of student-athlete mental health. For example, the mean well-being score for the “lowest well-being, severe symptoms”, “moderate well-being, normal symptoms”, and “moderate well-being, extremely severe symptoms” profiles was lower than the sample population average and thus, “highest well-being, normal symptoms” student-athletes are inflating the mean score, despite there only being 26.1% in this profile. Furthermore, the mean depression and anxiety scores do not accurately represent the profiles. Consequently, these results highlight the importance of a person-centred rather than a variable-centred approach when assessing the mental health of student-athletes as it can contribute to providing more targeted intervention.

Another strength of the present study was considering a broad range of emotion regulation strategies. Investigating a broader range compared to the frequently researched strategies of reappraisal and suppression (Chapter 2) enables us to explore the potential risk or protectiveness of strategy use in more detail, as in line with the PMER, different strategies

can be implemented at different stages of the emotion generating process (Gross, 2015a). Sport participation may provide student-athletes with a context in which they can learn to adaptively regulate their emotions and so emotion focused interventions that encourage athletes to regulate emotions in a way that is appropriate for them, and their context, would be integral for promoting mental health and learning skills that can be translated into wider life. In particular, profiles high in alexithymia would benefit from emotion regulation interventions, but future research is required to support this suggestion. Emotion regulation and alexithymia is an understudied area of the risk and protective research base. Consequently, the present findings contribute to the existing literature and add novel insights to the field. Future research would benefit from comparing the importance of different risk and protective factors such as those explored here and those explored by Kuettel and Larsen (2020). In addition, future research should consider the role of dual-career status when investigating student-athlete mental health and associated risk and protective factors.

A limitation of the present study is in the cross-sectional design, reflecting student-athletes' mental health profiles at one point in time. Although novel insight has been provided into emotion regulation and alexithymia as risk and protective factors for profile membership, it would be beneficial for future research to conduct longitudinal studies to assess whether profile membership is stable over time and whether emotion regulation and alexithymia predict changes or stability of profile membership between time points. Regarding timing of data collection, it is important to consider the point of the academic and sporting year in which data is collected. Previous studies have found students anxiety and depressive symptoms increase over the year and thus, it would be beneficial for future research to investigate this longitudinally and with student-athletes (Adams et al., 2021; Duffy et al., 2020). It would also be beneficial for future research to conduct intervention

studies to explore whether student-athletes move between profiles when receiving interventions that target their emotion regulation and alexithymia.

A further limitation is in the limited availability of mental health measures that are contextualized to the sport context. The SMHC-SF, for example, has been developed and validated for use in athlete populations (Foster & Chow, 2019). An athletes' level of sport well-being can contribute towards their levels of global well-being (Lundqvist, 2011). Consequently, it is important to consider the sport context to better understand athletes' experiences of well-being within their sport and how this support their global well-being (Foster & Chow, 2019). Further validation of the SMHC-SF as well as to determine sport-specific cut-offs for flourishing, moderately mentally healthy, and languishing would be useful next steps. Future research would benefit from validating contextualized measures of mental illness. The DASS-21 has been validated for athlete populations (Vaughan et al., 2020) but to better understand symptoms of mental illness within the sport context, future research and sport specific measures are needed.

Conclusion

Student-athletes across all four mental health profiles require support with promoting their mental well-being and student-athletes who are not in the “highest well-being, normal symptoms” profile require support with reducing symptoms of mental illness. Using Keyes' (2002) model to facilitate intervention would be beneficial as two arms of support are required (symptom reduction and well-being promotion). Findings suggest behavioral emotion regulation strategies play a role in profile membership, especially student-athletes use of maladaptive strategies. Student-athletes may benefit from intervention that specifically focuses on emotion regulation for promoting greater overall mental health (i.e., move into “highest well-being, normal symptoms”) by reducing use of withdrawal and ignoring. In

contrast, actively approaching a stressor would be more beneficial for their mental health. It would also be beneficial to be aware of student-athletes with high levels of trait alexithymia as further support with effective emotion regulation may be required. Results suggest that mental health profiles differed more in maladaptive than adaptive emotion regulation but that student-athletes in all four profiles are using adaptive strategies. Sport participation may, therefore, be providing opportunities for using a range of strategies but implementation may not be effective and maladaptive strategies are being used too frequently and with negative consequences. Future research should investigate the effectiveness of emotion regulation in relation to mental health outcomes based on differing levels of severity as well as understand for who, and why, strategies may be a risk for, or protect their mental health.

Chapter 4

Exploring student-athletes' mental health profiles through a person-centred approach: a replication and extension study

Chapter 4 replicates and extends Chapter 3 by providing further evidence for Keyes' model by again using a person-centred approach (i.e., LPA) to determining the mental health profiles in UK student-athletes. Four profiles were identified in Chapter 3 that differed according to behavioral emotion regulation strategies reflecting the first three processes of the PMER and alexithymia. The present chapter replicates these analyses with a new sample of student-athletes collected in the following academic year (see appendix 9 to compare the demographic information of the samples included in Chapters 3 & 4) and extends these findings by exploring both cognitive and behavioral strategies reflecting the later stages of the PMER.

Introduction

Despite narrative reviews and calls to action to address the mental health of athletes from a complete state perspective (e.g., Lundqvist & Anderson, 2021; Uphill et al., 2016), sport mental health research has not always included indicators of both mental illness and positive mental health. Considering positive indicators of mental health assumes a more nuanced understanding of mental health that explains how we must explore an individual's symptoms of well-being in addition to the presence or absence of symptoms of mental illness to truly explore the salutogenic perspective, in line with the dual-continua model of mental health (Keyes, 2002). Historically, mental health has been viewed and studied from a lens that focuses on the absence of symptoms of mental illness to define what it means to be mentally healthy (Keyes, 2005). The importance of well-being is often missed and within sport, this may precipitate stigma and barriers to help-seeking (Chow et al., 2020; Uphill et al., 2016).

In a recent scoping review, Kegelaers et al (2022) found 159 papers on student-athlete (including high-school student-athletes) mental health. Of these, 13.8% included indicators of both positive mental health and mental illness, whereas 63.5% focused on mental illness only and 22.6% on positive mental health only. Without including both indicators, studies are not able to fully examine mental health from a dual continua perspective. Consequently, mental health research with athletes in general, and student-athletes specifically, has typically been done using variable-centred approaches that predominantly focus on mental illness or well-being and relationships between variables. This variable-centred approach limits our understanding of student-athletes' complete mental health, because according to Keyes' model, mental health is best understood as consisting of both positive and negative indicators of mental health and illness.

Studies have begun to address the gap of exploring mental health in sport from a salutogenic perspective with Danish elite soccer players (Kuettel et al., 2021) and Canadian student-athletes (van Slingerland et al., 2019). University student-athletes within the UK have been currently overlooked in this research and warrant consideration as a unique population with their own risk, protective factors, and education systems (see Chapter 1 for risk and protective factors of student-athlete mental health; e.g., Moreland et al., 2018) and thus, we cannot assume patterns will be the same as with these other populations. In fact, Kegelaers et al. (2022) found that just 3% of all studies in their review were conducted in the UK. Altogether, there are clear gaps in the literature that point to the need for exploring UK student-athlete mental health profiles as a complete state.

In Chapter 3, latent profile analysis (LPA) was used to identify classes of student-athletes within the data to explore latent mental health profiles. The LPA was conducted using scores on the continuous variables of sport mental well-being, depression, and anxiety symptoms as clustering variables, and provided evidence for 4 latent mental health profiles.

These profiles were distinguishable by symptoms of anxiety and depression but not entirely by well-being scores. That is, only the profile with 100% of student-athletes having normal symptoms of anxiety and depression differed significantly in their well-being score to the other profiles. The findings of this previous chapter support Keyes' model with UK student-athletes. Further investigation from a salutogenic perspective is, however, warranted including the need to replicate with a new sample.

Beyond exploring student-athlete mental health from a salutogenic perspective, it is important to understand the risk and protective factors associated with mental health and mental illness. Due to the risks associated with competitive sports (e.g., Breslin et al., 2017; Breslin et al., 2019; Reardon et al., 2019; Schinke et al., 2018; Stambulova & Wylleman, 2019), athletes are considered to be at as much a risk, or sometimes at a greater risk, for experiencing problems with mental illness such as depressive and anxiety symptoms (Belz et al., 2018; Foskett & Longstaff, 2018). In addition to competitive sport, student-athletes must also manage the stressors associated with being a student (Drew & Matthews, 2019; van Slingerland et al., 2018; Kegelaers et al., 2022). Despite associated risks, participation in competitive sport can also provide protective factors that support athlete mental health (Breslin et al., 2019; Kuettel & Larsen, 2020).

The relationship between how student-athletes attempt to regulate sport emotions to their mental health outcomes is still relatively unexplored. Given how emotion regulation could be both a risk and protective factor (Aldao et al., 2010), it is important to understand whether the strategies athletes are using are adaptive or maladaptive for the context. Research suggests sport may provide opportunities for developing emotional regulation (G. A. Bird et al., 2021) and the systematic review reported in Chapter 2 highlighted initial evidence for the relationships between emotional regulation and mental health outcomes in athlete populations. Chapter 3 began to address this gap, but it is necessary to further explore the

emotion regulation strategies employed by athletes and how this differs according to their mental health profiles. Doing so through adopting a salutogenic perspective would help to clarify whether the strategies that promote well-being differ from those that reduce symptoms of mental illness (G. A. Bird et al., 2021; Uphill et al., 2012).

Emotion regulation

It is well-established that the ways in which individuals regulate their emotions (see Chapter 1 for operational definition; [Gross, 1998a]) has consequences for their mental health, including well-being and symptoms of mental illness (Aldao et al., 2010). As found in Chapter 2 and supporting a BASES expert statement on emotion regulation in sport (Lane et al., 2012), athletes use a range of emotion regulation strategies to regulate sport emotions. However, few strategies have been explored from a salutogenic perspective. Moreover, and underpinned by the PMER (Gross, 1998b), it is understood from broader psychology that individuals can employ various strategies to regulate a single emotion episode (Ford et al., 2019) and that multiple strategies can be used simultaneously or successively (Gross, 2015a). To advance understanding of emotion regulation in sport, it is important to include strategies that reflect different stages of the PMER and vary according to whether they are typically adaptive or maladaptive for mental health outcomes (Webb et al., 2012). Addressing these gaps, Chapter 3 showed that the 4 latent mental health profiles showed some significant differences in use of withdrawal, actively approaching, seeking distraction, and alexithymia. However, this previous chapter was limited to strategies that address the first three processes of PMER (situation selection, situation modification, and attentional deployment).

To extend the findings of Chapter 3, the present chapter explored more of the later processes of the PMER by including strategies that reflect attentional deployment, cognitive change, and response modulation, to more fully understand student-athletes' use of emotion

regulation strategies and differences in use between mental health profiles (Gross, 1998b). More specifically, Chapter 4 included antecedent-focused cognitive emotion regulation strategies of positive refocusing, refocus on planning, reappraisal, rumination, and catastrophizing and the response-focused behavioral strategy of expressive suppression (Garnefski & Kraaij, 2007; Gross & John, 2003). According to Garnefski and Kraaij (2007), positive refocusing is associated with more favorable mental health outcomes in non-clinical samples (lower depression and anxiety). Researchers have also argued that positive refocusing is an adaptive strategy that can be increased with athletes through intervention (Wagstaff et al., 2013). Refocus on planning has also been found to be related to fewer symptoms of depression, higher well-being, and improvements in sport performance (Balzarotti et al., 2016; Kubiak et al., 2019; Sacchi & Dan-Glauser, 2021). Reappraisal has been more frequently investigated within and outside of sport when compared to positive refocusing and refocus on planning (see Chapter 2). Existing literature has found reappraisal to be predictive of increased mental well-being (G. A. Bird et al., 2021; Gross & John, 2003), reduced symptoms of mental illness (Aldao et al., 2010), and predominantly improved performance under high pressure and threat (Balk et al., 2013; Moore et al., 2015). Taken together, these strategies (positive refocusing, refocus on planning, and reappraisal) have typically been considered adaptive for mental health.

In contrast, suppression, rumination, and catastrophizing are typically considered maladaptive for mental health and were also explored in the present study. As indicated in Chapter 2, athletes may use expressive suppression to improve performance, however, this strategy has frequently been cited to relate to poorer mental health outcomes (Gross & John, 2003; G. A. Bird et al., 2021). Similarly, some evidence suggests rumination may be beneficial in some contexts and for improved sport performance but has frequently been cited as linked to depressive symptoms (Roy et al., 2016; Schäfer et al., 2017). Catastrophizing is

also associated with higher symptoms of depression and anxiety (Garnefski & Kraaij, 2006; Mannes et al., 2020), and worsened sport performance (Kubiak et al. 2019). There is, however, limited research investigating these strategies in relation to student-athletes' complete mental health, despite the importance of considering individual and contextual experiences with mental health and emotion regulation (Gratz & Roemer, 2004; Paul et al., 2023). It is, therefore, important to explore student-athletes' emotion regulation use as risk and protective factors for mental health outcomes.

Aims and hypotheses

The aims of the present study were to replicate and extend the cross-sectional study reported in Chapter 3 by again using a person-centred approach (i.e., LPA) to identify the number of latent mental health profiles and their characteristics, and then investigate differences in these mental health profiles according to emotion regulation strategies.

Aim 1: replicate

Within psychology more broadly, there are concerns over the reliability of findings with replication studies often showing different results and thus, highlighting a need for replication studies to draw more robust conclusions (Anderson & Maxwell, 2016; Maxwell et al., 2015). Chapter 3 began to address the gap of exploring the salutogenic perspective by identifying the mental health profiles of UK student-athletes using LPA. It is important to note that LPA is inductive in that theory is derived from the data and thus, it would not be expected to find a certain number of mental health profiles (Fisher & Robie, 2019). However, as the new sample in Chapter 4 was drawn from the same population (UK student-athletes), a similar pattern would help to replicate the findings and provide further support for Keyes' model. Moreover, a systematic review with 83 articles from mostly non-clinical samples, found studies to consistently group participants into 4 mental health profiles to validate sub-

groups of the dual-continua model (for a review, see Iasiello et al., 2020). It was therefore predicted that 4 profiles would be found, replicating the findings from Chapter 3 and previous research, and these profiles would be distinguishable by the clustering variables (mental well-being, anxiety, and depressive symptoms).

Aim 2: extend

The identification of groups of student-athletes with similar patterns of mental health outcomes can provide understanding on the underlying mechanisms that help explain variation between profiles (Isler et al., 2017). Doing so would contribute to literature on personal risk and protective factors and inform future interventions for preventing or reducing mental illness and promoting mental health. It was hypothesized that typically more “adaptive” (i.e., positive refocusing, refocus on planning, and reappraisal) versus “maladaptive” emotion regulation strategies (i.e., rumination, catastrophizing, and expressive suppression) would be used more by more favorable profiles (e.g., higher well-being and lower depressive and anxiety symptoms) whilst less favorable profiles would report the opposite pattern (Garnefski & Kraaij, 2018; Gross & John, 2003).

Methods and materials

Participants and procedures

Adopting a cross-sectional design, student-athletes representing a range of sports, types (team $n = 162$, individual $n = 85$), and competitive levels (recreational $n = 65$, club $n = 69$, regional $n = 101$, and elite $n = 11$) aged 18-25 years ($M_{age} = 19.59$, $SD = 1.11$) were recruited from UK universities. The final sample of 248 student-athletes completed questionnaires on demographics, mental health, mental illness, and emotion regulation in November/December 2022. These student-athletes identified as male ($n = 82$) and female ($n = 166$).

Measures

Indicators of mental health

The Sport and Mental Health Continuum-Short Form (SMHC-SF; Foster & Chow, 2019) was used to explore student-athletes' mental well-being. Cronbach alphas for the present study were all found to be acceptable: overall sport well-being (.94), emotional well-being (.86), social well-being (.86), and psychological well-being (.90). Anxiety and depressive symptoms were assessed via the depression and anxiety subscales of the Depression, Anxiety, and Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The Cronbach alpha coefficient for the depression subscale was .86 and anxiety was .78. See Chapter 3 for a detailed description of the SMHC-SF and DASS-21.

Emotion regulation

The Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2002) was used to explore student-athletes' use of cognitive emotion regulation strategies during sports performance. Each subscale consists of four items and examples include "I dwell upon the feelings the situation has evoked in me" (rumination), "I think about pleasant experiences" (positive refocusing), "I think of what I can do best" (refocus on planning), and "I continually think how horrible the situation has been" (catastrophizing). Items are scored on a Likert type scale from *almost never* (1) to *almost always* (5) with a possible total score of 20 for each sub-scale, Cronbach alpha coefficients for the present study ranged from .72 (rumination) to .80 (positive refocusing), suggesting acceptable internal consistency. In the original development of the scale, Garnefski and Kraaij (2007) reported coefficients of .71 (refocus on planning) to .86 (positive refocusing), perhaps suggesting some differences in reliability between student-athletes and the general adult population. Although the CERQ also measures

positive reappraisal, this strategy was instead measured using a validated instrument for use with athletes (ERQ).

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) was used to measure student-athletes' cognitive reappraisal and expressive suppression during their sport performance. Six items measure reappraisal (e.g., "when I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm"), and 4-items measure suppression (e.g., "I control my emotions by not expressing them"), against a Likert-type scale from *strongly disagree* (1) to *strongly agree* (7). The present study found Cronbach alpha coefficients of .84 (reappraisal) and .75 (suppression), suggesting good and acceptable internal reliability respectively. This was similar to those found by Uphill et al. (2012) who validated the ERQ for use with athlete populations (.82 and .70 respectively). Mean scores were calculated for each subscale.

Data analysis

Data were initially cleaned and screened following the procedures of Tabachnick and Fidell (2019) (see Chapter 3 for detail on the preliminary analyses). For the main analyses, Latent Gold 6.0 (Vermunt & Magidson, 2021) was used for exploring latent groups of student-athletes mental health profiles. LPA was conducted to group student-athletes into profiles based on their mean scores on sport mental well-being, anxiety, and depressive symptoms. Multiple solutions were tested until fit indices revealed additional models were not appropriate fits to the data. The first 7 solutions are displayed in Table 4.2. The Bayesian information criteria (BIC), sample-adjusted Bayesian information criteria (SABIC), and Akaike information criteria (AIC) were considered as possible fit indices for selecting the best fitting model. The same methods for conducting LPA and validating the profiles were again used (see Chapter 3).

Results

Preliminary analyses

Following cleaning and screening procedures, 17 cases were removed as duplicates or majority of the survey missing. 6 univariate and 3 multivariate outliers were removed before producing the final sample of 248 student-athletes. Little's MCAR test was conducted to assess the randomness of missing data (Little, 1988). Data was MCAR for emotional ($\chi^2 = 1.06$, $df = 2$, $p = .590$), social ($\chi^2 = 1.47$, $df = 4$, $p = .831$), and psychological well-being ($\chi^2 = 10.92$, $df = 15$, $p = .758$). It was also MCAR for depression ($\chi^2 = 43.68$, $df = 30$, $p = .051$), anxiety ($\chi^2 = 24.69$, $df = 12$, $p = .016$), and most emotion regulation strategies (rumination $\chi^2 = 16.06$, $df = 11$, $p = .139$; positive refocusing $\chi^2 = 10.16$, $df = 9$, $p = .338$; refocus on planning $\chi^2 = 7.21$, $df = 9$, $p = .615$; reappraisal $\chi^2 = 1.45$, $df = 10$, $p = .999$; and suppression $\chi^2 = 4.45$, $df = 3$, $p = .217$). Catastrophizing ($\chi^2 = 15.14$, $df = 6$, $p = .019$) was not MCAR but as just 1.2% were missing, expectation maximization values were used to replace the missing data (Tabachnick & Fidell, 2019).

As indicated in Table 4.1, results of the Pearson correlation analyses show positive refocusing and reappraisal had small and positive relationships with well-being whilst refocus on planning had a moderate and positive relationship with well-being. These findings suggest positive refocusing, reappraisal, and refocus on planning to relate to higher levels of mental well-being. Conversely, catastrophizing and suppression shared small and negative relationships with well-being, suggesting their use relates to lower levels of mental well-being.

Regarding depressive and anxiety symptoms, rumination and suppression had small and positive relationships, whilst catastrophizing shared moderate and positive relationships. Whereas reappraisal shared a small and negative relationship with depressive symptoms,

there was no statistically significant relationship between reappraisal and anxiety. Refocus on planning shared a moderate and negative relationship with depressive symptoms and a small, negative relationship with anxiety symptoms. There were no statistically significant relationships between positive refocusing and anxiety and depressive symptoms. Together, these results suggest rumination, suppression, and catastrophizing to be related to increased depressive symptoms whilst refocus on planning related to reduced depressive and anxiety symptoms, and reappraisal related to reduced depressive symptoms.

Table 4.1

Bivariate correlations between mental well-being, mental illness, and risk and protective factors

	α	1	2	3	4	5	6	7	8	9
1. Well-being	.94	1								
2. Depression	.86	-.24***	1							
3. Anxiety	.78	-.13*	.58***	1						
4. Rumination	.72	.05	.20**	.26***	1					
5. Positive refocusing	.80	.15*	-.10	-.02	.24***	1				
6. Refocus on planning	.78	.31***	-.32***	-.13*	.24***	.58***	1			
7. Catastrophizing	.77	-.13*	.34***	.31***	.38***	.15*	-.11	1		
8. Reappraisal	.84	.14*	-.24***	-.00	.09	.25***	.37***	-.03	1	
9. Suppression	.75	-.20**	.26***	.18**	-.03	-.09	-.22***	.19**	.13*	1

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

Main analyses

Latent profile analysis

As shown in Table 4.2, the 4-profile model was the best fit for the data based on the BIC as the indicator of fit. The 4-profile model was also a significantly better fit to the data than the 3-profile (model 4 BLRT $p < .001$) and 5-profile solutions (model 5 BLRT $p < .062$). The addition of a fifth profile would have comprised of just 16 student-athletes and thus,

should not be included (Lubke & Neale, 2006)). Similar to Chapter 3, the 4-profile model has low classification error (13.58%) and medium entropy R^2 (74.6%) (Clark & Muthén, 2017).

Table 4.2

Fit indices for Latent Profile Analysis

Model	-LL	BIC	SABIC	AIC	BLRT (<i>p</i>)	Class. Err.	Entropy R^2
Model 1	-2672.43	5377.94	5358.92	5356.86		.0000	1.0000
Model 2	-2556.43	5184.54	5143.33	5138.87	<.001	.0686	.7430
Model 3	-2518.53	5147.32	5083.92	5077.06	<.001	.1036	.7438
Model 4	-2490.25	5129.37	5043.78	5034.51	<.001	.1358	.7461
Model 5	-2480.65	5148.76	5040.98	5029.30	.062	.1515	.7411
Model 6	-2468.58	5163.20	5033.23	5019.15	.014	.1551	.7538
Model 7	-2465.93	5196.496	5044.34	5027.85	.922	.1593	.7691

Note. Log likelihood (-LL), Bayesian Information Criteria (BIC), Sample Adjusted Bayesian Information Criteria (SABIC), Akaike Information Criteria (AIC). Bootstrapped Likelihood Ratio Test (BLRT), Classification Error (Class. Err.).

Results of the ANOVA revealed statistically significant differences in well-being score between the 4 latent mental health profiles ($F(3, 244) = 35.87, p < .001, \eta_p^2 = .31$, observed power = 100%). Post-hoc analysis revealed statistically significant differences between all profiles (all $p < .001$, except 1 and 3 ($p = .015$) and 2 and 4 ($p = .036$)). Results of a MANOVA revealed statistically significant differences in the subscales of the SMHC-SF (Pillai's trace = .34, $F(9, 732) = 10.39, p < .001, \eta_p^2 = .11$, observed power = 100%). At the univariate level, there were statistically significant differences in emotional ($F(3, 244) = 15.92, p < .001, \eta_p^2 = .16$, observed power = 100%), social ($F(3, 244) = 31.00, p < .001, \eta_p^2 = .28$, observed power = 100%), and psychological well-being ($F(3, 244) = 30.32, p < .001, \eta_p^2 = .27$, power = 100%) (see Table 4.3). A second MANOVA revealed statistically significant differences in symptoms of depression and anxiety between profiles at the multivariate level (Pillai's trace = 1.00, $F(6, 488) = 81.41, p < .001, \eta_p^2 = .50$, observed power = 100%). At the

univariate level, statistically significant differences were found for depressive symptoms across all profiles ($F(3, 244) = 162.35, p < .001, \eta_p^2 = .67$, observed power = 100%) between profiles 1 and 2, 1 and 3, 1 and 4, and 2 and 3 ($p < .001$), 2 and 4 ($p = .036$), and 3 and 4 ($p = .016$). Statistically significant differences were also found for anxiety ($F(3, 244) = 212.33, p < .001, \eta_p^2 = .723$, observed power = 100%) across all profiles except 1 and 2 ($p > .05$), all other profiles ($p < .001$). These results can be seen in Table 4.3.

Table 4.3

Profile scores for indicators of mental health and mental illness (clustering variables)

Variable(s)	Profile 1: lowest well-being, mild symptoms <i>M (SD)</i>	Profile 2: highest well-being, normal symptoms <i>M (SD)</i>	Profile 3: lower well- being, severe symptoms <i>M (SD)</i>	Profile 4: higher well- being, normal symptoms <i>M (SD)</i>	Total <i>M (SD)</i>
Well-being					
Overall	37.83 (11.29) ^{2,3,4}	55.51 (6.21) ^{1,3,4}	43.69 (11.66) ^{1,2,4}	50.06 (13.33) ^{1,2,3}	46.59 (12.76)
Emotional	8.99 (2.71) ^{2,4}	11.53 (1.89) ^{1,3}	9.42 (2.74) ^{2,4}	11.16 (2.87) ^{1,3}	10.24 (2.77)
Social	12.89 (4.79) ^{1,2,3}	20.02 (2.91) ^{1,3,4}	15.72 (4.57) ^{1,2}	17.47 (5.77) ^{1,2}	16.45 (5.29)
Psychological	15.95 (5.45) ^{2,3,4}	23.96 (3.64) ^{1,3}	18.56 (5.85) ^{1,2,4}	21.43 (6.19) ^{1,3}	19.90 (6.14)
Mental illness					
Anxiety	6.42 (3.73) ^{3,4}	6.33 (3.48) ^{3,4}	18.77 (5.68) ^{1,2,4}	.59 (.92) ^{1,2,3}	7.83 (7.23)
Depression	10.79 (3.94) ^{2,3,4}	3.92 (2.61) ^{1,3,4}	17.79 (7.36) ^{1,2,4}	1.39 (1.27) ^{1,2,3}	8.41 (7.397)

Note. Range of possible scores for overall well-being (0-70), emotional (0-15), social (0-20), psychological (0-25), anxiety and depression (0-42). Superscript denotes where significant differences exist between profiles based on results of ANOVA's and MANOVA's

¹ = significantly different to profile 1

² = significantly different to profile 2

³ = significantly different to profile 3

⁴ = significantly different to profile 4

Comprising of 29.8% of the sample, profile 1 was the largest (Table 4.3). This profile was characterized by the lowest levels of mental well-being, normal anxiety, and mild depressive symptoms (lowest well-being, mild symptoms) (Table 4.3). Profile 2 contained 28.2% of the student-athletes who were classified as having the highest levels of well-being coupled with normal symptoms of anxiety and depression (highest well-being, normal symptoms). Profile 3 consisted of 21.4% of the sample and classified those with moderate levels of well-being but severe anxiety and moderate symptoms of depression (lower well-being, severe symptoms). The smallest latent mental health profile included 20.6% of the sample who had higher (but not the highest) well-being coupled with the lowest symptoms of anxiety and depression in the normal range (higher well-being, normal symptoms).

The level and severity of mental health indicators can be seen in Table 4.4. Although profile 1 (lowest well-being, mild symptoms) had the lowest levels of well-being, they still had majority “normal” symptoms of anxiety that were similar to those with the highest well-being in profile 2. Profile 1 had the most languishers, fewest flourishers and normal to moderate symptoms of anxiety and depression. Profile 2 (highest well-being, normal symptoms) had the most flourishers and was predominantly flourishing (72.9%), with 100% normal symptoms of depression but some elevated symptoms of anxiety in the mild, moderate, and severe categories (34.3%). Despite 100% normal symptoms of anxiety and depressive symptoms in profile 4 (higher well-being, normal symptoms), student-athletes in this profile did not have the highest well-being and only just over half (52.9%) were flourishing. Finally, the most severe symptoms (profile 3) did not have the lowest levels of well-being and flourishing in the sample although approximately 68% were experiencing less than flourishing.

Table 4.4

Level and symptom severity of mental health and illness between the mental health profiles where % shows distribution within the profiles (columns)

Variable(s)	Profile 1: lowest well-being, mild symptoms <i>n</i> (%) 74 (29.8%)	Profile 2: highest well-being, normal symptoms <i>n</i> (%) 70 (28.2%)	Profile 3: lower well- being, severe symptoms <i>n</i> (%) 53 (21.4%)	Profile 4: higher well-being, normal symptoms <i>n</i> (%) 51 (20.6%)	Total <i>n</i> (%)
Well-being					
Flourishing	14 (18.9%)	51 (72.9%)	17 (32.1%)	27 (52.9%)	109 (44%)
Moderately mentally healthy	55 (74.3%)	19 (27.1%)	33 (62.3%)	23 (45.1%)	130 (52.4%)
Languishing	5 (6.8%)	0	3 (5.7%)	1 (2%)	9 (3.6%)
Anxiety symptoms					
Normal	43 (58.1%)	46 (65.7%)	0	51 (100%)	140 (56.5%)
Mild	12 (16.2%)	9 (12.9%)	0	0	21 (8.5%)
Moderate	19 (25.7%)	13 (18.6%)	14 (26.4%)	0	46 (18.5%)
Severe	0	2 (2.9%)	16 (30.2%)	0	18 (7.3%)
Extremely severe	0	0	23 (43.4%)	0	23 (9.3%)
Depression symptoms					
Normal	25 (33.8%)	70 (100%)	7 (13.2%)	51 (100%)	153 (61.7%)
Mild	26 (35.1%)	0	5 (9.4%)	0	31 (12.5%)
Moderate	23 (31.1%)	0	28 (52.8%)	0	51 (20.6%)
Severe	0	0	5 (9.4%)	0	5 (2%)

Variable(s)	Profile 1: lowest well-being, mild symptoms <i>n</i> (%)	Profile 2: highest well-being, normal symptoms <i>n</i> (%)	Profile 3: lower well- being, severe symptoms <i>n</i> (%)	Profile 4: higher well-being, normal symptoms <i>n</i> (%)	Total <i>n</i> (%)
	74 (29.8%)	70 (28.2%)	53 (21.4%)	51 (20.6%)	
Extremely severe	0	0	8 (15.1%)	0	8 (3.2%)

Latent mental health profiles

To further validate the profiles, demographics and emotion regulation strategies were compared across profiles. The comparison of emotion regulation scores was conducted to address the study aims as well as provide external validation for the 4-profile model.

Demographics. Results of 4 chi-squared tests revealed no statistically significant differences between the profiles' proportions of gender ($\chi^2 = 3.20$, $df = 3$, $p = .363$) and competitive level ($\chi^2 = 13.81$, $df = 9$, $p = .129$). There was, however, a statistically significant difference in the proportion of student-athletes based on sport type ($\chi^2 = 14.18$, $df = 3$, $p = .003$) and who self-reported a mental illness across the profiles ($\chi^2 = 32.22$, $df = 3$, $p < .001$). That is, there were more than expected team athletes in profiles 2 and 4, and more than expected individual athletes in profiles 1 and 3. Further, there were more than expected reporting "yes" in profile 3 and more than expected reporting "no" in profiles 1, 2, and 4 to self-reported symptoms of mental illness.

Table 4.5

Demographic characteristics of the latent mental health profiles where % shows distribution within the demographic variables (rows)

Characteristics	Profile 1: lowest well-being, mild symptoms <i>n</i> (%) 74 (29.8%)	Profile 2: highest well-being, normal symptoms <i>n</i> (%) 70 (28.2%)	Profile 3: lower well- being, severe symptoms <i>n</i> (%) 53 (21.4%)	Profile 4: higher well- being, normal symptoms <i>n</i> (%) 51 (20.6%)	Total <i>n</i> (%)
Gender					
Female	51 (30.7%)	41 (24.7%)	38 (22.9%)	36 (21.7%)	166 (66.94%)
Male	23 (28%)	29 (35.4%)	15 (18.3%)	15 (18.3%)	82 (33.06%)
Sport type					
Team	41 (25.3%)	57 (35.2%)	30 (18.5%)	34 (21%)	162 (65.59%)
Individual	33 (38.8%)	12 (14.1%)	23 (27.1%)	17 (20%)	85 (34.41%)
Competitive level					
Recreational	26 (40%)	10 (15.4%)	15 (23.1%)	14 (21.5%)	65 (26.42%)
Club	20 (29%)	26 (37.7%)	9 (13%)	14 (20.3%)	69 (28.05%)
Regional	25 (24.8%)	30 (29.7%)	25 (24.8%)	21 (20.8%)	101 (41.06%)
Elite	2 (18.2%)	3 (27.3%)	5 (36.4%)	2 (18.2%)	11 (4.47%)
Self-reported mental illness status					
Yes	7 (20%)	5 (14.3%)	20 (57.1%)	3 (8.6%)	35 (14.17%)
No	67 (31.6%)	64 (30.2%)	33 (15.6%)	48 (22.6%)	212 (85.83%)

Risk and protective factors: emotion regulation. Results of a MANOVA (Table 3.5) showed that, at the multivariate level, there were statistically significant differences in strategy use from the CERQ strategies (i.e., rumination, positive refocusing, refocus on planning, and catastrophizing) between the mental health profiles (Pillai's trace = .336, $F(24, 717) = 3.77$, $p < .001$, $\eta_p^2 = .11$, observed power = 100%). At the univariate level, these differences existed for rumination ($F(3, 244) = 5.03$, $p = .002$, $\eta_p^2 = .06$, observed power = 91.4%) between profiles 3 and 4 ($p < .001$), refocus on planning ($F(3, 244) = 7.22$, $p < .001$, $\eta_p^2 = .08$, observed power = 98.2%) between 1 and 2 ($p = .002$), 1 and 4 ($p = .027$), 2 and 3 ($p = .002$), and 3 and 4 ($p = .027$), and catastrophizing ($F(3, 244) = 12.75$, $p < .001$, $\eta_p^2 = .14$, observed power = 100%) between 1 and 4 ($p < .001$), 2 and 3 ($p < .001$), and 3 and 4 ($p < .001$). There were no statistically significant differences in positive refocusing ($F(3, 244) = 1.67$, $p = .175$, $\eta_p^2 = .02$, observed power = 43.4%) between profiles.

A second MANOVA for ERQ strategies (reappraisal and suppression) revealed statistically significant differences at the multivariate level (Pillai's trace = .161, $F(6, 488) = 3.77$, $p < .001$, $\eta_p^2 = .080$, observed power = 100%). At the univariate level, these differences existed for reappraisal ($F(3, 244) = 3.89$, $p = .010$, $\eta_p^2 = .05$, observed power = 82.2%) between profiles 1 and 2 ($p = .042$), and 1 and 4 ($p = .020$). Differences also existed for use of suppression ($F(3, 244) = 8.37$, $p < .001$, $\eta_p^2 = .09$, observed power = 99.3%) between profiles 1 and 2 ($p = .017$), 1 and 4 ($p = .049$), 2 and 3 ($p < .001$), and 3 and 4 ($p < .001$).

Table 4.6*Profile scores for risk and protective factors*

	Profile 1: lowest well-being, mild symptoms <i>M (SD)</i> 74 (29.8%)	Profile 2: highest well-being, normal symptoms <i>M (SD)</i> 70 (28.2%)	Profile 3: lower well- being, severe symptoms <i>M (SD)</i> 53 (21.4%)	Profile 4: higher well-being, normal symptoms <i>M (SD)</i> 51 (20.6%)	Total <i>M (SD)</i>
CERQ					
Rumination	11.35 (3.189)	11.21 (3.169)	12.52 (2.18) ⁴	10.19 (3.51) ³	11.32 (3.14)
Positive refocusing	9.81 (3.33) ^{2,4}	10.68 (3.12) ^{1,3}	10.35 (3.13) ^{2,4}	11.07 (3.36) ^{1,3}	10.43 (3.30)
Refocus on planning	12.05 (3.05)	13.81 (2.63)	11.92 (2.87)	13.57 (3.15)	12.83 (3.03)
Catastrophizing	8.91 (2.94) ⁴	7.70 (2.90) ³	9.99 (3.11) ^{2,4}	6.61 (3.18) ^{1,3}	8.32 (3.23)
ERQ					
Reappraisal	4.27 (1.09) ^{2,4}	4.74 (.907) ¹	4.48 (1.05)	4.83 (1.08) ¹	4.57 (1.05)
Suppression	4.06 (1.15) ^{2,4}	3.48 (1.01) ^{1,3}	4.37 (1.15) ^{2,4}	3.497 (1.34) ^{1,3}	3.85 (1.20)

Note. CERQ strategies (4-20), ERQ strategies (1-7). Superscript denotes where significant differences exist between profiles based on results the MANOVAs.

¹ = significantly different to profile 1

² = significantly different to profile 2

³ = significantly different to profile 3

⁴ = significantly different to profile 4

Discussion

The aims of Chapter 4 were to replicate and extend the findings from Chapter 3 using a homogenous but more recent sample of UK student-athletes to identify latent mental health profiles according to patterns in mental well-being, anxiety, and depressive symptoms. Four latent mental health profiles were found and characteristics such as individual (gender, self-reported mental illness) and sport (sport type and competitive level) differences were

explored. To extend the findings from Chapter 3, differences in emotion regulation strategies reflecting more stages of the PMER (attentional deployment, cognitive change, and response modulation) were also explored and patterns for emotion regulation use were found.

Aim 1: replicate – are four latent mental health profiles replicated?

In line with the hypotheses, 4 latent mental health profiles were found. This replicates the findings from Chapter 3 and existing literature in broader psychology (for a review, see Iasiello et al., 2020). The hypothesis that profiles would be distinguishable by quantitative differences in mental well-being, anxiety, and depression was mostly supported. That is, mean scores on the cluster variables were significantly different between mental health profiles for well-being and depressive symptoms, but anxiety symptoms were statistically similar for profiles 1 (lowest well-being, mild symptoms) and 2 (highest well-being, normal symptoms). The mild symptoms of depression may, therefore, help explain differences in well-being score between these profiles since well-being was lowest, and highest, in these profiles respectively. In line with the dual-continua model, an absence of symptoms of mental illness does not automatically assume a presence of high levels of well-being (Keyes, 2002). This is particularly apparent and demonstrated by profile 4 (higher well-being, normal symptoms), which had 100% of student-athletes with normal symptoms of anxiety and depression, but just 52.9% were flourishing. Further, despite lower symptoms of mental illness (normal anxiety, mild depressive symptoms) in profile 1, student-athletes in this profile reported significantly lower well-being to those with severe anxiety and moderate depressive symptoms (profile 3). Symptoms of anxiety or depression, therefore, appear related to lower levels of well-being, regardless of symptom severity. This notion of the dual-continua model, that mental health and illness are distinct but related, is well supported in the broader literature and Chapters 3 and 4 provide further support for this relationship with student-athletes (Keyes, 2005; Iasiello et al., 2020).

The four mental health profiles found and replicated in the present study provides further empirical support for the dual-continua model of mental health in student-athlete populations (Keyes, 2002). Traditional mental health assessments that focus on symptoms of mental illness would deem student-athletes in profile 4 (higher well-being, normal symptoms) to be mentally healthy, but as suggested by Keyes (2007), moderate and languishing levels of well-being are associated with poorer outcomes and thus, do not indicate mental health. The present findings, therefore, contribute to arguments that mental health should be explored holistically. Adopting a person-centred approach and salutogenic perspective across two cross-sectional studies (Chapters 3 and 4) has highlighted the importance of considering indicators of mental health and illness in the same study. That is, 56.5% (anxiety) and 61.7% (depression) of all student-athletes could be described as having ‘normal’ symptoms of mental illness. However, 56% are struggling with moderate and languishing levels of well-being and require support for mental health promotion. Further, the person-centred approach and mental health profiles provided empirical evidence to suggest student-athletes have different experiences with mental health and provides a more nuanced understanding of patterns of symptoms of mental illness and levels of mental well-being.

Sport psychology research has found 3 (Kuettel, Pedersen, et al., 2021) to 4 profiles (Chapters 3 and 4) that collectively show the importance of considering athletes’ complete mental health and highlight that an absence of symptoms is not indicative of true, complete mental health. In their study of elite Danish athletes, Kuettel et al. (2021) found three profiles to best fit their data using LPA. Their profiles were characterized by: (1) above average well-being and low anxiety and depression (although well-being was above average for the sample, the proportion with average well-being was greater (64.9%) compared to the proportion with above average well-being (28.5%)), (2) below average well-being and mild or moderate symptoms of anxiety and depression respectively, and (3) low well-being and

moderate to severe symptoms of anxiety and depression respectively. The present findings offer a few differences to these patterns for student-athletes. Firstly, the lowest well-being scores were not coupled with the most severe symptoms and secondly, the highest well-being scores were not coupled with the lowest symptoms. Chapter 3 provided initial support for a 4-profile solution to explain patterns of mental health for UK student-athletes and Chapter 4 has replicated these findings. Furthermore, these studies indicate that athletes (elite and students) do not have a latent mental health profile characterized by pure flourishing with an absence of symptoms of mental illness and thus, few are truly mentally healthy.

The characteristics of profiles were similar in Chapters 3 and 4, with profiles distinguishable by self-reported mental illness. However, Chapter 4 found that mental health profiles also differed by sport type, where the proportion of team athletes were greater in profiles 2 (highest well-being, normal symptoms) and 4 (higher well-being, normal symptoms), and the proportion of individual athletes greater in profiles 1 (lowest well-being, mild symptoms) and 3 (lower well-being, severe symptoms). Consequently, team sport athletes were more likely to be classified in profiles with higher well-being and normal symptoms of anxiety and depression. Team sport athletes are not immune to mental illness but participation in team sports may offer unique protective factors, such as enhanced perceived support and social acceptance (Pluhar et al., 2019), and this requires further exploration. Additionally, there was a greater proportion reporting “yes” in profile 3 and more reporting “no” in profiles 1, 2, and 4. Self-reported mental illness is, therefore, more likely to influence profile membership characterized by moderate anxiety symptoms, severe depressive symptoms, and lower (but not the lowest) levels of mental well-being. Consequently, asking student-athletes about their self-reported mental illness may indicate considerations for their overall mental health and well-being, however, precautions around

stigma should be considered (M. D. Bird et al., 2021; Eisenberg et al., 2009; Tabet et al., 2021).

Aim 2: extend knowledge on patterns of emotion regulation use between profiles

In response to the second aim of the study, to extend knowledge on patterns of emotion regulation use between mental health profiles, the present chapter found that profiles differed by emotion regulation strategy use. The second hypothesis, that profiles scoring higher on mental well-being and lower on symptoms of anxiety and depression would use more adaptive, and less maladaptive, emotional regulation strategies was mostly supported. That is, some differences existed for the adaptive strategies of positive refocusing and reappraisal, as well as the maladaptive strategies suppression, rumination, and catastrophizing. There were not statistically significant differences in the use of refocus on planning.

Consistent with the PMER and existing literature, results indicate that student-athletes are using emotional regulation strategies reflecting the latter 3 stages of the PMER (attentional deployment, cognitive change, and response modulation) to regulate sport emotions similar to other student-athlete and broader populations (Garnefski & Kraaij, 2007; Stanger et al., 2018; Uphill et al., 2012). A novel contribution is the finding that the pattern of these strategies differs by mental health profile. The most favorable profiles (2 and 4) used more adaptive and less maladaptive emotion regulation than the least favorable profiles (1 and 3). A practical implication is that increased awareness on emotional regulation strategies is required by athletes and those who work with them.

Protective factors: adaptive emotion regulation strategies

Pankow et al. (2021) found student-athletes to use personal protective factors and the present study adds to this knowledge by finding that student-athletes employ adaptive strategies of positive refocusing, refocus on planning, and reappraisal to regulate sport

emotions. The preliminary analyses support that these strategies are adaptive by indicating positive refocusing as related to increased well-being, refocus on planning as related to increased well-being and decreased symptoms of depression and anxiety, and reappraisal as related to increased well-being and decreased depressive symptoms. Refocus on planning was, therefore, the only strategy that related to supporting overall mental health, highlighting that strategies that promote well-being or decrease symptoms may not support both (Uphill et al., 2016; G. A. Bird et al., 2021). Refocus on planning is a cognitive change strategy and one that did not significantly differ between profiles. The mean score for refocus on planning was higher than other strategies from the CERQ (Table 4.6) suggesting it to be a frequently used strategy by athletes regardless of mental health profile membership and may offer some protection against mental health difficulties.

As hypothesized, student-athletes in the most favorable profiles (2 and 4) used more positive refocusing than the least favorable (1 and 3). That is, profiles 2 and 4 which were characterized by higher levels of well-being and normal symptoms of anxiety and depression used positive refocusing more often than those with lower well-being and elevated symptoms of anxiety and/or depression (1 and 3). Consequently, student-athletes would benefit from increased use of positive refocusing to regulate sport emotions. As described by the PMER, this attentional deployment strategy would be beneficial when a situation cannot be selected or modified, which may be common in sport.

As an emotion unfolds, cognitive change presents the final opportunity for antecedent-focused regulation, that is, to regulate before a full emotion is generated. Reappraisal is a frequently researched cognitive change strategy that has received empirical support as adaptive for indicators of mental health within and outside of sport (e.g., Webb et al., 2012; Uphill et al., 2012). In line with the hypotheses, profile 1 used less reappraisal than 2 and 4 (higher well-being profiles) but similarly to profile 3 (lower well-being, severe

symptoms). Consequently, reappraisal use appears to be influenced by levels of mental well-being more so than anxiety and depressive symptoms. This is in line with previous research finding that reappraisal was predictive of increased well-being but not depressive symptoms (G. A. Bird et al., 2021). G. A. Bird et al. (2021) further argued that reappraisal was associated with increased mental well-being regardless of symptom severity and thus, it is possible that increasing use of reappraisal for athletes in profiles 1 and 3 would have adaptive benefits of their levels of mental well-being and promote higher proportions of flourishing.

Risk factors: maladaptive emotion regulation strategies

Use of maladaptive emotion regulation strategies can be a risk factor for poorer mental health outcomes (Webb et al., 2012). As supported by the preliminary analyses, rumination was related to increased anxiety and depressive symptoms, whilst catastrophizing and suppression were related to reduced well-being and increased anxiety and depressive symptoms. In partial support of the hypotheses, profile 4 (higher well-being and normal symptoms) used the attentional deployment strategy of rumination less than profile 3 (lower well-being and severe symptoms). Even those with highest well-being (profile 2), used rumination similarly to those with lower well-being and elevated symptoms (1 and 3). It is likely that the severe symptoms of anxiety and moderate symptoms of depression are influencing differences in rumination use between profiles. That is, rumination has frequently been cited as associated with depressive symptoms (Treynor, 2003). Rumination, however, has been argued to be adaptive or maladaptive depending on how it is used (Joormann et al., 2006). That is, brooding or reflective rumination, where the latter has been found to be adaptive in some circumstances (Joormann et al., 2006). Since the student-athletes in the present sample use rumination, as evidenced by the mean score (Table 4.6), it would be beneficial to explore the adaptiveness or maladaptiveness of this strategy further. In the present study, greater use of rumination was correlated with a higher use of refocus on

planning, an adaptive strategy, pointing to some evidence for rumination having the potential to be adaptive when used in conjunction with other strategies. Rumination has been cited as maladaptive for well-being (e.g., Harrington & Loffredo, 2010) but researchers have argued the importance of considering reflection when investigating differences in rumination use and well-being (Newman & Nezlek, 2019).

Student-athletes with “lower well-being, severe symptoms” (profile 3), and those with “lowest well-being, mild symptoms” (profile 1), used the cognitive change strategy of catastrophizing significantly more than those with “higher well-being, normal symptoms” (profile 4). Catastrophizing was, therefore, higher in the least favorable profiles but only partially supports the hypotheses as profile 2 (highest well-being, normal symptoms) did not use significantly less catastrophizing than profile 1 (lowest well-being, mild symptoms) despite observed trends. Thus, it is likely that mental illness symptoms are influencing use of catastrophizing. Encouragingly, this typically maladaptive strategy was used less, on average, than other CERQ strategies (Table 4.6).

As hypothesized, student-athletes in the most favorable profiles (2 and 4) used less of the response-modulation strategy of suppression than the least favorable profiles (1 and 3). Previous findings suggest suppression to be used more frequently by those with depressive symptoms and the present study supports this claim by indicating that those with mild and moderate symptoms of depression and lower levels of well-being (profiles 1 and 3), use more suppression than those with normal symptoms (and higher well-being; profiles 2 and 4) (Wenzlaff & Wegner, 2000). Expressive suppression removes the outward expression of the emotion, but the internal experience of the emotion persists (Gross & John, 2003), therefore, it would be important for athletes to learn other strategies to implement than suppression earlier in the emotion generating process as there is greater capacity for use of multiple strategies to implement if the first attempt was unsuccessful.

Strengths, limitations, and future directions

Firstly, a strength of the present study is that it has replicated the novel findings from Chapter 3 that student-athletes can be classified into 4 latent mental health profiles, highlighting the person-centred approach of LPA as an insightful method for exploring patterns of mental health (mental well-being, depression, and anxiety) in samples of student-athletes. It was important to replicate the LPA to explore whether 4 profiles were found again in a new sample, to provide more evidence and support for the classification of student-athlete mental health and the present study has achieved this aim. The study also extended Chapter 3 by adding to developing knowledge on emotion regulation strategy use between student-athletes in profiles with differing patterns of mental health.

A second strength of the present study is in underpinning the research with well supported models. Using the PMER has ensured strategies reflecting all stages of the PMER have been explored between Chapters 3 and 4 and has provided initial evidence for the types of strategies student-athletes use to regulate sport emotions. Furthermore, adopting Keyes' dual-continua model has provided a holistic understanding of student-athletes' mental health and provides valuable insight for mental health awareness and intervention. Nevertheless, although the present study provided support for the dual-continua model with student-athletes, the cross-sectional design did not allow for the exploration of another key proposition of the model. That is, mental health is not stable and fluctuates over time (Keyes, 2005). Future research should, therefore, adopt longitudinal designs and person-centred approaches to explore the stability of student-athletes mental health over time and the mechanisms that help explain stability or change.

The sport literature, and consequently the present study, on emotion regulation is limited by a lack of sport specific measures on emotion regulation strategies, besides the

ERQ for use with athletes (Uphill et al., 2012). Although Uphill et al. (2012) state that further investigation of the ERQ for athletes is required due to issues with item stability. There needs to be more validated measures that assess broader strategies that athletes use. Although the CERQ has provided an ability to explore a broader range of strategies, the Cronbach alpha coefficients in the present study were only acceptable, pointing to a need for measures that are validated to the sport context. The CERQ instructions are also negatively valenced. That is, student-athletes were asked “to indicate what you generally think, when you experience negative or unpleasant events”; therefore, it does not consider the up or down regulation of positive emotions and thus, is not aligned with Gross’ conceptualization of emotion regulation (Gross, 1998b). The strengths and limitations outlined in Chapter 3 of using a person-centred approach, range of emotional regulation strategies, cross-sectional design, and limited availability of sport specific measures of mental health and illness also apply to the present chapter.

Areas for future research include further exploration of student-athletes’ mental health profiles and differences with broader risk and protective factors beyond emotion regulation. Nevertheless, further research on emotion regulation is also needed to clarify some of the patterns observed in Chapter 4. Although rumination is deemed ‘maladaptive’, the strategy was related to use of more ‘adaptive’ strategies such as refocus on planning, but also correlated moderately with increased catastrophizing which had a moderate relationship with increased depressive symptoms. Furthermore, use of ‘adaptive’ strategies such as reappraisal related to increased use of positive refocusing and refocus on planning. Suppression and reappraisal were weakly correlated, as also found by Uphill et al., (2012), perhaps suggesting that athletes attempts to reappraise do not always work and then suppress their emotions. Future research should, therefore, explore how strategies are used in conjunction and address the notion of polyregulation explicitly within sport (Ford et al., 2019).

Conclusion

Results of the present study support the replicability of four latent mental health profiles based on indicators of mental well-being, anxiety, and depressive symptoms in another sample of student-athletes from a later academic year (see appendix 9 for summary of demographic characteristics between Chapters 3 & 4). The findings, therefore, provide initial evidence for the generalizability of 4 mental health profiles for UK student-athletes.

Adopting a person-centred approach and understanding the mental health of student-athletes from a salutogenic perspective in future studies and intervention may provide improvements in mental health awareness and classification, as well as emotion regulation strategies that are risk factors for poor mental health and protective factors for better overall mental health. In the same way that mental health and illness are distinct but related, strategies that are adaptive or maladaptive for one indicator of mental health are not necessarily the same for other indicators, highlighting a real need to consider complete mental health in intervention to best support student-athletes. To advance understanding, future research should investigate the stability of student-athlete mental health over time.

Chapter 5

Assessing the longitudinal stability of student-athletes' mental health profiles and mechanisms for change

The cross-sectional designs of Chapters 3 and 4 provided valuable insight into the 4-profile solution for understanding student-athletes' mental health experiences. However, the utility of Keyes' (2002) dual-continua model extends beyond the components explored in Chapters 3 and 4 and longitudinal studies are required to assess whether profile membership is stable over time and to explore whether emotion regulation strategies help explain stability or change. Chapter 5 asked participants from Chapter 4 to take part in data collection at two time points, with an attrition rate of 68.55%. Key components of the PPCT model were explored in Chapter 5, particularly person resource factors and the time component.

Introduction

Considering the number of unique risk factors for poor mental health amongst student-athletes, it is not surprising that student-athletes experience problems with their mental health (Neal et al., 2015), despite mixed evidence for prevalence rates for mental illness in student-athletes and student non-athletes (Edwards & Froehle, 2021). This discrepancy is possibly due to student-athletes also having a number of protective factors such as exercising, which can help reduce anxiety (Herring et al., 2019), having increased access to sources of support (Egan, 2019), and opportunities for developing emotion regulation (G. A. Bird et al., 2021).

Research on student-athlete mental health has grown considerably in recent years (Kegelaers et al., 2022). However, the majority of this research has focused on symptoms of mental illness only, or to a lesser extent, levels of mental well-being only (Kegelaers et al., 2022). Consequently, empirical research on student-athlete mental health, and also athletes more broadly, is limited by a lack of consideration for the salutogenic perspective (Keyes,

2014; Kuettel & Larsen, 2020). Investigating mental health holistically is not only important for best supporting student-athletes by targeting symptoms of mental illness and promoting well-being, but mental health is considered a resource for optimal performance and so would be a priority for athletes and those who work with them (Egan, 2019).

The notion of mental health incorporating indicators of mental illness and positive mental health has received substantial empirical support in broader psychology (e.g., Iasiello et al., 2020) and is beginning to be explored in sport (e.g., Kuettel et al., 2021). Chapters 3 and 4 have added to the growing knowledge on student-athletes' mental health from a salutogenic perspective. Keyes' (2002) dual-continua model, however, explains more than just how mental health should be defined and researched. The model also accounts for individual experiences; that is, mental health is not a stable construct and is instead a transient phenomenon that fluctuates over time (Keyes, 2005). In broader psychology, there is limited research exploring the stability of mental health with most research being cross-sectional (Moore et al., 2019). An exception was a study by Kelly et al. (2012) who have provided support for the longitudinal stability of dual-factor models. Kelly et al.'s study (2012) provided important insight into the transient nature of mental health by exploring profiles of subjective well-being and psychopathology as well as underlying mechanisms, such as social support, that predict change or stability in adolescent students. They found stability was greatest in flourishing students and thus, are an important group to learn from. Within sport, the small albeit growing body of research underpinned by Keyes' dual-continua model has also predominantly employed a cross-sectional design (Kuettel, Durand-Bush, et al., 2021; Kuettel, Pedersen, et al., 2021). Adopting a longitudinal design would be important for exploring this key proposition of the dual-continua model to explore student-athletes mental health over time and begin to understand how, and why, stability or change occurs. In turn, this would help to inform mental health services and inform intervention design.

To date, longitudinal studies involving mostly North American samples of first year students have shown that symptoms of depression and anxiety can increase (Duffy et al., 2020) or persist (Adams et al., 2021). A study conducted on elite student-athletes conversely found mental health (measured as disturbed mood, poor sleep and anxiety and depressive symptoms) improves over time (Sheehan et al., 2018), whilst Sullivan et al. (2019) found athletes to have higher levels of psychological stress pre-season compared to in season. Consequently, trends in student-athletes' symptoms of mental illness are not necessarily the same as for student non-athletes and thus, it is important to assess student-athletes mental health trajectories as a unique population. These studies only considered symptoms of mental illness and did not include positive mental health.

Studies have explored changes in athletes' positive mental health and well-being with mixed results (Columbus et al., 2023; Grimson et al., 2022; Zhou et al., 2016). Both Grimson et al. (2022) and Zhou et al.'s (2016) studies showed no changes over time, suggesting stability in athletes' well-being exists when the data is aggregated. In contrast, Columbus et al. (2023) found female student-athletes' well-being to be more dynamic in nature, particularly when investigated as person-level changes. Again, these studies have provided valuable insight into the stability of well-being in athlete populations, yet the knowledge base is limited by a lack of consideration for the salutogenic perspective.

As argued by Vella et al. (2021), the different phases of a competitive season can differentially effect athletes' mental health. Few sport studies, however, have so far used a longitudinal design to examine changes in mental health as a complete state. An exception was a study conducted by van Slingerland et al. (2019) who included a measure of mental health that incorporated emotional, social, and psychological well-being (Keyes et al., 2008). Within a student-athlete sample, they found mental health functioning to be stable over time and that a previous mental illness diagnosis influenced levels of well-being (flourishing,

moderately mentally healthy, or languishing). However, as a single item measure of mental illness was used to investigate previous diagnoses of mental illness, research is needed to consider symptoms of mental illness more explicitly. Doing so would make an important contribution to the understanding of student-athletes' mental health by exploring their levels of mental well-being simultaneous to symptoms of mental illness. Exploring student-athletes' mental health profiles over time is important for understanding to what extent these profiles fluctuate over an academic year. Van Slingerland et al. (2018) suggested student-athletes may have high levels of self-regulation that enable them to cope with the stressors of having a dual-career and promote higher levels of well-being. Their findings highlight a need to explore student-athletes' self-regulation, such as emotion regulation, to explore the mechanisms that help explain why some student-athletes have more favorable mental health profiles and why others are struggling. That is, whether athletes have personal resources, such as emotion regulation, that protect them from poorer mental health outcomes over the academic year or whether such strategies help to explain harmful changes in mental health status.

Emotion regulation

The ways in which individuals regulate their emotions has important implications for symptoms of mental illness and well-being (Aldao et al., 2010; Gross & John, 2003; G. A. Bird et al., 2021) (see Chapter 1 for operational definition; Gross, 1998a). It is already well established that athletes regulate their emotions for performance purposes (e.g., Lane et al., 2012) and is a vital skill for athletes to develop, not only for sport performance but for supporting their mental health (see Chapter 2).

Two emotional regulation strategies that have been found to be used by athletes are cognitive reappraisal and expressive suppression (Uphill et al., 2012; G. A. Bird et al., 2021). These two strategies reflect two key components of the process model of emotion regulation

(PMER): antecedent-focused and response-focused emotion regulation (see Chapter 1 for more detail on PMER). That is, a strategy employed before a full emotion is generated (cognitive reappraisal) vs. after an emotion has been fully generated (expressive suppression) (Gross, 1998b). Cognitive reappraisal has been found to be adaptive for mental illness (Sheppes et al., 2015) and well-being (Gross & John, 2003; G. A. Bird et al., 2021), whereas expressive suppression is typically considered maladaptive for mental illness (Sheppes et al., 2015) and well-being (Gross & John, 2003; G. A. Bird et al., 2021). Expressive suppression and cognitive reappraisal have, however, received mixed results regarding their influence on performance (e.g., Balk et al., 2013; Kubiak et al., 2019; Wagstaff, 2014; Wang et al., 2022) (see Chapter 2). It is likely that an athlete will use a strategy if they perceive it to support their performance (Lane et al., 2011). Consequently, it is important to understand the costs and benefits of athletes' emotional regulation use to ensure their mental health is supported simultaneous to performance goals.

As highlighted in Chapters 2, 3, and 4, the associations between emotion regulation and mental health outcomes for athletes have mainly been explored cross-sectionally to date. Due to the relationships between strategies and mental health in broader psychology (Webb et al., 2012) and the findings in this thesis that strategies relate to athletes' mental health, it is important to understand how strategies can be a mechanism for explaining mental health outcomes over time. Previous research in broader psychology has found reappraisal and suppression to predict students latent profile membership over time based on indicators of psychosocial functioning, including indicators of well-being, psychological distress, and coping skills (Brewer et al., 2016). These findings highlight the importance of students' emotion regulation use in shaping changes in important psychological outcomes. There is, therefore, a clear gap for exploring the relationships between student-athletes emotion regulation strategy use and indicators of well-being and mental illness longitudinally.

Study aims and hypotheses

To date, much of the sport literature has: (1) focused on symptoms of mental illness, or well-being, but rarely both, (2) used cross-sectional designs, and (3) been variable-focused. The present chapter, therefore, aims to address key gaps in the literature and explore student-athletes mental health profiles underpinned by Keyes' (2002) dual-continua model of mental health by: (1) exploring student-athletes mental health profiles that include mental well-being, anxiety, and depressive symptoms, (2) assessing the longitudinal stability of student-athletes complete mental health over time, and (3) adopting a person-centred approach.

A second aim explored the relationship between the use of two well established emotion regulation strategies (i.e., reappraisal and suppression) and change in mental health status. It was hypothesized that cognitive reappraisal would relate to improvements in mental health outcomes at Time 2, whilst expressive suppression would relate to decreases in mental health outcomes at Time 2 (Gross & John, 2003; Uphill et al., 2012; Webb et al., 2012). As argued by Brewer et al. (2016) integrating variable and person-centred approaches can provide a more nuanced understanding of the emerged patterns.

Methods and materials

An exploratory longitudinal design with two time points was adopted. At Time 1 (November/December 2022) and Time 2 (February/March 2023), 78 student-athletes completed questionnaires on mental health, mental illness, and emotion regulation (i.e., ERQ) as detailed in Chapters 3 and 4. Data was collected in November/December 2022 (timepoint 1; Chapter 4) with 248 student-athletes. Of those original participants, 78 participants completed a second data collection in February/March 2023 (timepoint 2), representing an attrition rate of 68.55%.

Measures

Student-athletes completed the SMHC-SF, DASS-21, and ERQ as detailed in Chapters 3 and 4.

Data analysis

Data were cleaned and screened before analysis took place (Tabachnick & Fidell, 2019). Little's MCAR test was conducted to investigate the randomness of missing data and inform the handling of missing data. (Little, 1988).

Due to the limited sample of student-athletes that completed both time points ($N = 78$), LPA was not possible on this data. Instead, the procedures outlined by Keyes (2005, 2007) were used to explore mental health profiles. Student-athletes were assigned to profiles based on whether they were flourishing, moderately mentally healthy, or languishing with or without symptoms of mental illness. To be classified as flourishing, a student-athlete had to score “almost everyday” or “everyday” on 1 item from the emotional well-being subscale, and on ≥ 6 of the items measuring psychological and social well-being (Westerhof & Keyes, 2010). To be languishing, they had to instead score “never” or “once or twice”. Moderately mentally healthy athletes were those who did not meet the criteria for flourishing or languishing. To be considered “without” a mental illness, student-athletes had to have a depression and anxiety score within the “normal” category, otherwise they were classified as “with” symptoms of mental illness (Lovibond & Lovibond, 1995).

A series of MANOVAs were conducted to explore mean differences in mental well-being, mental illness, and emotion regulation between T1 and T2. Chi-squared tests were also conducted to explore potential differences in symptom severity between the time points. Pearson correlations were also conducted to understand whether associations exist between the use of emotion regulation strategies and mental health profile membership at each time point and between times 1 and 2, and were interpreted as detailed in Chapter 3.

Results

Preliminary analyses

Data were cleaned and screened before analysis took place and resulted in 1 univariate and 1 multivariate outlier being removed (Tabachnick & Fidell, 2019). Emotional, social, and psychological well-being had no missing data and all others were MCAR (depression, $\chi^2 = 8.16$, $df = 6$, $p = .226$; anxiety, $\chi^2 = 11.11$, $df = 6$, $p = .085$; reappraisal, $\chi^2 = 2.23$, $df = 5$, $p = .816$; suppression, $\chi^2 = 12.28$, $df = 6$, $p = .056$) and missing data was then replaced with EM values (Little, 1988).

Characteristics of Chapter 4 vs 5

The characteristics of student-athletes retained for the second time point were statistically similar to the baseline sample at Time 1 (Chapter 4) (Table 5.1). That is, the proportions across gender ($\chi^2 = .142$, $df = 1$, $p = .706$), sport type ($\chi^2 = .058$, $df = 1$, $p = .810$), competitive level ($\chi^2 = .618$, $df = 3$, $p = .892$), and self-reported mental illness ($\chi^2 = .071$, $df = 1$, $p = .790$) were similar and suggest a representative sample of the original 248 was retained at Time 2.

Table 5.1

Demographic characteristics of student-athletes completing Time 1 (Chapter 4) and Time 2 (Chapter 5)

	Time 1 (<i>n</i> = 248)	Time 2 (<i>n</i> = 78)
	<i>N</i> (%)	<i>N</i> (%)
Gender		
Male	82 (33.1%)	24 (30.8%)
Female	166 (66.9%)	54 (69.2%)
Sport type		
Team	162 (65.6%)	50 (64.1%)
Individual	85 (34.4%)	28 (35.9%)
Competitive level		
Recreational	65 (26.4%)	20 (25.6%)
Club	69 (28%)	25 (32.1%)
Regional	101 (41.1%)	29 (37.2%)
Elite	11 (4.5%)	4 (5.1%)
Mental illness		
Yes	35 (14.2%)	12 (15.4%)
No	212 (85.8%)	66 (84.6%)

Differences in mental health and emotion regulation over time

Of the 78 student-athletes who completed both time points, there were no statistically significant differences in mean well-being scores between T1 and T2 at the multivariate level (Pillai's trace = 0.25, $F(3, 152) = 1.29$, $p = .280$, $\eta_p^2 = .025$, observed power = 34%) (Table 5.2). Mean scores for symptoms of mental illness were also not significantly different. That is, their symptoms of depression and anxiety were statistically similar at both time points (Pillai's trace = .001, $F(2, 153) = .044$, $p = .957$, $\eta_p^2 = .001$, observed power = 5.6%). In regard to student-athletes' emotion regulation, there were no statistically significant

differences over time at the multivariate level (Pillai's trace = .007, $F(2, 153) = .577$, $p = .563$, $\eta_p^2 = .007$, observed power = 14.4%) in the use of reappraisal and suppression.

Table 5.2

Mean and standard deviation of study variables at Time 1 and Time 2 for the student-athletes who completed both time points

	Time 1 ($n = 78$)	Time 2 ($n = 78$)
	$M (SD)$	$M (SD)$
Mental well-being		
Overall	47.55 (11.79)	48.45 (12.06)
Emotional	10.43 (2.66)	10.14 (2.91)
Social	16.74 (4.77)	17.38 (4.65)
Psychological	20.38 (5.93)	20.92 (5.36)
Mental illness		
Depression	8.12 (7.32)	8.43 (8.52)
Anxiety	8.23 (6.80)	8.25 (7.68)
Emotion regulation		
Reappraisal	4.59 (0.94)	4.70 (0.93)
Suppression	3.61 (1.13)	3.47 (1.24)

Note. Range of possible scores for overall well-being (0-70), emotional (0-15), social (0-20), psychological (0-25), anxiety and depression (0-42), reappraisal and suppression (1-7).

At Time 1, approximately 40% and 50% of the 78 student-athletes who completed both time points reported symptoms of depression and anxiety respectively (Figures 5.1 and 5.2). At Time 2, these proportions were smaller with approximately 34% and 48% reporting symptoms of depression and anxiety. Despite these observed trends, results from chi-squared tests revealed these differences were not statistically significant (anxiety, $\chi^2 = .113$, $df = 3$, $p = .990$; depression, $\chi^2 = 3.63$, $df = 3$, $p = .305$). For the chi-squared test, the severe and extremely severe categories were combined to ensure cells contained ≥ 5 data points.

Figure 5.1

Proportion of student-athletes in each category of symptom severity for self-reported depressive symptoms at times 1 and 2

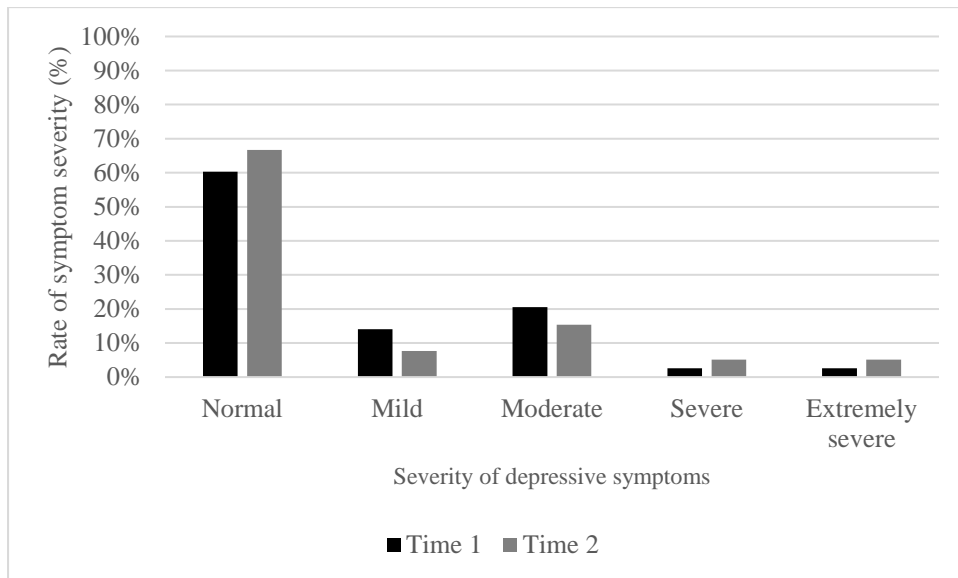
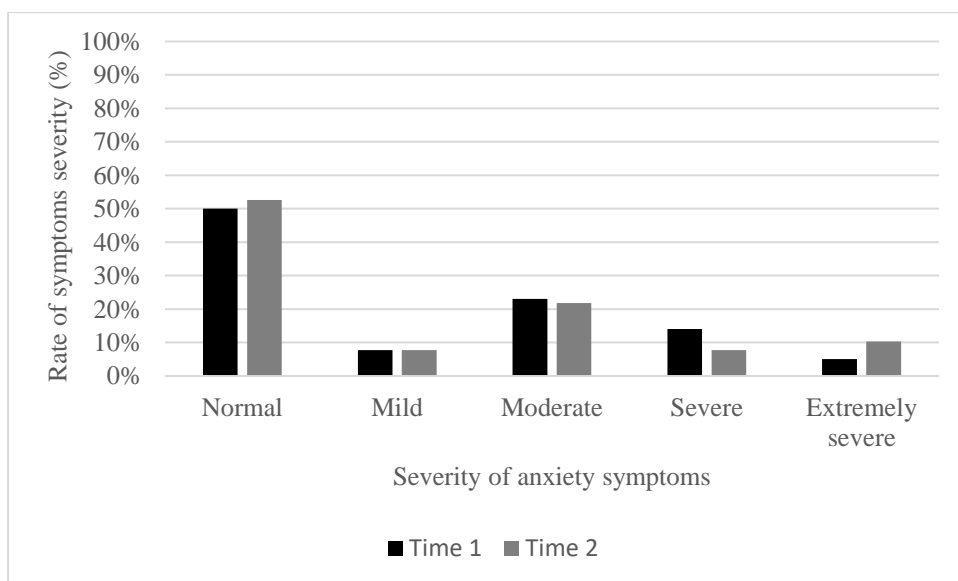


Figure 5.2

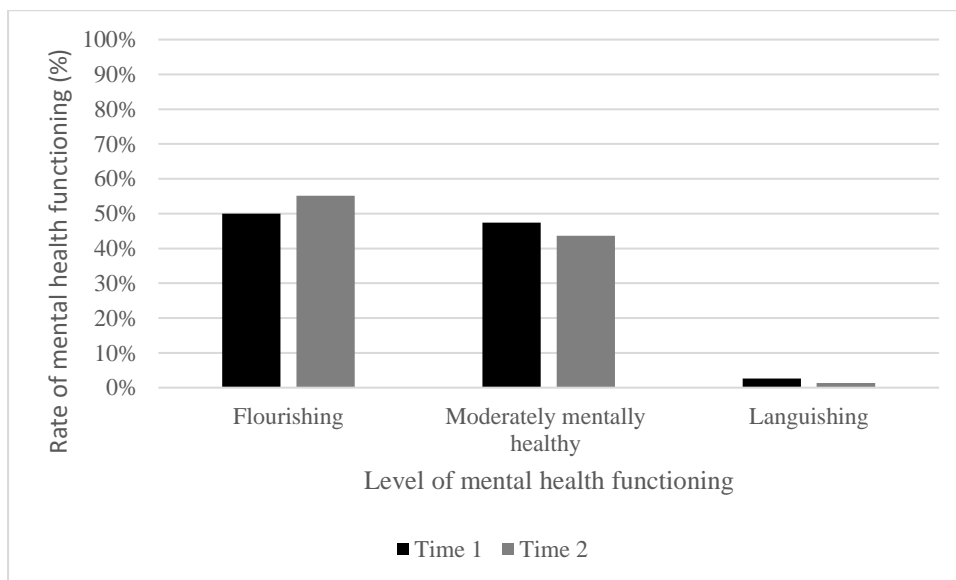
Proportion of student-athletes in each category of symptom severity for self-reported anxiety symptoms at times 1 and 2



As seen in Figure 5.3, half the sample were experiencing moderate or languishing levels of well-being at time 1 (50%) whilst at Time 2, more than half were flourishing (55.1%). These differences were, however, not statistically significant ($\chi^2 = .411$, $df = 1$, $p = .521$) but point to improvements in well-being at T2. For the chi-squared test, the moderate and languishing categories were combined to ensure there were ≥ 5 cases in each category for the analyses.

Figure 5.3

Proportion of student-athletes classified as flourishing, moderately mentally healthy, and languishing at times 1 and 2



Main analyses

Mental health profiles

Adopting a person-centred approach, student-athletes were grouped into mental health profiles in line with Keyes' (2005, 2007) mental health diagnosis categories. At Time 1, the majority of student-athletes had moderate mental health with symptoms of depression and/or

anxiety (Table 5.3). At Time 2, the majority were either flourishing with (28.2%), or without (26.9%), symptoms of depression and/or anxiety (Table 5.3).

Table 5.3

Proportion of student-athletes assigned to 1 of 6 mental health profiles that combine well-being scores with mental illness scores n (%)

Time	Flourishing without symptoms	Flourishing with symptoms	Moderate mental health without symptoms	Moderate mental health with symptoms	Languishing without symptoms	Languishing with symptoms	Total
T1	(20) 25.6%	(19) 24.4%	(12) 15.4%	(25) 32.1%	(1) 1.3%	(1) 1.3%	78 (100%)
T2	(22) 28.2%	(21) 26.9%	(15) 19.2%	(19) 24.4%	(0) 0%	(1) 1.3%	78 (100%)

This data (Table 5.3) highlights the proportions in each profile, not whether individual student-athletes have moved between profiles. At T2, over half (42, 53.8%) of student-athletes had a change in their mental health profile membership. Encouragingly, 65% of those who were flourishing without depression and anxiety symptoms remained in this profile at Time 2 (Table 5.4). Nevertheless, 35% of student-athletes moved out of this most favorable profile due to worsening mental health. Both of the student-athletes who were languishing (1 with and 1 without symptoms) had an improvement in their mental health and both moved to moderate mental health without symptoms. For greater detail on how student-athletes have moved between profiles, see Table 5.4.

Of the 42 student-athletes who experienced changes to their mental health, 18 student-athletes had a change in just their levels of well-being; 8 of these reported a decrease in well-being (7 moved from flourishing to moderate mental health and 1 from moderate to languishing) whereas 10 reported improvements (1 moved from languishing to moderately mentally healthy and 9 from moderate to flourishing). Seventeen indicated a change in just their symptoms of mental illness, with 6 changing from without to with and 11 changing from with to without symptoms. Seven experienced changes in both well-being and mental illness, with 1 reduced to moderate well-being but without symptoms, 2 improved well-being but

with symptoms, 1 reduced well-being but with symptoms, 3 improved well-being but with symptoms.

Table 5.4

Table to show where changes in profile membership occurred with profile at time 1 across the rows and profile at time 2 across the columns

Mental health profiles	Flourishing without symptoms T2 <i>n (%)</i>	Flourishing with symptoms T2 <i>n (%)</i>	Moderate mental health without symptoms T2 <i>n (%)</i>	Moderate mental health with symptoms T2 <i>n (%)</i>	Languishing without symptoms T2 <i>n (%)</i>	Languishing with symptoms T2 <i>n (%)</i>	Total T1 <i>n (%)</i>
Flourishing without symptoms T1	13 (65%)	3 (15%)	3 (15%)	1 (5%)	-	-	20 (25.64%)
Flourishing with symptoms T1	6 (31.58%)	8 (42.11%)	1 (5.26%)	4 (21.05%)	-	-	19 (24.36%)
Moderate without symptoms T1	2 (16.67%)	3 (25%)	4 (33.33%)	3 (25%)	-	-	12 (15.38%)
Moderate with symptoms T1	1 (4%)	7 (28%)	5 (20%)	11 (44%)	-	1 (4%)	25 (32.05%)
Languishing without symptoms T1	-	-	1 (100%)	-	-	-	1 (1.28%)
Languishing with symptoms T1	-	-	1 (100%)	-	-	-	1 (1.28%)
Total T2	22 (28.21%)	21 (26.92%)	15 (19.23%)	19 (24.36%)	0 (0%)	1 (1.28%)	78 (100%)

Note, student-athletes remaining in the same profile are highlighted in bold

Emotion Regulation

Student-athletes are using reappraisal and suppression to regulate their sport emotions (Table 5.2) and results also suggest this is related to some mental health outcomes (Table 5.5). As shown in Table 5.5, suppression was related to reduced well-being and increased symptoms of anxiety and depression at T1. Reappraisal was not significantly related to any mental health outcomes at T1. T2 reappraisal was related to improved T2 well-being and reduced depressive symptoms whilst T2 suppression was related to reduced T2 well-being and increased anxiety and depressive symptoms.

Correlations across time points reveal that T1 suppression was related to increased symptoms of anxiety and depression at T2. Further, T1 mental health outcomes were related to emotion regulation use at T2. That is, lower well-being and increased symptoms of anxiety were related to increased use of suppression at T2, whilst higher T1 well-being was related to increased reappraisal at T2. Emotion regulation strategies may be a mechanism that helps explain for who mental health worsens or improves.

Table 5.5

Pearson correlations to show associations between emotion regulation use and mental health outcomes at each time point

Strategies	T1 Well-being	T1 Anxiety	T1 Depression	T2 Well-being	T2 Anxiety	T2 Depression
T1						
Reappraisal	.17	-.06	-.07	.14	-.13	-.20
Suppression	-.23*	.30**	.37**	-.19	.28*	.30*
T2						
Reappraisal	.23*	-.08	-.16	.25*	-.11	-.24*
Suppression	-.26*	.30**	.20	-.31**	.41***	.49***

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

Discussion

The present study was the first of its kind to investigate the longitudinal stability of UK student-athletes' mental health across two time points, underpinned by the dual-continua model of mental health (Keyes, 2002). Taking a person-centred approach, the results suggest that some athletes experience fluctuations in their mental health from a salutogenic perspective. This finding aligns with Keyes' propositions and provides novel evidence into the stability of student-athletes' mental health. The key message for practitioners is that student-athlete mental health is not stable, as evidenced by 53.8% of the sample population experiencing fluctuations, and thus, continual monitoring and awareness is necessary. As argued by Shannon et al. (2023), the mental health continuum is a useful tool for doing so. A gap in the literature was also *how* mental health changes or remains stable. The present study contributes to addressing this gap by highlighting emotion regulation as an underlying mechanism that may help to explain fluctuations in mental health.

The results from the present study suggest an ability for student-athletes' mental health to improve, not just worsen, and may be an important consideration when intervening with athletes. For example, stigma is a well-documented problem for student-athletes (e.g., M. D. Bird et al., 2021; Tabet et al., 2021) and thus, improving mental health literacy to help athletes realize that their mental health may fluctuate and that it is normal and can be improved may offer a less stigmatizing approach to mental health support (Uphill et al., 2016). Further, improvement could occur through learning how to adaptively regulate emotions for both performance and mental health purposes.

Mental health profiles

In line with previous research, flourishing levels of well-being does not mean a student-athlete will be free of mental illness (Durand-Bush et al., 2015; Eklund et al., 2010;

Keyes, 2002). This is evidenced by 24.4% (T1) and 26.9% (T2) of student-athletes flourishing with symptoms of depression and/or anxiety in the present study. This key consideration of the dual-continua model has received substantial empirical support (Iasiello et al., 2020), but the present study extends knowledge by exploring the stability of mental health with student-athletes.

Stability of mental health profiles. Based on results from a chi-squared test, the proportion of student-athletes in each mental health profile was statistically similar at both time points. This result diverges from findings from North American samples who suggest that undergraduate students in their first year of study experience a worsening of mental health over the course of an academic year (Duffy et al., 2020; Goodday et al., 2019). However, these studies predominantly focused on depression and anxiety, but the latter included a measure of student subjective well-being. van Slingerland et al. (2019) longitudinally assessed Canadian student-athletes complete mental health but included a singular item for mental illness and found mental health was not significantly different between time points. Being a student-athlete may, therefore, buffer against changes to mental health. The present study considered student-athletes specifically and included measures of depressive symptoms and positive mental health (well-being) to gain a complete state picture and similarly found mental health was not significantly different, however the chi-squared test results indicate that the proportions in each profile remain stable, but it does not explain whether individual student-athletes moved between profiles. Adopting a person-centred approach to the research highlighted the importance of exploring the stability of profiles beyond just statistics. In fact, criticisms in the literature exist around the suitability of p-values (Gagnier & Morgenstern, 2017). When researching mental health, the present study highlights that it is important to consider the individual and not just the statistics because in all profiles (besides flourishing without symptoms), the majority of student-athletes were in a

different profile at T2. Although the present research is quantitative, it has still been possible to explore student-athletes mental health holistically from a person-centred lens.

The present findings suggest a capacity for student-athletes' mental health to improve and evidence indicates that the highest level of stability was observed in the flourishing without symptoms profile (65%). Previous findings have also evidenced the highest stability for students who were flourishing (Kelly et al., 2012). Furthermore, those who were languishing at T1 improved their mental well-being to reflect moderate levels of mental health, although moderate is not optimal as it is associated with increased risk for physical impairment, it supports a capacity for improvement (Keyes, 2007). Possible explanations for this are that: (1) sports participation may offer some promotive factors, and (2) use of the SMHC suggests a capacity for sport-related well-being to improve. Research suggests that the sub-scales of the SMHC correlate strongly with the MHC, suggesting sport and global well-being to be closely related and thus, improvements in sport well-being can lead to improvements in global well-being (Foster & Chow, 2019).

Student-athletes' changes in mental health status were varied. That is, some had changes in just well-being, some mental illness symptoms, and others had changes in both. This finding provides further support for the utility of the dual-continua model in relation to the research and practical assessment of student-athlete mental health. It is important for researchers to explore how to promote flourishing for student-athletes through the regulation of their emotions as flourishing athletes have been found to have a higher awareness of mental health difficulties and how these may influence their sport well-being (Pankow et al., 2021).

In line with Keyes (2007), only about a quarter of student-athletes in the present study can be defined as mentally healthy at each time point. Consequently, the majority of student-

athletes are experiencing some problems with their well-being, symptoms of mental illness, or both, particularly when compared to other athlete populations (e.g., flourishing without symptoms = 40.3% in women ice hockey players; Johansson et al., 2023). It is, therefore, necessary to explore potential risk and protective factors for student-athletes' low levels of mental health to ensure support is provided appropriately (Kuettel & Larsen, 2020).

Risk and protective factors. Student-athletes' use of reappraisal and suppression during their sports performance provides a possible explanation for mental health experiences and why some athletes experienced changes in their complete mental health profiles. Results highlight that student-athletes are using reappraisal and suppression to regulate sport emotions, in line with previous findings in student-athletes (Uphill et al., 2012). Previous research within sport has found reappraisal to be related to adaptive psychological outcomes such as enhanced mental well-being (G. A. Bird et al., 2021), pleasant emotions (Robazza et al., 2023; Uphill et al., 2012), and favorable psychological outcomes more broadly (e.g., confidence, satisfaction, and reduced loneliness; Kim & Tamminen, 2022). Whilst expressive suppression was related to decreased well-being, increased unpleasant emotions, and the broader psychological outcomes (e.g., increased confidence and satisfaction, and increased loneliness) (G. A. Bird et al., 2021; Kim & Tamminen, 2022; Robazza et al., 2023). Uphill et al., (2012) found suppression was not related to the experience of unpleasant emotions. Consequently, it was hypothesized that a greater use of reappraisal, and less frequent use of suppression, would relate to higher well-being and lower anxiety and depressive symptoms. This hypothesis was partially supported.

Protective factor: adaptive emotion regulation

Student-athletes' use of reappraisal at Time 2 was related to higher well-being and lower depressive symptoms, also at Time 2. Although use of reappraisal at T1 was not associated with mental health outcomes at T2, higher levels of well-being at T2 were

associated with an increased use of reappraisal at T2. Consequently, if a student-athlete has higher levels of well-being at T1 then they are more likely to reappraise sport stressors later on, and this may offer some explanation for the greatest stability observed amongst flourishing student-athletes. Time 1 reappraisal was not related to well-being at T1 or T2. Time 2 reappraisal was, however, related to increased well-being at T2, as well as reduced depressive symptoms. Ford and Troy (2019) discussed the importance of exploring the influence of time on outcomes. That is, what mental health outcomes occur immediately after using reappraisal, and what mental health outcomes occur over time after habitual use of reappraisal. The present findings suggest limited but adaptive outcomes occur in the short-term for increasing well-being and decreasing depressive symptoms (Time 2) when using reappraisal, but an accumulated use of reappraisal over an academic and sporting year does not significantly relate to improved mental health outcomes. Participation in sport may, therefore, be providing athletes with the opportunity to learn emotional regulation skills such as reappraisal since use of this strategy at T2 was related to improved short-term outcomes (G. A. Bird et al., 2021).

Previously, Dawel et al. (2021) found cognitive reappraisal was not associated with anxiety or depression during COVID-19. The authors argue that this may be a consequence of the enhanced stressors of the pandemic inhibiting the ability to successfully reappraise their emotions. Sport is considered a high stress context and thus, it is likely there are cognitive costs to using reappraisal (Troy et al., 2018). Furthermore, Ford and Troy (2019) argue that people are not always successful at using reappraisal to feel better. Within sport, however, athletes do not always use strategies for hedonic purposes (to feel better) (Lane et al., 2011). Consequently, it would be important to explore student-athletes' reasons for adopting reappraisal to understand if individual differences exist for adaptive mental health outcomes depending on whether athletes are regulating for hedonic or instrumental purposes.

Despite the evidence for reappraisal as adaptive in broader psychology (Webb et al., 2012), authors have considered individual and contextual differences that may inhibit reappraisals adaptiveness (Troy et al., 2013). For example, the degree of control an individual has over a stressor influences reappraisals adaptiveness (Troy et al., 2013). That is, reappraisal is considered maladaptive for depressive symptoms when stressors are controllable. Although the present study has found reappraisal to be adaptive for mental health outcomes, this was not consistent across time or for multiple indicators of mental health. Previous research has drawn similar conclusions. For example, Brockman et al. (2017) found reappraisal was related to positive affect but not negative affect in students and G. A. Bird et al. (2021) found reappraisal was related to increased well-being but not reduced symptoms of depression in student-athletes. Consequently, a strategies adaptiveness depends on the person, the context, and their goals (Gross, 2015a).

Risk factor: maladaptive emotion regulation. Expressive suppression had stronger relationships with mental health outcomes than reappraisal, suggesting use of maladaptive emotion regulation strategies to be a larger contributor to poorer outcomes than not using adaptive strategies. Within time points, suppression was related to reduced well-being and increased symptoms of anxiety and depression, with stronger associations at Time 2. Consequently, athletes and those who work with them should be aware of their use of expressive suppression, since an accumulated use of suppression over an academic and sporting year was significantly related to increased symptoms of anxiety and depression, as indicated by the relationship between T1 suppression and T2 outcomes. It would be important for future research to explore why suppression had stronger associations with poorer outcomes at T2, such as increased exam stress and the role of having a dual-career.

Greater use of expressive suppression at T1 was related to higher levels of anxiety and depression at T2 but surprisingly, not reduced well-being. Whilst higher levels of T1 mental

illness related to increased use of suppression at T2, and higher levels of T1 well-being related to less frequent use of suppression at T2. Thus, higher levels of well-being and flourishing may offer some protection against mental health difficulties (Iasiello et al., 2019; Keyes et al., 2010). The bi-directionality of emotion regulation and mental health is important to consider. That is, expressive suppression has been predicted to be used more by individuals experiencing higher anxiety and depressive symptoms, and also predicted to increase these symptoms (Dawel et al., 2021). Therefore, whilst all student-athletes would benefit from intervention that aims to reduce use of expressive suppression, such intervention might be most important for those experiencing symptoms of anxiety and depression.

As explained by Gross (2002), suppressing one's emotions does not remove the emotional experience of them and thus, if athletes are using suppression during sport performance to support their goals, then they need avenues for support to then share. In a study by Bonanno et al. (2004), they found students who engaged in expressive suppression experienced higher emotional well-being if they were also able to enhance the expression of emotion. Consequently, it would be important for future researchers to explore strategies in conjunction and investigate how emotional expression relates to mental health to understand whether the sharing of emotions has an inverse relationship to the suppression of emotions.

Those working with athletes should support them to use less expressive suppression to help enhance their sport well-being and reduce the risk for symptoms of anxiety and depression. Instead, adaptive strategies should be encouraged. Although reappraisal has been frequently cited as adaptive for mental health (Webb et al., 2012), the results of the present study suggest reappraisal may not be the optimal strategy for athletes. However, as multiple strategies were not explored in the present study, this suggestion requires further investigation.

Strengths, limitations, and future directions

As argued by Hu et al. (2023), variations in an individuals' emotional regulation is based on their emotional goals and that this variation is related to fluctuations in mental health outcomes. Throughout the course of an academic and sporting year, athletes are likely to have different emotional goals and thus, rigid use of strategies is unlikely to support these goals and have negative consequences for mental health (Rusk et al., 2011). It is, therefore, beneficial for future research to longitudinally assess student-athletes' use of emotion regulation strategies along with exploring the reasons behind their emotion regulation choice and how this relates to mental health outcomes. A mixed-methods approach would be fruitful to investigate this proposition.

A key strength of the present study is considering a range of student-athletes from multiple academic years and representing a range of different sports and competitive levels. The study also adopted a holistic approach to exploring mental health. Previous research has been limited to investigating a particular academic year or subgroup of athletes with a predominant focus on symptoms of mental illness in elites. As the first of its kind, including a range of student-athletes was important for providing generalizable results and laying a foundation for future research to build upon and explore particular subgroups in further detail. It has also pointed towards some nuances for stability and change involving mental well-being and symptoms of mental illness. Including a range of athletes reflecting elites and nonelites, genders, sports, and underpinned by Keyes' (2002), is in line with recent calls to expand knowledge beyond just elite athletes and from a mental illness lens (Breslin et al., 2019; Vella & Swann, 2021).

A key limitation of the present study is the sample size of student-athletes who completed the questionnaires at T2. With an attrition of 68.55% resulting in a sample of 78 participants at T2, and subsequent limited power for statistical analyses, the study was at risk

for type II error, therefore, the study was mostly exploratory in nature. It is possible that sample sizes in some profiles would be small regardless of overall sample size (e.g., languishing with symptoms), however, future research is needed to investigate this. The exploratory nature of the study has, however, highlighted some patterns in the stability of mental health and the potential risk or protective nature of reappraisal and suppression. As the first of its kind, the present data provides a foundation for future research and avenues for informing coaches on how to support athlete mental health (Bissett et al., 2020).

Conclusion

Results highlight that person-level changes in mental health occur over an academic and sporting year. For some student-athletes, changes in just well-being occurred, for some just symptoms of anxiety and/or depression, but for others, indicators of both changed. Consequently, it is important to consider changes in student-athletes' complete mental health over time, ontogenetically and historically, to understand the broader influence of time on mental health outcomes. This capacity for change is important because it not only indicates that student-athletes' mental health can improve, but highlights that intervention is required to reduce the risk of worsening mental health experiences. Initial evidence suggests strategies that relate to improved symptoms at one time point, do not necessarily relate to improvements longitudinally but that use of expressive suppression may be a particular risk factor for poor mental health over time in student-athletes.

Chapter 6

The Depression, Anxiety, and Stress of Student-athletes from a Pre- to Post-COVID-19

World.

Chapter 4 has highlighted the importance of the time component of the PPCT model when taking an ecological approach to exploring student-athletes' mental health. Time, however, exists on multiple levels and Chapter 5 explores what happened when key features of the sport context were removed during a major historical time, the COVID-19 pandemic. Due to the unexpected global COVID-19 pandemic, the opportunity presented itself to explore student-athletes' symptoms of mental illness pre- and post-COVID-19 pandemic. This often-understudied element of the time component can provide valuable lessons for supporting student-athletes with mental health concerns.

Introduction

Student-athletes must balance numerous and often competing demands that increase their risk for symptoms of mental illness (Moreland et al., 2018). Yet, there is mixed evidence in the literature, mainly drawn from North American samples, as to whether student-athletes are at less, as much, or at more risk for experiencing symptoms of mental illness than their non-athlete counterparts (Kegelaers et al., 2022). To broaden our understanding and better support UK student-athletes' mental health, there is a need to explore prevalence rates within the context of the COVID-19 pandemic as there is a gap for comparing rates of mental illness symptoms before and after the pandemic. Uncovering rates of mental illness post-pandemic is vital for informing sufficient mental health support is provided to meet the needs of student-athletes.

The COVID-19 pandemic was a global issue that presented challenges for physical and mental health (Galea et al., 2020; Moreno et al., 2020). Worldwide, symptoms of

depression and anxiety rose by 25% during this period across all ages (WHO, 2023). Mental health problems were also evidenced in multiple populations such as Italian students (Meda et al., 2021), those with pre-existing mental health disorders (Murphy et al., 2021), and Australian general population (Fisher et al., 2021). For students, it was widely assumed that university closures and ambiguity in exam procedures would impact their mental health (Hotopf et al., 2020). It is unclear however, whether student-athletes followed this trend given that young people were disproportionately affected by the pandemic (Weber et al., 2023; WHO, 2023). It is, therefore, necessary for those working with athletes, including universities, to understand the impact of the pandemic on student-athlete mental health to ensure appropriate support is provided. Findings from this study will not only be beneficial for supporting student-athletes now but for potential future increased rates of COVID-19 lockdowns or periods of isolation (e.g., injury, outbreaks of other diseases).

The national lockdown resulted in the suspension of normal sporting activities, as well as campus-based learning, presenting new and unfamiliar challenges for student-athletes alongside existing pressures of their dual career identity (Moreland et al., 2018). Exasperating the situation further, student-athletes also experienced a loss of typical protective factors associated with their sport, such as training, social interaction, and learning, which was shown to contribute to anxiety about the future (NCAA, 2020). Despite an overall increase in symptom severity pre- to post-pandemic in North American samples (Strauser et al., 2023), research suggests that athletes with greater protective factors may have been less severely impacted by the pandemic. For example, physical activity was found to be a protective factor for young people's mental health and well-being during the pandemic (Wright et al., 2021). Previous findings from North America also found that student-athletes' with higher levels of social support and connectedness during the pandemic reported fewer problems with their mental health (Graupensperger et al., 2020), and that student-athletes had somewhat better

coping mechanisms than student-nonathletes (Strauser et al., 2023). Given that the policies for COVID-19 restrictions differed across countries, there is a need to understand UK student-athletes' mental illness over COVID-19.

It is rare that an opportunity arises to investigate what happens when key features of university and sport are removed, with the last instance of this situation relating to the suspension of all sports during World War II in the 1940's (Chandler et al., 2021). This knowledge could help to inform the provision of sports and mental health support in the future by exploring the historical time component of the PPCT model (Bronfenbrenner & Morris, 1998; Bronfenbrenner, 2005) to provide valuable insight into the effects this can have on student-athletes' symptoms of mental illness.

Therefore, through a multiple cohort cross-sectional design, the aim of this chapter was to investigate UK student-athletes' symptoms of depression, anxiety, and stress pre- and post-COVID-19 pandemic. It was hypothesized that there would be higher symptoms of depression, anxiety, and stress in the post-pandemic cohort compared to the pre-pandemic cohort.

Methods and materials

Participants

Following ethical approval, data were collected from 807 student-athletes representing different sport types (team = 462, individual = 342, 3 did not specify) and competitive levels (recreational = 158, club = 257, regional = 328, elite = 58, 6 did not specify), aged 18-25 ($M = 19.98$ years, $SD = 1.50$) enrolled at UK universities. The sample consisted of 305 student-athletes who identified as male, 501 who identified as female, and 1 who did not specify.

Data was obtained from two separate cohorts as part of larger studies using a multiple cohort cross-sectional study design. The pre-pandemic cohort completed questionnaires between November 2018 and March 2020 ($n = 427$). The post-pandemic cohort completed questionnaires between November 2021 and November 2022 ($n = 380$), shortly after restrictions were lifted in the UK for the last time.

Measures

Participants completed the Depression, Anxiety, and Stress Scale (DASS-21; Lovibond & Lovibond, 1995) a 21-item measure with 7 items each for depressive, anxiety, and stress symptoms, reported on a Likert-type scale from *did not apply to me at all* (0) to *applied to me very much or most of the time* (3). Cronbach alpha coefficients in the present study were good (stress = .84, anxiety = .80, depression = .89), demonstrating reliable internal consistency. Total scores were created for each sub-scale and multiplied by 2 (Lovibond & Lovibond, 1995). The DASS-21 has been validated for use in athlete populations during and post-COVID-19 (Vaughan et al., 2020).

Data analysis

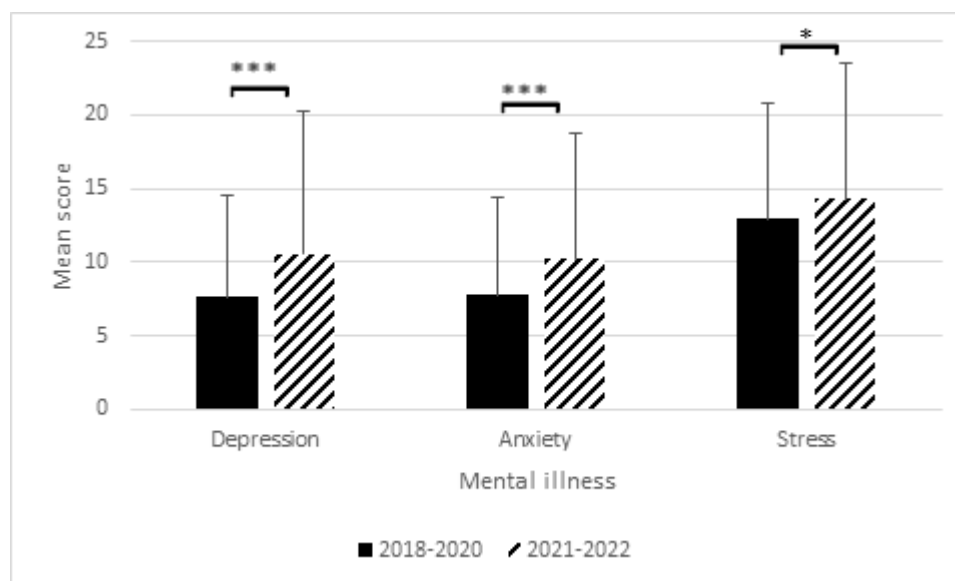
Using SPSS v.29, data was cleaned and screened for missing data and outliers (Tabachnick & Fidell, 2019). Depression, anxiety, and stress were continuous variables and used to conduct a repeated measures multivariate analysis of variance (MANOVA) test for comparing mean scores, where Pillai's Trace values were reported. These continuous variables were also transformed into categorical variables to understand the distribution of student-athletes across symptom severity from normal, mild, moderate, severe to extremely severe symptoms (Lovibond & Lovibond, 1995). Cross-tabulations and chi-squared tests were conducted on the categorical variables to assess for statistically significant differences in symptom severity pre- to post-pandemic.

Results

Results of the MANOVA revealed student-athletes post-pandemic reported higher levels of mental illness compared to the pre-pandemic cohort (Pillai's trace = .04, $F(3, 803) = 11.28$, $p < .001$, $\eta_p^2 = .04$, observed power = 99.9%). At the univariate level, these differences were statistically significant for depressive ($F(1, 805) = 23.92$, $p < .001$, $\eta_p^2 = .03$, observed power = 99.8%), anxiety ($F(1, 806) = 20.15$, $p < .001$, $\eta_p^2 = .02$, observed power = 99.4%), and stress symptoms ($F(1, 805) = 5.24$, $p = .022$, $\eta_p^2 = .01$, observed power = 62.8%) (Figure 5.1). That is, student-athletes reported higher rates of depressive, anxiety, and stress symptoms in the post-pandemic cohort.

Figure 6.1

Changes in mean depressive, anxiety, and stress symptoms from pre- to post-pandemic cohorts



Note, * $p < .05$; ** $p < .01$; *** $p < .001$

Crosstabulations and chi-squared tests revealed statistically significant differences in the distribution of student-athletes across symptom severity (Table 6.1) for depressive ($\chi^2 = 29.28$, $df = 4$, $p < .001$) and anxiety ($\chi^2 = 27.86$, $df = 4$, $p < .001$) symptoms from pre- to post-pandemic. There were no statistically significant differences in distribution for stress ($\chi^2 =$

9.45, $df = 4$, $p = .051$). Results highlight that student-athletes in the post-pandemic cohort reported proportionately greater symptoms of depressive and anxiety symptoms compared to those at pre-pandemic.

Table 6.1

Distribution of student-athletes across categories of symptom severity pre- to post-pandemic

Mental illness	Normal	Mild	Moderate	Severe	Extremely severe
Depression					
<i>Pre-pandemic</i>	287 (67.2%)	54 (12.6%)	60 (14.1%)	20 (4.7%)	6 (1.4%)
<i>Post-pandemic</i>	203 (53.4%)	44 (11.6%)	75 (19.7%)	33 (8.7%)	25 (6.6%)
Anxiety					
<i>Pre-pandemic</i>	238 (55.7%)	43 (10.1%)	86 (20.1%)	26 (6.1%)	34 (8%)
<i>Post-pandemic</i>	180 (47.4%)	27 (7.1%)	65 (17.1%)	34 (8.9%)	74 (19.5%)
Stress					
<i>Pre-pandemic</i>	272 (63.7%)	64 (15%)	54 (12.6%)	32 (7.5%)	5 (1.2%)
<i>Post-pandemic</i>	213 (56.1%)	51 (13.4%)	65 (17.1%)	42 (11.1%)	9 (2.4%)

Discussion

Despite previous research, predominantly from North American samples, indicating mixed results on the extent to which student-athletes are at risk for mental illness (Kegelaers et al., 2022), from the current results it is clear that UK student-athletes are experiencing difficulties with symptoms of depression, anxiety, and stress pre- but especially post-pandemic and there is an urgent need to support their mental health. Research has shown the impact of the COVID-19 pandemic on the mental health of North American student-athletes (Graupensperger et al., 2020; Strauser et al., 2023), and of UK 13-19 year olds (Wright et al., 2021). Although the authors argue that athletes appeared to face fewer mental health challenges when compared to non-athletes, they did note that post-pandemic scores for anxiety were nonetheless higher than pre-pandemic values (Strauser et al., 2023). The present findings follow this trend of heightened post-pandemic symptoms and enhance our understanding on student-athlete mental health by providing novel knowledge on UK

student-athletes symptoms of mental illness as a population who experience different health, educational, and sporting contexts to those in North America (Kegelaers et al., 2022). The findings are also situated within the time component of the PPCT model (Bronfenbrenner & Morris, 1998; Bronfenbrenner, 2005) and provide valuable insight into the effects this can have on student-athletes' symptoms of mental illness.

Symptoms pre- and post-COVID-19 pandemic

Symptoms of depression and anxiety were elevated over the COVID-19 pandemic and thus, is one of the many factors that has worsened mental health. In particular, depressive symptoms heightened from normal to mild levels, anxiety from normal to mild, and stress from normal to borderline mild. A key clinical implication of the present findings is that these symptoms will get worse without intervention, that students will leave university with poor mental health that could have been better supported, or drop out of university all together (Sorkkila et al., 2017). To identify potential intervention targets, future research should explore protective factors for student-athletes, such as adaptive emotion regulation, for any future eventualities of pandemics or other stressors which relate to periods of isolation from sport (e.g., injury).

Symptom severity

For depressive and anxiety symptoms, the severity in the present samples has significantly skewed towards more severe categories of symptoms from pre- to post-pandemic. Indeed, 46.6% of student-athletes reported mild to extremely severe symptoms of depression post-pandemic compared to 32.8% pre-pandemic, and 52.6% reported mild to extremely severe symptoms of anxiety post-pandemic compared to 44.3% pre-pandemic. Alarming, rates of extremely severe symptoms of anxiety increased from 8% to 19.5%. Further, just 7.1% are in the mild category. It is important to note that the mean score ($M =$

10.21) reflected mild levels of symptoms. If this mean score alone was considered, then the large proportion experiencing extremely severe symptoms would have not been appropriately considered in the analyses. Anxiety appears to be a particular concern with 52.6% symptomatic with mild to extremely severe symptoms. This distinction is also important because the intervention for someone with mild symptoms might be different to those experiencing more severe symptoms (i.e., campus counselling vs. clinical treatments (Barnett et al., 2021; Mowbray et al., 2006)). Although severity of symptoms of stress are not statistically significantly different post-pandemic, the mean score has significantly increased and so student-athletes also require support managing their symptoms of stress.

Strengths and limitations

A strength of this study is its contribution to knowledge on UK student-athlete mental illness, but particularly when faced with challenges presented by factors such as the COVID-19 pandemic. A limitation of the present study is in the cross-sectional design. That is, different cohorts participated at the two time points, rather than the same cohort in a longitudinal design. Nevertheless, the heterogeneity of the sample provides an opportunity to generalize the findings to student-athletes more broadly. Future research should explore ways in which student-athlete mental health can be promoted, such as by exploring their levels of well-being and various risk and protective factors, such as emotion regulation strategies, that are associated with their symptoms of mental illness.

Conclusion

Taken together, the results indicate that large proportions of student-athletes reported heightened symptoms of depression, anxiety, and stress pre-pandemic, suggesting they were struggling with their mental health. However, post-pandemic, the severity of symptoms heightened for some student-athletes experiences of depression and anxiety. This clear

increase in rates of student-athletes' symptoms of mental illness warrants immediate attention to understand how best to support their mental health. Future research should aim to address this problem to understand how athletes, coaches, universities, and others who work with them can be aware of their symptoms of mental illness and support these athletes, but also to investigate whether interventions can be implemented to reduce the risk of such symptoms in the first instance during this peak developmental period. The findings highlight that severe implications can occur when key features of the sport environment are removed. Therefore, key, unique features of the sport environment should be researched to understand how they influence student-athletes mental health (mental illness and well-being).

Chapter 7

General Discussion

General discussion

Framed within an ecological, salutogenic, and person-centered approach to mental health, the overarching aim of this thesis was to investigate the relationship between athletes' use of emotion regulation strategies and mental health outcomes. The aim was achieved by firstly synthesizing existing literature with a systematic review. A combination of cross-sectional and longitudinal research then followed to address the thesis aims and gaps identified in the systematic review. This thesis provided new insights into UK student-athletes' complete mental health by considering indicators of positive mental health (well-being) and illness and providing evidence to support why including both outcomes when conducting research on emotion regulation in sport is important. That is, strategies are sometimes related to just well-being or mental illness. For example, seeking distraction and positive refocusing were related to increased well-being only, whilst rumination was related to reduced symptoms of depression and anxiety only, and reappraisal did not relate to reduced anxiety but did relate to higher well-being and fewer depressive symptoms. Consequently, if only one component of mental health had been explored, then strategies such as seeking distraction and positive refocusing may be concluded as adaptive for mental health when the findings suggest they are adaptive for well-being but do not significantly relate to symptoms of mental illness. The research has also been conducted across components of the PPCT model and thus, recommendations are made later in this chapter for promoting mental health that considers the broader ecological system. The aim of this chapter is to discuss the overarching findings from the empirical chapters of the thesis. It is organized by first providing a summary of each empirical chapter and describes how each study was built on from the previous one. The major theoretical contributions of the thesis are then discussed and followed by key applied implications. Suggestions for future research are made and strengths and limitations of the overall thesis are presented.

Summary of results

Chapter 2

The aims of Chapter 2 were three-fold: (1) to explore the relationships between emotion regulation strategies and indicators of mental health, mental illness, and performance; (2) to explore what type of strategy, based on the PMER, was related to the outcomes; and (3) to synthesize the measures used to explore emotion regulation in the sport literature. The systematic review included the search terms (“emotion* regulat*” AND “athlete* OR sport*”) as no review in this area had previously been conducted. This broad approach was taken to identify key gaps and make evidence-based recommendations for future research and applied implications. The data was synthesized and reported narratively, with a small number of highly varied studies in the review, conducting a meta-analysis was not viable.

The results of this chapter demonstrated that few authors explored the relationship between emotion regulation and indicators of mental well-being and illness as the main aim of their study. The majority of studies included emotions as an outcome but did not explicitly state these were indicators of well-being. The findings from these studies were included in the review because emotions are a key indicator of emotional well-being and it allowed for an exploration of initial patterns. Although this is not a critique of the quality of included studies, it does highlight a key literature gap for explicitly investigating athletes’ use of emotion regulation strategies and how this relates to their well-being. Furthermore, well-being incorporates elements of positive functioning (psychological and social well-being) and not just emotions and thus, future research should explore the three functions of well-being to gain a more holistic and nuanced understanding of athletes’ well-being, such as by using thorough measures that include emotional, social, and psychological elements, such as the

recently developed and validated Sport Mental Health Continuum – Short Form (Foster & Chow, 2019) (used in Chapters 3, 4, & 5).

Much less frequently investigated were indicators of mental illness, but compared to well-being, these indicators were included as more explicit aims of the study. Only two studies included indicators of well-being and mental illness in the same study (G. A. Bird et al, 2021; Molina, 2018). These studies provide evidence that strategies relating to one component of mental health do not necessarily support the other. That is, reappraisal was related to increased levels of mental well-being but was not related to symptoms of mental illness in either study. Consequently, not considering mental health or mental illness in the same study may lead to misjudged conclusions.

This chapter was underpinned by the PMER to synthesize findings based on each stage of the model. Cognitive change strategies were explored most frequently, in particular cognitive reappraisal, which mimics findings from the broader psychology literature (McRae & Gross, 2020). The response modulation strategy of suppression was also explored frequently. Reappraisal and suppression were also the only strategies to be explored across indicators of mental health, mental illness, and performance, however not within the same study. A possible explanation for this is that the Emotion Regulation Questionnaire (Gross & John, 2003), which is a multidimensional scale consisting of cognitive reappraisal and expressive suppression sub-scales, is the only measure, to the author's knowledge, that has been adapted and validated for use with athletes (Uphill et al., 2012). The study concluded that broader emotion regulation strategies, such as rumination, distraction, and catastrophizing should be explored in relation to student-athletes' complete mental health. These strategies, amongst others, were subsequently explored in Chapters 3 and 4 of this thesis.

Chapter 3

Based on the key gaps highlighted in Chapter 2, Chapter 3 explored (1) student-athletes' complete mental health profiles consisting of sport mental well-being and symptoms of depression and anxiety, influenced by Keyes' dual-continua model and the clear gap in the sport emotion regulation literature; and (2) whether mental health profiles differed in emotion regulation strategy use and alexithymia using a cross-sectional design. Mental health profiles were created using latent profile analysis and 4 latent mental health profiles were found. As a novel method of analysis in the UK student-athlete mental health literature, the findings provide initial evidence for understanding mental health from a complete state perspective and risk and protective factors associated with profile membership. Overall, the findings highlight the importance of considering both indicators of well-being and mental illness and provide support for the dual-continua model of mental health.

The results of this chapter demonstrated that less than half the sample were flourishing, the majority were moderately mentally healthy, and a few were languishing. Keyes' work highlights the negative associations with anything less than flourishing (Keyes, 2007). Consequently, student-athletes require support for promoting well-being. If just indicators of mental illness had been included, then a large proportion of student-athletes who require support may have been missed as demonstrated by the inclusion of mental well-being, anxiety, and depressive symptoms in Chapter 3 (as well as 4 & 5).

The emotion regulation strategies explored in Chapter 3 reflected the first three stages of the PMER; that is, situation selection, situation modification, and attentional deployment. Protective of complete mental health were actively approaching (situation selection) and seeking social support (but not depressive symptoms; situation modification). A risk to

complete mental health were withdrawal (situation selection) and ignoring (situation modification), whilst seeking distraction (attentional deployment) was related to increased well-being only. Differences in strategy use between mental health profiles were found except for seeking social support and seeking distraction. The trend was for student-athletes to use distraction more than other behavioral emotion regulation strategies (Stanley et al., 2012). However, the mean scores suggest that student-athletes are using these behavioral emotion regulation strategies, and it would be beneficial to learn to use them more adaptively. An individual factor that significantly related to well-being, mental illness, and emotion regulation strategies, and was significantly different between all profiles, was alexithymia. The “lowest well-being, severe symptoms” and “moderate well-being, extremely severe symptoms” profiles had moderate and high levels of alexithymia respectively and may help further explain their mental health. Consequently, considering person factors such as emotion regulation and alexithymia is important and future studies should continue to explore a range of factors.

Chapter 4

The novel approach taken in Chapter 3 provided insight into student-athletes’ mental health profiles and between-profile differences in emotion regulation strategies reflecting the first three processes of the PMER (situation selection, situation modification, and attentional deployment). Chapter 4 aimed to replicate the results of 4 latent mental health profiles from Chapter 3 to provide enhanced reliability of findings. Secondly, because profiles in Chapter 3 showed some differences in their use of behavioral emotion regulation strategies and argued for the importance of considering a range of risk and protective factors, it was important to extend these findings to explore more of the PMER, as also argued in Chapter 2. Consequently, cognitive and behavior emotional regulation strategies reflecting attentional deployment, cognitive change, and response modulation were explored.

Adopting the same cross-sectional design as Chapter 3, 4 latent mental health profiles were found within the data based on patterns of mental well-being, anxiety, and depressive symptoms. Therefore, the finding of a 4-profile solution was replicated. The study considered the strategies rumination (attentional deployment), positive refocusing (attentional deployment), refocus on planning (cognitive change), catastrophizing (cognitive change), reappraisal (cognitive change), and suppression (response modulation). Chapter 4 extended the findings from Chapter 3 by providing evidence for different patterns of use between latent mental health profiles. Consistent with other chapters of the thesis, it is clear student-athletes are using emotional regulation strategies during their sport performance, with mean scores similar to other populations (Uphill et al., 2012; Garnefski & Kraaij, 2007).

Chapter 5

Chapters 3 and 4 provided support within the sport context for the dual-continua model by exploring both indicators of mental health and illness. Chapter 5 explored another key argument of the dual-continua model, that is, mental health is not stable and can fluctuate over time. Chapter 5 was longitudinal in design and exploratory in nature. Mental health profiles were created to explore changes in mental health profile membership. The findings indicate that student-athletes' mental health changes over the course of an academic and sporting year. Mental health worsened for some but improved for others, and so there was an opportunity to learn how this happens. The study, therefore, also explored emotion regulation strategies over time and found that suppression use at Time 1 related to mental health outcomes at Time 2, indicating emotion regulation as associated with change in mental health.

The findings from Chapter 5 provide further evidence for the applicability of Keyes' (2002) model to student-athlete mental health research. That is, some athletes experienced

changes in solely their levels of mental well-being, some in just their symptoms of mental illness, and others in both indicators. In addition to mental health status changing for many athletes, mental health can also be maintained. It is, therefore, important to consider both well-being and mental illness in mental health, research, promotion, and intervention.

Chapter 6

Chapter 6 was a multiple cohort cross-sectional research note that explored differences in mental illness symptoms pre- and post-COVID-19 pandemic. The global pandemic was an unplanned and unexpected event that provided a natural experiment and a unique opportunity to explore changes in symptoms of mental illness when key features of athletes' context (i.e., the sport environment) were removed. A previous review by Kuettel and Larsen (2020) found a number of personal and environmental risk and protective factors for athletes' mental health, however, there was limited contextual evidence. Chapter 5 therefore provided novel evidence for what happens when key features of the sport context are taken away. Considering the component of historical time in the PPCT model, this chapter has highlighted what happens to student-athletes' symptoms of mental illness and offers an explanation for why their symptoms changed. The findings indicate that student-athletes' symptoms of depression and anxiety were significantly higher post-pandemic and symptoms of stress also followed this trend. Symptoms of mental illness, therefore, worsened, and contextual influences play a role in this change. Although COVID-19 was a major global stressor, on a smaller scale, student-athletes may experience other periods of isolation that mimic some of the features of the pandemic, such as the removal of sport protective factors during periods of isolation (e.g., injury).

Theoretical contributions

Key theories and models underpinning this thesis included the PMER, PPCT model, and the dual-continua model of mental health. The thesis has provided theoretical contributions to each of these models which will be discussed next. As indicated in Table 7.1, a range of strategies from across the PMER were considered in this thesis. In summary, the results highlight that emotion regulation strategies used by athletes during sport performance relate to their mental health outcomes. With limited research examining these relationships and across limited outcomes, more research is required, and this thesis has provided a preliminary foundation to build upon. The results of the thesis highlight that athletes are using more strategies, reflecting more stages of the PMER, than reappraisal and suppression: the two most commonly researched emotion regulation strategies. Reappraisal may not always be the best strategy for athletes, and it is important to understand for who and in what context this applies. Future research with athletes would benefit from exploring a range of strategies from across the emotion generating process.

Table 7.1.

Table to show emotion regulation strategies as related to mental well-being, mental illness, and performance within the thesis

Strategies	Well-being	Mental illness	Performance
Situation Selection			
Escape	↓		
Behavioral avoidance	↓		
Actively approaching	↑	↓	
Withdrawal	↓	↑	
Situation Modification			
Compensation			
Social support	↓↓↑	↓	
Problem-solving	↑↑	↑	
Physical preparation			↑
Ignoring	↓	↑	
Attentional deployment			
Cognitive avoidance	↓↓		
Seeking distraction	↑		
Rumination		↑	
Positive refocusing	↑		
Cognitive change			
Cognitive reappraisal	↑↑↑↑↑↑↑↑	↓↓	↓
Acceptance	↑		
Positive self-talk			↑
Planning			↑
Catastrophizing	↓	↑	
Self-blame			
Anger control-in			
Anger control-out			
Cognitive reinterpretation			

Strategies	Well-being	Mental illness	Performance
Refocus on planning	↑	↓	
Response modulation			
Expressive suppression	↓↓↓↓↓	↑↑	↑
Impression management			↑
Anger expression-in			
Anger expression-out			
Self-suppression	↓		
Self-expansion	↑		
Emotional expression			

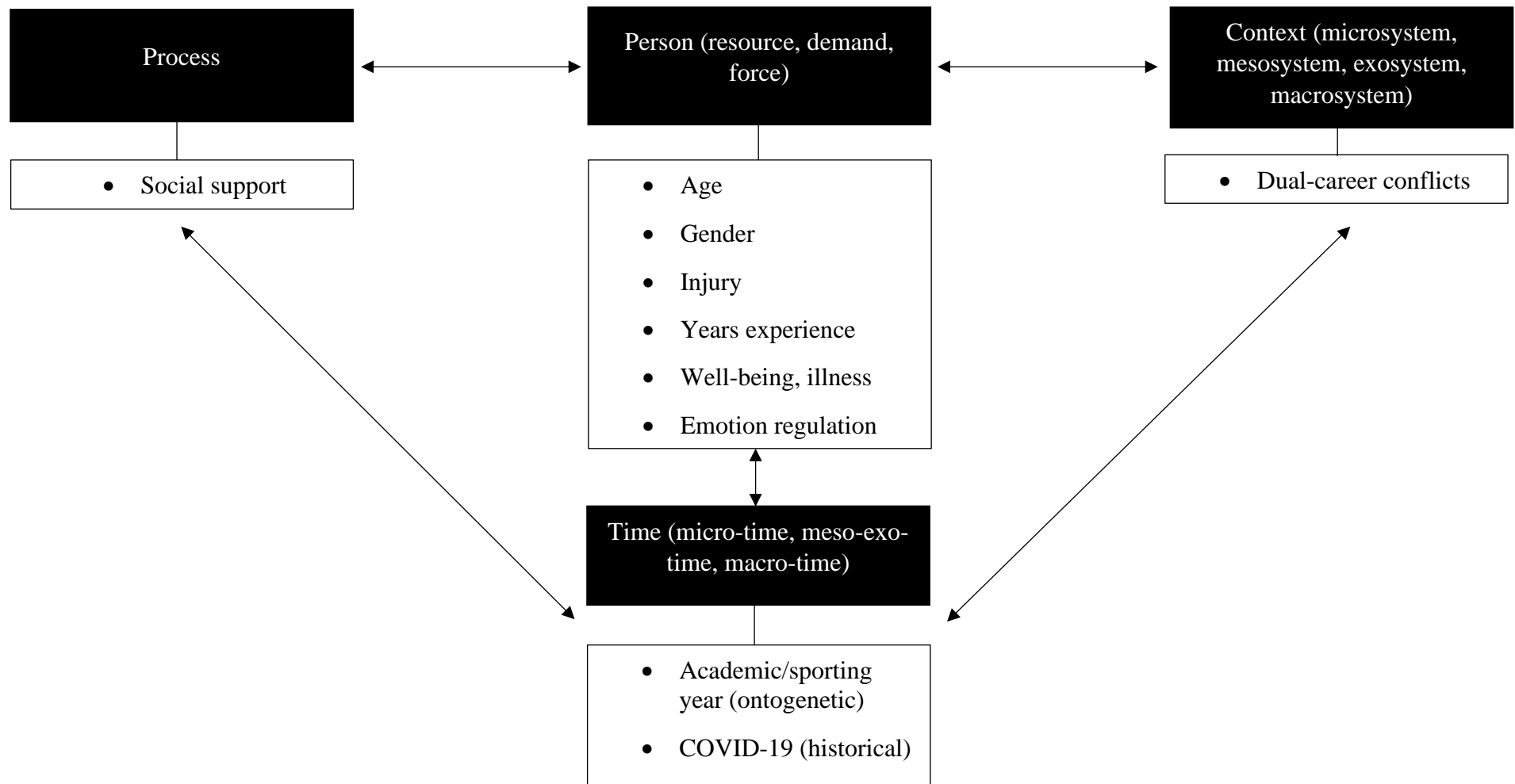
Note, ↑ = improved, ↓ = worsened with each individual arrow signifying the frequency with which the relationship was found. Relationships with performance were explored in Chapter 2 only.

The PPCT model

The PPCT model was included as a broader model underpinning the thesis and a theoretical lens for understanding student-athletes' mental health experiences in a more holistic way. Capturing the entire ecological system and all components of the PPCT model in one study is difficult and has not been explored for student-athletes (Ault et al., 2024). This thesis has, however, contributed to advancing understanding of athlete and student-athlete mental health by considering multiple components of the PPCT across different chapters. The next section of this thesis will discuss how the results of the thesis, combined with existing literature on emotion regulation and athlete mental health, advance the literature of research using an ecological systems approach to underpinning athlete mental health and make suggestions for future research.

Figure 7.1

Components of the PPCT model in the present thesis (Bronfenbrenner & Morris, 1998; Bronfenbrenner, 2005)



Person. Chapters 3, 4, and 5 have highlighted intrapersonal emotion regulation as a person resource factor of student-athletes. That is, the mean scores for emotion regulation indicate that they are using emotional regulation strategies during sport performance. The sport context may provide an environment for learning adaptive emotional regulation skills and this thesis has provided evidence for the use of emotional regulation strategies within the microsystem. Data collection relied predominantly on online participation during COVID-19 and resulted in a large proportion of the data being from student-athletes who identified as female, with limited capacity to distribute hard copies of the questionnaires to aim for a more representative sample. Consequently, the thesis focused on UK student-athletes more broadly, as a population exposed to risk and protective factors, and their emotion regulation, as a relatively understudied factor in the sport literature. This thesis also collected data on other person and sport characteristics such as age, gender, sport type, competitive level, and self-reported mental illness and highlighted that doing so is important when investigating athlete mental health.

Process. An example proximal process explored in the present thesis is social support seeking. The findings highlight the importance of considering how components of the PPCT model interact. For example, social support seeking involves interaction with others in the microsystem and is used alongside other emotion regulation strategies (person factors), as indicated in Table (3.1). From the systematic review in Chapter 2, Doorley and Kashdan (2021) and Doorley et al. (2022) found social support related to increased negative emotions (sad, angry, and annoyed) for US student-athletes. In Chapter 3 of this thesis, however, seeking social support was related to increased well-being and decreased depression, but was not significantly related to anxiety in UK student-athletes. Social support seeking is an example of a proximal process that requires further investigation into: (1) the types of support

athletes are seeking (e.g., from informal or formal sources), (2) who they are seeking it from, and (3) what they are seeking support for.

Future research should explore proximal processes in student-athlete mental health research, since they are influenced by person factors and context (Bronfenbrenner & Ceci, 1993). This would help understand how proximal processes or other features of the system (e.g., context) influence mental health and thus would help inform future intervention (e.g., mental health services designed to meet the needs of student-athletes). Mental health and emotion regulation occur as an interaction between the individual and their environment. Due to its quantitative design, this thesis did not explore whether athletes' emotion regulation strategy use occurred as interactions between the athlete, teammates, and their coaches for example and would be an important avenue for future qualitative research. That is, what are the key proximal processes that have shaped the athletes' emotion regulation choices?

Context. It is understood from the work of Bronfenbrenner that a person's development is shaped and influenced by the microsystem within which they exist (Bronfenbrenner & Morris, 1998). Focusing on a sub-population of athletes who are not only navigating the sport context but are young adults who have moved to independence for the first time and must also navigate new academic and social contexts (microsystem) is an important consideration for understanding their mental health, emotion regulation use, and thus, development during this time. While this context helped to form the arguments for why this thesis specifically focused on student-athletes, future research should explore all systems within the context to truly take an ecological systems approach, and the interactions between the context and other components of the model.

Time. The cross-sectional chapters allowed for the exploration of student-athletes mental health and emotion regulation strategy use within micro-time, although some questionnaires related to meso-time by asking study athletes to recall their experiences over weeks and months. The longitudinal study (Chapter 5) explored these outcomes in macro-time during two phases of an academic and sporting year by investigating whether strategies could explain changes in mental health over time. Bronfenbrenner and Morris (2006, p. 812) argue that “developmental outcomes at Time 1 indirectly influence developmental outcomes at Time 2 through their effect on proximal processes during the intervening period”. Consequently, mental health at Time 2 in Chapter 5 could be explained by athletes’ emotion regulation use and proximal processes that exist within the sport context.

Chapter 6 situated the research into its historical time (i.e., before, during, and after the COVID-19 pandemic). Doing so recognizes that development is likely to be impacted due to historical events (Tudge et al., 2009). It is not often an opportunity presents to explore student-athletes mental illness during unique historical events such as the pandemic. During this period, there was interaction between the individual and the context that resulted in worsening of mental illness symptoms. Consequently, multiple components of the PPCT model need exploring to look at interactions in a more nuanced way, whether things happen at the individual or societal level, or in the case of the pandemic, both. The time component of the PPCT model has been neglected in athlete mental health research underpinned by Bronfenbrenner (e.g., Purcell et al., 2022), and this thesis provides original contributions to the literature by exploring not only ontogenetic time, but also historical time.

Applied Implications

In this section, overall applied implications are discussed beyond those already provided in the empirical chapters. The thesis has highlighted the importance of adopting a person-centred approach when researching athlete mental health and this can also extend to interventions. Because athletes have varied mental health experiences, a person-centered approach would aid recognition of how emotion regulation strategies work for different people in different contexts. Thus, a tailored approach to mental health promotion that aims to improve emotion regulation is required and should consider how a strategies adaptiveness depends on the individual and the context within which it is used (Iwakabe et al., 2023).

The dual-continua model of mental health is recommended as a valuable framework for exploring student-athlete mental health. Uphill et al. (2016) already proposed use of the model with athletes but with some considerations around language when working specifically with athletes. That is, psychological distress may be favorable, and less stigmatizing, compared to mental illness. In a later study, Laslett and Uphill (2020) conducted an online intervention and found student-athlete mental health to improve and for psychological distress to decrease in two case studies. Although the authors proposed several limitations of the intervention, the results highlight the potential for interventions to improve student-athletes' complete mental health. This thesis has provided support for the application of this model in sport by providing evidence that student-athletes' mental health and illness are related but distinct, and that mental health fluctuates over time. Crucially, and advancing our understanding of student-athlete mental health, this thesis has provided evidence that emotion regulation is a mechanism by which these fluctuations (or stability) in mental health status occur. Consequently, sport psychologists should be aware of student-athletes' mental health from a salutogenic perspective and the factors that influence mental health and illness. Doing

so would provide a more holistic view of the individuals' mental health experiences from a less stigmatizing approach.

Just 25-28% of the sample in Chapter 5 could be described as mentally healthy (Keyes, 2007). Keyes (2007) reported that 17% of adults were completely mentally healthy but assessment was with a global measure of mental health and visibility and openness of mental health concerns are higher in more recent years, again highlighting the necessity to contextualize findings to the historical time in which they were found. This prevalence amongst student-athletes highlights mental health as a key concern and the need for more research that aims to understand why student-athletes are experiencing low levels of complete mental health. As argued by Keyes (2007), interventions that target the promotion of positive mental health and well-being may protect against symptoms of mental illness. Consequently, improving student-athletes' well-being and overall mental health appears needed and may offer a less stigmatizing approach through targeted intervention for student-athlete mental health that adopts the perspective of Keyes' model (Uphill et al., 2016). Chapter 5 highlighted that some student-athletes' mental health improved and suggests some protective factors within the sport context. The thesis indicates emotion regulation as a person resource factor, aligned with the PPCT model, for protecting mental health. Consequently, athletes and those who work with them should be aware of their emotional regulation use and ensure strategies are protecting their mental health as well as performance goals. Coaches should consider individual differences in emotion regulation use as well as enhance awareness of the emotion regulation they use themselves and model to athletes since proximal processes' influence the athlete. A more considered emotional sporting environment that considers the ecological system would be fruitful.

Within the microsystem, coaches can play an influential part in proximal processes with their athletes, and therefore the impact on their mental health. Coaches should create sporting environments that encourage the use of adaptive emotion regulation strategies. For example, they should be cautious of encouraging athletes to suppress their emotions because the short-term performance gains may come at a long-term cost by leading to negative consequences for their mental health. It is recommended that coaches and others who work with athletes should have emotional regulation awareness education to ensure they are best supporting their athletes. This could occur at the macrosystem where NGO's and universities provide resources for coaches and athletes. That is, organizations should ensure to continue building systems, guidance, and policy outputs that holistically support student-athlete mental health alongside performance and mental ill-health. Research suggests female student-athletes are better at regulating their emotions than their non-athlete counterparts (Wollenberg et al., 2015). Consequently, student-athletes may already have emotional regulatory skills that can be harnessed and improved, and the sport context may be providing opportunities for developing adaptive emotion regulation skills.

This thesis has, therefore, provided insight into strategies that are beneficial for student-athletes to use that could simultaneously support their sport performance and their mental health. For example, planning had been found to improve performance in the review and in Chapter 4 was found to increase well-being and decrease depressive and anxiety symptoms. Further research is required because these findings are from just one study (performance, Kubiak et al., 2019; mental health, Chapter 4). Nevertheless, education is required to teach athletes and those who work with them (e.g., coaches, sport psychologists, and organizations) on the benefits of regulating for both purposes and which strategies could be adaptive or maladaptive.

Suppression: a cautionary tale

Expressive suppression was one of only two strategies (the other reappraisal) to be looked at in terms of performance, mental illness, and mental well-being in Chapter 2's systematic review. Although this strategy related to improved performance status, the r value was weak (Kubiak, 2019), and other studies have found this strategy to be maladaptive for overall mental well-being (G. A. Bird et al., 2021) and cognitive anxiety (Molina et al. 2018). Nevertheless, Monaci and Veronesi (2019) found anger-control out to significantly relate to worsened performance, suggesting the outward expression of anger is detrimental to performance. It may be beneficial for researchers to investigate exactly which emotions athletes are suppressing to get a more nuanced understanding of suppression in the sport context. Consequently, athletes should monitor the benefits vs. drawbacks of this strategy when used in sport. Although it may provide short-term benefits to performance, this strategy could have maladaptive consequences for their mental health. Previous qualitative literature identified "difficulty in or not willing to express emotion" as a barrier to help-seeking in elite athletes (Gulliver et al., 2012l p. 6). Therefore, athletes appear to be using suppression but with maladaptive consequences to their mental health. Future research should endeavor to measure athletes' perspectives on whether strategies are helpful or unhelpful to understand the nuances further. This could then inform a protocol and feasibility study for conducting an intervention for promoting adaptive emotion regulation that considers individual differences and context within competitive sports.

Emotion regulation skills are not only beneficial for reducing symptoms of mental illness (Cludius et al., 2020) and increasing levels of mental well-being (Gross & John, 2003), but they can improve performance (Beatty & Janelle, 2020), quality of friendships (Ricciardi et al., 2022), academic success (De Neve et al., 2023), physical health (Song et al., 2015), and

are, therefore, beneficial to educate for a wide variety of benefits. In fact, Lopez and Denny (2019), argue that promoting adaptive emotional regulation skills in young adults is vital for supporting overall health. Viewing athletes holistically and recognizing that the development of emotion regulation skills could also help benefit other areas of their lives outside of sport is important.

Strengths and Limitations

This thesis was designed and conducted based on well supported frameworks, theories, and models. These were the dual-continua model of mental health (Keyes, 2002), the process model of emotion regulation (Gross & John, 2003), and the PPCT model (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 1998). Central to every chapter was the PPCT model. The thesis adopted a range of study designs and methodological approaches that could utilize components of the PPCT model to help explain why student-athletes experience mental health differently and provide some explanations for why that can change over time (e.g., micro-time of academic and sporting year, historical time of COVID-19 pandemic, and athletes personal resource factors such as emotional regulation strategies). Although the PMER and dual-continua model were not explicitly used in Chapter 6, this study aimed to be conceptually clear with how mental illness was operationalized. That is, not referring to mental illness as mental health, which is in line with the language of the dual-continua model. Using such frameworks to guide the research, frame the research questions, and define key concepts has been important to ensure conceptual clarity. Definitions and conceptualizations of emotion regulation and mental health were varied across studies with little consistency. To advance the field, authors should make clear their operationalization of these constructs and underpin their studies with models such as the PMER and dual-continua model of mental health, not only for clarity, but to inform practical implications that can best support athlete

mental health. Consequently, a key methodological contribution of the present thesis is in highlighting the inconsistencies in conceptualizations (Chapter 2) and then addressing these inconsistencies by adopting clear definitions of mental health, emotion regulation, and alexithymia for the thesis (Chapters 3, 4, 5, and 6).

The potential bias in recruitment and reporting presents a limitation of the thesis. Data was collected during some periods of the COVID-19 pandemic, and in the instances where restrictions were removed, barriers to data collection remained. The thesis relied predominantly on participants completing online questionnaires, with course credits as a potential motivating factor for completion. This resulted in a sample consisting of predominantly female identifying student-athletes, and in particular, Psychology students. A small sample size of student-athletes completed questionnaires at Time 2 (Chapter 5). Small sample sizes can result in Type II error by failing to identify significant changes when fluctuations have actually occurred (Pallant, 2020). This thesis has argued for the importance of considering the individual holistically and adopting a person-centred approach, however, during the process of cleaning and screening the data, univariate and multivariate outliers were removed that represented the most severe cases of mental illness for example. These athletes are, arguably, important to learn from and include in data, however, to be rigorous and follow procedures, these data were removed. An opportunity exists for future research to consider the benefits versus drawbacks of excluding such data. Nevertheless, the data obtained from those with more favorable mental health has provided insight into the types of strategies that are related to positive mental health and provide lessons for support for those who are more vulnerable.

Previous research with student-athletes suggests that those with strong senses of athletic identity experienced low levels of well-being during the COVID-19 pandemic (Hebert

& Newland, 2023). That is, they perceived they had high levels of well-being if their sports training and performance were perceived as successful. This is in line with other research outside of student-athletes that sought to define what it means to be mentally healthy from elite divers' perspectives (Coyle et al., 2017). It was found that elite divers defined being mentally healthy as being able to compete at one's optimal capacity (Coyle et al., 2017). Student-athletes also believe that their mental health impacts on their performance outcomes (Beebe et al., 2023), exemplifying how intertwined with perceptions of mental health sport performance is for student and elite athletes. Considering the SMHC-SF was adopted in Chapters 3 and 4 and that some of the data was collected during periods of the pandemic, it is possible that the low levels of mental health could be attributed to reduced sport participation and sense of sport well-being. Research does indicate that sport and global well-being are related (Lundqvist, 2011), but it would be beneficial to help athletes to cope and regulate their emotions effectively when key protective features of the sport context are removed. This has the potential to provide them with skills for promoting mental health beyond their sporting activities.

Future directions

As with the applied implications, the future directions specific to each chapter have been discussed in their respective chapters and so overarching future directions will be addressed here. A common theme of this thesis is that there is a need in the sport literature for consistency in measurement used to draw comparisons, as discussed in Chapters 2, 3, and 4. Overall, this thesis argues that the relationships between emotion regulation and indicators of mental health, mental illness, and performance in sport is limited and inconsistent (Chapter 2). There is a clear gap in the literature for instruments that explore athletes use of emotion regulation strategies or the validation of existing measures such as the Cognitive Emotion

Regulation Questionnaire, Behavioral Emotion Regulation Questionnaire, and Process Model of Emotion Regulation Questionnaire (Garnefski & Kraaij, 2007; Kraaij & Garnefski, 2019; Olderbak et al., 2023). As argued by Lane et al. (2011), the validity of a measure should be assessed regardless of how frequently a measure has been used in the literature. For example, further investigation of the ERQ for athletes is required due to issues with item stability (Uphill et al., 2012). Definitions of emotion regulation are diverse and there is a range of measures used, creating barriers for comparison across studies and for making evidence-based recommendations. A key methodological contribution of the present thesis is in highlighting this need and making suggestions for future research to validate existing measures, or create new measures on emotion regulation strategies that athletes actually use for their sport performance, particularly beyond reappraisal and suppression (see Chapters 2, 3, 4, & 5).

The present thesis adopted the PMER to explore initial patterns in emotion regulation strategy use and mental health outcomes in student-athletes. Theoretically, the Extended Process Model has also been proposed (EPM; Gross, 2015b). The EPM proposes that valuation systems influence subsequent emotion regulation to achieve goals relevant to the individual through identification, selection, and implementation stages (and monitoring) of valuation and are rooted within the original PMER. To enhance understanding through rich description, future qualitative research should consider the EPM by exploring: (1) what inputs do athletes identify as a need for emotional regulation, (2) what strategies do they select to regulate their emotions, and (3) how do they implement their chosen strategy. Nevertheless, the PMER has provided insight into the types of strategies athletes are using and patterns with indicators of mental well-being, anxiety, and depression, thus providing empirical evidence to a limited pool of knowledge.

A beneficial next step would be to conduct a qualitative study, such as using semi-structured interviews, to more fully understand how multiple components of the PPCT model interact. For example, exploring proximal processes and how these relate to student-athletes well-being and mental illness in the context of their sports and across time. A realist evaluation would help develop this understanding on what works for who, under what conditions, and why. Although this thesis focused on intrapersonal emotion regulation, it is well-known that other actors in the sport context can interpersonally regulate emotions towards the athlete (e.g., Friesen et al., 2013; Kim et al., 2022). The transition to young adulthood and university marks a period where the importance of social relationships with peers influences emotion regulation (Marroquín & Nolen-Hoeksema, 2015; Maunder, 2018). Furthermore, the culture of specific sports at specific times may influence athletes' emotional regulation. For example, if there is a coach or captain who promotes notions of 'masculinity', this may instill the stigma and idea that displaying emotions and seeking social support are not ideal and instead, emotion suppression is favored.

A gap also exists for exploring multiple strategies across multiple outcomes within the same study and sample population. The notions of regulatory flexibility (Chen & Bonanno, 2021) and polyregulation (Ford et al., 2019) have been proposed more recently in the literature. Consequently, future research should explore how athletes use multiple strategies simultaneously or concurrently to regulate their emotions. Such an exploration would be best conducted using a mixed method design. Questionnaires can provide quantitative data on the frequency of emotion regulation strategies used during training and competition with analyses such as hierarchical linear regression that control for the use of other strategies. Qualitative interviews would then provide a rich description of athletes' regulation from their own perspective. As athletes have unique perspectives on what it means to be mentally healthy

(Coyle et al., 2017), often consider ‘unpleasant’ emotions to be beneficial during sport (Lane et al., 2011), and that emotion regulation is part of psychological well-being (Foster & Chow, 2019), it is likely that their identification, selection, and implementation of strategies is unique to other individuals and other contexts and therefore would be better suited to qualitative research to investigate these nuances further.

Finally, the present thesis included a short longitudinal study that assessed stability and change in student-athletes’ mental health profiles. To further understanding and build on the initial findings, it would be beneficial for future research to conduct longitudinal studies over longer periods of time or with three distinct time points. This would provide greater insight into the stability of student-athletes’ mental health over an academic year through enhanced contextualization of the distinct data collection time points. For example, different competitive seasons, key academic points of the year, or from entry into university through to graduation. Taking these next research steps and questions would add novel and valuable insight to the field for supporting student-athlete mental health holistically.

Conclusion

In conclusion, this thesis explored student-athletes’ complete mental health as understood by the dual-continua model of mental health (Keyes, 2002) and explored student-athletes’ use of emotion regulation strategies and how these could explain mental health outcomes, guided by the PMER (Gross, 1998b). These aims were achieved through a systematic review, cross-sectional, and longitudinal studies by synthesizing key gaps in the sport psychology literature and addressing these gaps as framed by Bronfenbrenner and Morris’ (1998) PPCT model. The thesis provided novel support to the sport emotion regulation and mental health literature by exploring relationships and differences in emotion

regulation strategy use in relation to complete mental health (indicators of positive mental health/well-being and mental illness). Chapter 2 was the first systematic review to narratively synthesize emotion regulation strategies and the relationships with mental health, mental illness, and performance in sport. Chapter 3 found that student-athletes experienced lower levels of well-being regardless of symptom severity unless symptoms were ‘normal’ and that those in the most favorable mental health profile, “well-adjusted”, used typically “adaptive” strategies more, and “maladaptive” strategies less, than those in more unfavorable profiles. Chapter 4 extended these findings by considering more families of the PMER and finding similar results, suggesting some protective capacity between student-athletes’ emotion regulation use and their mental health outcomes. However, the direction of the relationship cannot be concluded due to the cross-sectional nature of these studies. Consequently, Chapter 4 provided a novel contribution by highlighting that emotion regulation strategies (reappraisal and suppression) used at Time 1 related to mental health outcomes at Time 2 and thus, could be a mechanism for change in complete mental health status. Finally, Chapter 5 focused exclusively on mental illness symptoms and explored the consequences of a unique historical event, the COVID-19 pandemic. The natural experiment of the pandemic revealed student-athletes experienced a worsening of symptoms of depression and anxiety when key features of the sport environment were removed. The thesis has highlighted the benefits of learning adaptive emotional regulation skills. Consequently, participation in sport whilst at university could offer student-athletes the opportunity to develop adaptive emotional regulatory skills. More research is required to explore the nuances and interactions between components of the PPCT model, but this thesis has provided a clearer understanding of the relationships between emotion regulation and mental health and illness for student-athletes and highlighted a clear need for supporting their mental health.

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Appendices

Appendix 1: Supplementary Table 2.1 (Chapter 2)

Supplementary Table 2.1

Outcome variables for studies included in systematic review (Chapter 2)

	Well-being	Mental illness	Performance
Bird, Quinton, & Cumming (2021)	Mental well-being (psychological, emotional, & social)	Depressive symptoms	X
Castanier, Scanff, & Woodman (2011)	Positive emotions (joy & affection); negative emotions (anxiety, anger, shame, & sadness); negative affectivity		X
Doorley & Kashdan (2021)	Positive emotions (content, joyful, cheerful, grateful); Negative emotions (sad, angry, & annoyed)		X
Doorley et al. (2022)	Positive emotions (cheerful, joyful, content, grateful); negative emotions (sad, angry, annoyed)		X
Kubiak et al. (2019)	X	X	Performance status (table tennis rating scores 2014-2015)
Monaci & Veronesi (2019)	X	X	Improved & worsened performance

	Well-being	Mental illness	Performance
Molina, Oriol, & Mendoza (2018)	Positive affect; negative affect	Cognitive anxiety	X
Potoczny et al. (2022)	Satisfaction with life	X	X
Robazza et al. (2022)	Sport emotions (excitement, happiness, anger, anxiety, dejection)		X
Stanger, Chettle, & Whittle (2018)	Sport emotions (excitement, happiness, anxiety, anger, dejection))		X
Stenseng & Phelps (2016)	Positive affective outcomes; negative affective outcomes		X
Wang et al. (2022)	X	X	Archery performance
Yamaguchi et al. (2022)	X	Vulnerability	X

Supplementary Table 2.2

Studies investigating the relationship between emotion regulation and indicators of mental well-being, SEM results

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>
Potoczny, Herzog- Kryzwoszanska, (2022)	<i>N</i> = 117 (<i>n</i> = 58 athletes) Athletes <i>M</i> _{age} = 25.95 <i>SD</i> = 7.37 Athletes <i>N</i> _{males} = 43 <i>N</i> _{females} = 15, Karate, ≥ 1 year training and ≥ 1 session per week, Poland	Cross- sectional	Reappraisal	Satisfaction with life (SWLS)	Linear regression-based mediation analysis. Direct effect.	$\beta = .27$	<.05
			Suppression	Satisfaction with life (SWLS)		$\beta = .01$	NS

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>
Robazza et al. (2022)	<i>N</i> = 459, <i>M</i> age = 21.13, <i>SD</i> = 6.29, 16-35 years of age, <i>N</i> males = 258, <i>N</i> females = 201, <i>M</i> years experience = 9, <i>SD</i> = 5.55, 73% regional, 17% national, 10% international, <i>N</i> individual = 158, <i>N</i> team = 301, range of individual and team sports, Italy		Reappraisal	Excitement (SEQ)	SEM (ER = mediator variable). Direct effect.	$\beta = .35$	<.05
			Suppression	Happiness (SEQ)	Direct effect	$\beta = .31$	<.05
				Dejection (SEQ)	SEM (ER as mediator variable). Direct effect.	$\beta = .20$	<.05
				Anger (SEQ)	Direct effect.	$\beta = .26$	<.05
Robazza et al. (2023)	<i>N</i> = 424, <i>N</i> male = 246, <i>N</i> female = 178, <i>M</i> age = 23.08, <i>SD</i> = 7.65, range = 16-36, <i>M</i> yearsexperience =	Cross-sectional	Reappraisal	Excitement (SEQ)	SEM (ER = mediator variable). Direct effect.	$\beta = .34$	<.05

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>
	9.71, <i>SD</i> = 7.65, range = 1-21 years, regional, national, international, team and individual			Happiness (SEQ)		$\beta = .30$	<.05
				Anxiety (SEQ)		$\beta = -.08$	NS
				Dejection (SEQ)		$\beta = -.05$	NS
				Anger (SEQ)		$\beta = .06$	NS
		Suppression		Dejection (SEQ)	SEM (ER as mediator variable). Direct effect.	$\beta = .08$	NS
				Anger (SEQ)		$\beta = .06$	NS
				Anxiety		$\beta = .08$	NS
				Happiness		$\beta = -.10$	NS
				Excitement		$\beta = -.11$	NS

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Well-being outcome (measure)	Statistical test for association	Coefficient	<i>p</i>
Stenseng & Phelps (2016)	<i>N</i> = 207, <i>N</i> men = 115, <i>N</i> women = 92, <i>M</i> age = 27.9, Average time participating = 11.4hrs per week		Self- expansion	Positive affect (PANAS- X)	SEM (ER as mediator variable). Direct effect.	$\beta = .19$	<.01
			Self- suppression	Negative affect (PANAS- X)	SEM (ER as mediator variable). Direct effect	$\beta = .24$	<.01

Note Positive and Negative Affect Schedule-Extended Form (PANAS-X; Watson et al., 1988), Satisfaction With Life Scale (SWLS; Diener et al., 1985; Jankowski, 2015), Sport Emotion Questionnaire (SEQ; Jones et al., 2005). NS= non-significant.

Appendix 3: Supplementary Table 2.3 (Chapter 2)

Supplementary Table 2.3

Studies investigating the relationship between emotion regulation and indicators of mental illness, SEM results

Author(s)	Sample Characteristics (N, age, gender, sport(s), location)	Study Design	Emotion regulation strategy (measure)	Mental illness (measure)	Time point	Statistical test for association	Coefficient	<i>p</i>
Molina, Oriol, & Mendoza (2018)	<i>N</i> = 300, <i>M</i> age = 15.5, <i>SD</i> = 2.38, aged 11-18years, range of sports, individual (<i>n</i> = 139) and collective (<i>n</i> = 161) sports, Chile	Cross-sectional	Suppression	Cognitive anxiety (CSAI-2R)	T1	SEM. Direct effect.	<i>b</i> = .27	Sig. >.001

Note Competitive State Anxiety Inventory-2 Revised (CSAI-2R; Andrade Fernández et al., 2007; Cox et al., 2003).

Supplementary Table 2.4.

Studies investigating the relationship between emotion regulation and indicators of performance, SEM results

Author(s)	Sample Characteristics (N, age, gender, sport(s), location)	Study design	Emotion regulation strategy (measure)	Performance (measure)	Time point	Statistical test for association	Coefficient	<i>p</i>
Monaci & Veronesi (2019)	N = 180, Nmale = 92, Nfemale = 88, Aged 15-70years, Mage = 36, SD = 12.8, recreational tennis, Minimum 2 years' experience, Individual sport athletes	Cross-sectional	Anger control in - females	Improved performance	T1	SEM	$\beta = .39$	<.05
			Anger control out - females	Worsened performance	T1	SEM	$\beta = .26$	<.05
			Anger expression out - females	Improved performance	T1	SEM	$\beta = .30$	<.05
			Anger control in - males - females	Improved performance	T1	SEM	$\beta = .17$	<.05
			Anger control out - males	Worsened performance	T1	SEM	$\beta = .26$	<.05

Author(s)	Sample Characteristics (<i>N</i> , age, gender, sport(s), location)	Study design	Emotion regulation strategy (measure)	Performance (measure)	Time point	Statistical test for association	Coefficient	<i>p</i>
Wang et al. (2022)	<i>N</i> = 61 <i>M</i> age = 20.2 <i>SD</i> = 1.9 <i>N</i> male = 26 <i>N</i> female = 35 <i>N</i> international = 12 <i>N</i> national = 30 <i>N</i> first class = 19 Archery Chinese national team		Anger expression in-males	Improved performance	T1	SEM	$\beta = .25$	<.05
			Anger expression out-males	Improved performance	T1	SEM	$\beta = .30$	<.05
			Cognitive reappraisal	Archery performance		SEM	$\beta = -0.268$	= .02

Participant Information Sheet

Dear participant,

Thank you for considering taking part in our study entitled 'Risk and Protective factors of Athletes' Mental Health', which has been approved by the School of Sport, Exercise, & Rehabilitation Sciences Ethics Committee.

What is the purpose of the study?

Sport participation has the potential to protect its participants from experiencing mental illness and promote mental health and wellbeing. However, many athletes experience difficulties with their mental health. Therefore, we are interested in understanding the risk and protective factors for mental health and mental illness within the context of sport. The findings may have important implications for how wellbeing is promoted through sport.

Why have I been chosen?

You have been chosen because you are a university sport participant who is studying full-time towards a degree and meet the following inclusion criteria:

- Aged 18-25
- Participating in University sport
- Full-time student
- Minimum 1 year of training/competing in current sport

Do I have to take part?

Participation in this study is entirely voluntary, if you decide to take part you will be provided with a consent form and will have the opportunity to ask any questions.

What will happen if I decide to take part?

Upon providing your consent, you will be invited to complete a questionnaire pack that will take approximately 20 minutes to complete. You will also have the option to express interest in being invited to participate in a follow up interview. We will ask your specific consent to be contacted for this interview. Participation in all parts of the study are voluntary, and you can withdraw at any point up to two weeks after completing the questionnaire pack and/or interview. You will be entered into a prize draw following completion of the questionnaire pack. Winning prize amounts will be 1 x £100, 2 x £50, 4 x £25, and 2 x £10 amazon vouchers. If you chose to take part in the 1:1 interview and are selected to participate, you will receive an additional £20 voucher.

Can I withdraw?

If you decide to participate in this study, you are also free to withdraw at any point up to two weeks after your latest participation in the study. Withdrawal will not have any impact on

you. If you wish to withdraw then please contact a member of the research team via the contact details below. Your data will be destroyed and not included in the study. If you withdraw prior to participating, no compensation will be received. If you withdraw after participating, you will still be entered into the prize draw for the questionnaires or retain the voucher for completing the interview.

The data we collect will not be anonymous however, it will be completely confidential and only accessed by the researchers involved in the study. It is not anonymous so that we can destroy your data if you chose to withdraw

What are the potential benefits and risks of taking part?

Though there are no direct benefits for you if you take part, your participation will help us to find out about risk and protective factors of mental health and mental illness in sport and this may improve how wellbeing is promoted in the future to student-athletes. The data we collect will not be anonymous however, it will be completely confidential and only accessed by the researchers involved in the study. It is not anonymous so that we can destroy your data if you chose to withdraw.

There are no risks to you in taking part outside of those you would experience in everyday life. However, by taking part, you may remember things that you may find upsetting. Some questions may be of a sensitive nature so please be aware that you do not have to answer any questions you may find upsetting or would prefer not to answer. If you feel any distress from participating in the study, there are a number of support resources available. For immediate support, contact the Samaritans on 116 123 or call NHS mental health services on 111. For non-emergencies, visit <https://www.elefriends.org.uk/> for resources and a supportive online community. There are also a number of NHS recommended apps for managing wellbeing, such as Catch It or Cove. For UoB student specific support, you can contact the Student Hub <https://intranet.birmingham.ac.uk/student/student-hub/hub-services.aspx#s> or your Wellbeing officer <https://intranet.birmingham.ac.uk/student/your-wellbeing/wellbeingofficers.aspx>.

Will my participation be confidential?

Yes. All information will be kept confidential between the researchers involved in the study.

What will happen at the end of the research study?

A summary of the results and findings will be made available following completion of the study. If you would like a copy of this then please do not hesitate to contact us via the details below.

Thank you for considering to take part in our study. This letter is yours to keep.

Contact for further information

Appendix 6: Consent form (Chapter 3)

PARTICIPANT CONSENT FORM

Study Title	Risk and Protective Factors of Athletes' Mental Health		
Participant Name:		Date:	
Researcher Name:		Ethics Code:	
Participant ID:			

This section to be completed by the participant:

Please tick the box at the end of each statement if you agree with it.

1. I confirm that I have read and understood the Participant Information Sheet for the above study. I have had the opportunity to ask questions to the named researcher and these have all been answered satisfactorily.	<input type="checkbox"/>
2. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty, without giving any reason. I understand that I can ask to withdraw my data for up to two weeks after my latest participation in the research process.	<input type="checkbox"/>
3. I agree to the storage and use of my data for the purposes of this research study.	<input type="checkbox"/>
4. Based on the above, I agree to take part in this research study.	<input type="checkbox"/>
5. I would like to be contacted about participating in the follow up questionnaire.	<input type="checkbox"/>
Signed:	
Date:	

This section to be completed by the researcher

I certify that this participant has read, properly completed and signed the screening and consent forms, witnessed by myself:

Signed:

Date:

This information is being collected as part of a research project conducted in the School of Sport, Exercise and Rehabilitation Sciences at the University of Birmingham. By supplying this information you are consenting to the University storing your information for the purposes of the stated research study. The information will be processed by the University of Birmingham in accordance with the provisions of the Data Protection Act 2018. No identifiable personal data will be published.

Appendix 7: Questionnaire pack (Chapter 3 and 6)

Questionnaire Pack

Age:

Education:

Full time ☐

Part time ☐

Undergraduate ☐

Postgraduate ☐

Year of study.....

Gender:

Male ☐

Female ☐

Transgender male ☐

Transgender female ☐

Gender variant/non-conforming ☐

Prefer not to say ☐

Not listed:

Main sport:

Type:

Team, please state which team this is i.e. 1st, 2nd etc: ☐

Individual ☐

Competitive level:

Recreational (non-competitive) ☐

Club (competition at a local level, playing and training at least once a week) ☐

Regional (represent county against other counties, i.e. BUCS) ☐

Elite (represent country) ☐

Years of experience (main sport):

Phase of competitive season:

Pre-season ☐

Competitive season ☐

Off-season ☐

Unsure ☐

Injury status:

Minor injury (i.e. able to train/compete) ☐

Severely injured (i.e. unable to train/compete) ☐

Not injured ☐

If injured, please state injury.....

Do you have a previous or current mental illness? (Please circle) Yes/no and previous/current

If yes, has this condition been formally diagnosed? (Please circle) Yes/no

If yes, please state the condition:

You will now begin the questionnaire pack; some questions may be of a sensitive nature so please be aware that you do not have to answer any questions you may find upsetting or would prefer not to answer

Part 1 Select the box that describes your experience over the ***last 2 weeks***

	None of the time	Rarely	Some of the time	Often	All of the time
1. I've been feeling optimistic about the future	1	2	3	4	5
2. I've been feeling useful	1	2	3	4	5
3. I've been feeling relaxed	1	2	3	4	5
4. I've been feeling interested in other people	1	2	3	4	5
5. I've had energy to spare	1	2	3	4	5
6. I've been dealing with problems well	1	2	3	4	5
7. I've been thinking clearly	1	2	3	4	5
8. I've been feeling good about myself					
9. I've been feeling close to other people	1	2	3	4	5
10. I've been feeling confident	1	2	3	4	5
11. I've been able to make up my own mind about things	1	2	3	4	5
12. I've been feeling loved	1	2	3	4	5
13. I've been interested in new things	1	2	3	4	5
14. I've been feeling cheerful	1	2	3	4	5

Part 2 During the past month, how often did your sport participation make you feel...

	Never	Once or twice	About once a week	About 2 or 3 times a week	Almost every day	Every day
1. Happy	0	1	2	3	4	5
2. Interested in your sport	0	1	2	3	4	5
3. Satisfied	0	1	2	3	4	5
4. That you had something to contribute to your	0	1	2	3	4	5

team or sport community						
5. That you belonged to your team or sport community	0	1	2	3	4	5
6. That your team or sport community is a good place for all participants	0	1	2	3	4	5
7. That people in your sport are basically good	0	1	2	3	4	5
8. That the way your sport is organized makes sense to you	0	1	2	3	4	5
9. That you liked most parts of your athletic personality	0	1	2	3	4	5
10. Good at managing the daily responsibilities of your sport	0	1	2	3	4	5
11. That you had warm and trusting relationships with others in your sport	0	1	2	3	4	5
12. That you had sport experiences that challenged you to grow and become a better person	0	1	2	3	4	5
13. Confident to think or express your own ideas and opinions to people in your sport	0	1	2	3	4	5
14. That you have a sense of direction or meaning within your sport	0	1	2	3	4	5

Part 3 *In the last week...*

	Did not apply to me at all	Applied to me to some degree or some of the time	Applied to me a considerable degree or a good part of the time	Applied to me very much or most of the time
1. I found it hard to wind down	0	1	2	3

2. I was aware of dryness of my mouth	0	1	2	3
3. I couldn't seem to experience any positive feeling at all	0	1	2	3
4. I experienced breathing difficulty (eg. excessively rapid breathing, breathlessness in the absence of physical exertion).	0	1	2	3
5. I found it difficult to work up the initiative to do things.	0	1	2	3
6. I tended to over-react to situations.	0	1	2	3
7. I experienced trembling (eg. in the hands)	0	1	2	3
8. I felt that I was using a lot of nervous energy	0	1	2	3
9. I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10. I felt that I had nothing to look forward to	0	1	2	3
11. I found myself getting agitated	0	1	2	3
12. I found it difficult to relax	0	1	2	3
13. I felt down-hearted and blue	0	1	2	3
14. I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15. I felt I was close to panic	0	1	2	3
16. I was unable to become enthusiastic about anything	0	1	2	3
17. I felt I wasn't worth much as a person	0	1	2	3
18. I felt that I was rather touchy	0	1	2	3
19. I was aware of the action of my heart in the absence of physical exertion (eg. sense of heart rate increase, heart missing a beat)	0	1	2	3
20. I felt scared without any good reason	0	1	2	3
21. I felt that life was meaningless	0	1	2	3

Part 4 *Over the last 4 weeks, how often have you felt the following ways? Please indicate your response by circling the number that best describes how you have felt over the last 4 weeks.*

	None of the time	Rarely	Some of the time	Often	All of the time
1. It was difficult to be around teammates.	1	2	3	4	5
2. I could not stop worrying about injury or my performance.	1	2	3	4	5
3. I found it difficult to do what I needed to do.	1	2	3	4	5
4. I found training more stressful.	1	2	3	4	5
5. I needed alcohol or other substances to relax.	1	2	3	4	5
6. I was less motivated.	1	2	3	4	5
7. I found it hard to cope with selection pressures.	1	2	3	4	5
8. I was irritable, angry or aggressive.	1	2	3	4	5
9. I worried about life after sport.	1	2	3	4	5
10. I took unusual risks off-field.	1	2	3	4	5

Part 5 Please consider each statement in relation to competing and training generally in sport

	Strongly Disagree			Neutral			Strongly Agree
1. When I want to feel more <i>positive</i> emotion (such as joy or amusement), I <i>change what I'm thinking about</i> .	1	2	3	4	5	6	7
2. I keep my emotions to myself.	1	2	3	4	5	6	7
3. When I want to feel less <i>negative</i> emotion (such as sadness or anger), I <i>change what I'm thinking about</i> .	1	2	3	4	5	6	7
4. When I feel <i>positive</i> emotions, I am careful not to express them.	1	2	3	4	5	6	7
5. When I'm faced with a stressful situation, I make myself <i>think about it</i> in a way that helps me stay calm.	1	2	3	4	5	6	7
6. I control my emotions by <i>not expressing them</i> .	1	2	3	4	5	6	7
7. When I want to feel more <i>positive</i> emotion, I <i>change the way I'm thinking</i> about the situation.	1	2	3	4	5	6	7
8. I control my emotions by <i>changing the way I think</i> about the situation I'm in.	1	2	3	4	5	6	7

9. When I am feeling <i>negative</i> emotions, I make sure not to express them.	1	2	3	4	5	6	7
10. When I want to feel less <i>negative</i> emotion, I <i>change the way I'm thinking</i> , about the situation.	1	2	3	4	5	6	7

Part 6 How do you cope with events?

Everyone gets confronted with negative or unpleasant events now and then and everyone responds to them in his or her own way. By the following questions you are asked to indicate what you generally think, when you experience negative or unpleasant events.

	(Almost) Never	Sometimes	Regularly	Often	(Almost) Always
1. I feel that I am the one to blame for it	1	2	3	4	5
2. I think that I have to accept that this has happened	1	2	3	4	5
3. I often think about how I feel about what I have experienced	1	2	3	4	5
4. I think of nicer things than what I have experienced	1	2	3	4	5
5. I think of what I can do best	1	2	3	4	5
6. I think I can learn something from the situation	1	2	3	4	5
7. I think that it all could have been much worse	1	2	3	4	5
8. I often think that what I have experienced is much worse than what others have experienced	1	2	3	4	5

9. I feel that others are to blame for it	1	2	3	4	5
10. I feel that I am the one who is responsible for what has happened	1	2	3	4	5
11. I think that I have to accept the situation	1	2	3	4	5
12. I am preoccupied with what I think and feel about what I have experienced	1	2	3	4	5
13. I think of pleasant things that have nothing to do with it	1	2	3	4	5
14. I think about how I can best cope with the situation	1	2	3	4	5
15. I think that I can become a stronger person as a result of what has happened	1	2	3	4	5
16. I think that other people go through much worse experiences	1	2	3	4	5
17. I keep thinking about how terrible it is what I have experienced	1	2	3	4	5
18. I feel that others are responsible for what has happened	1	2	3	4	5
19. I think about the mistakes I have made in this matter	1	2	3	4	5
20. I think that I cannot change anything about it	1	2	3	4	5
21. I want to understand why I feel the way I do about what I have experienced	1	2	3	4	5
22. I think of something nice instead of what has happened	1	2	3	4	5
23. I think about how to change the situation	1	2	3	4	5
24. I think that the situation also has its positive sides	1	2	3	4	5
25. I think that it hasn't been too bad compared to other things	1	2	3	4	5

26. I often think that what I have experienced is the worst that can happen to a person	1	2	3	4	5
27. I think about the mistakes others have made in this matter	1	2	3	4	5
28. I think that basically the cause must lie within myself	1	2	3	4	5
29. I think that I must learn to live with it	1	2	3	4	5
30. I dwell upon the feelings the situation has evoked in me	1	2	3	4	5
31. I think about pleasant experiences	1	2	3	4	5
32. I think about a plan of what I can do best	1	2	3	4	5
33. I look for the positive sides to the matter	1	2	3	4	5
34. I tell myself that there are worse things in life	1	2	3	4	5
35. I continually think how horrible the situation has been	1	2	3	4	5
36. I feel that basically the cause lies with others	1	2	3	4	5

Part 7 How do you deal with what happens in your life?

Everyone gets confronted with negative or unpleasant events now and then and everyone responds to them in his or her own way. By the following questions you are asked to indicate what you generally do, when you experience negative or unpleasant events. Read the sentences below and indicate how often they apply to you. You can do so by circling the answer which best describes you.

(Almost) Sometimes Regularly Often (Almost)
never Always

1. I engage in other, unrelated activities	1	2	3	4	5
2. I avoid other people	1	2	3	4	5
3. I try to do something about it	1	2	3	4	5
4. I look for someone to comfort me	1	2	3	4	5
5. I move on and pretend that nothing happened	1	2	3	4	5
6. I set my worries aside by doing something else	1	2	3	4	5
7. I withdraw	1	2	3	4	5
8. I get to work on it	1	2	3	4	5
9. I ask someone for advice	1	2	3	4	5
10. I repress it and pretend it never happened	1	2	3	4	5
11. I do other things to distract myself	1	2	3	4	5
12. I isolate myself	1	2	3	4	5
13. I take action to deal with it	1	2	3	4	5
14. I share my feelings with someone	1	2	3	4	5
15. I behave as if nothing is going on	1	2	3	4	5
16. I engage in an activity which makes me feel good	1	2	3	4	5
17. I close myself off to others	1	2	3	4	5
18. I do whatever is required to deal with it	1	2	3	4	5
19. I look for someone who can support me	1	2	3	4	5
20. I block it out	1	2	3	4	5

Part 8 *The following statements deal with reactions you may have to various situations. Indicate how true each of these statements is depending on how you feel about the situation. Do this by checking the most appropriate box.*

	Not at all true	Barely true	Somewhat true	Completely true
1. I am a "take charge" person.	1	2	3	4
2. I try to let things work out on their own.	1	2	3	4
3. After attaining a goal, I look for another, more challenging one.	1	2	3	4
4. I like challenges and beating the odds.	1	2	3	4
5. I visualise my dreams and try to achieve them.	1	2	3	4
6. Despite numerous setbacks, I usually succeed in getting what I want.	1	2	3	4
7. I try to pinpoint what I need to succeed.	1	2	3	4
8. I always try to find a way to work around obstacles; nothing really stops me.	1	2	3	4
9. I often see myself failing so I don't get my hopes up too high.	1	2	3	4
10. When I apply for a position, I imagine myself filling it.	1	2	3	4
11. I turn obstacles into positive experiences.	1	2	3	4

12. If someone tells me I can't do something, you can be sure I will do it.	1	2	3	4
13. When I experience a problem, I take the initiative in resolving it.	1	2	3	4
14. When I have a problem, I usually see myself in a no-win situation.	1	2	3	4
15. I plan for future eventualities.	1	2	3	4
16. Rather than spending every cent I make, I like to save for a rainy day.	1	2	3	4
17. I prepare for adverse events.	1	2	3	4
18. Before disaster strikes I am well-prepared for its consequences.	1	2	3	4
19. I plan my strategies to change a situation before I act.	1	2	3	4
20. I develop my job skills to protect myself against unemployment.	1	2	3	4
21. I make sure my family is well taken care of to protect them from adversity in the future.	1	2	3	4
22. I think ahead to avoid dangerous situations.	1	2	3	4
23. I plan strategies for what I hope will be the best possible outcome.	1	2	3	4

24. I try to manage my money well in order to avoid being destitute in old age.	1	2	3	4
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Part 9 Listed below are some statements regarding your coach. Please read each statement and decide how much you agree or disagree with each statement. If you have more than one coach, think about the coach that you spend most of your time with.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. The coach expects performances to be perfect at all times.	1	2	3	4	5
2. The coach is friendlier when performances are perfect.	1	2	3	4	5
3. The coach is nervous that things will not go perfectly during performance.	1	2	3	4	5
4. The coach criticises all mistakes no matter how small.	1	2	3	4	5
5. The coach withholds rewards if performances are not perfect.	1	2	3	4	5
6. The coach is less approving when performances are not perfect.	1	2	3	4	5
7. The coach expects nothing less than perfect performance.	1	2	3	4	5
8. The coach criticises performances that are not perfect.	1	2	3	4	5
9. The coach is tense when mistakes are more likely to happen during performances.	1	2	3	4	5
10. The coach uses threats to try to stop mistakes in performances.	1	2	3	4	5
11. The coach is anxious about the possibility of	1	2	3	4	5

even small mistakes when performing.					
12. The coach is less friendly when performances are not perfect.	1	2	3	4	5
13. The coach expects performances to include no errors.	1	2	3	4	5
14. The coach uses punishment to try to make performances perfect.	1	2	3	4	5
15. The coach criticises performances all the time.	1	2	3	4	5
16. The coach is kinder when no mistakes are made when performing.	1	2	3	4	5
17. The coach criticises even the best performances.	1	2	3	4	5
18. The coach is concerned about mistakes during performance.	1	2	3	4	5
19. The coach expects performances to be perfect.	1	2	3	4	5
20. The coach uses his/her position unfairly to try to make performances perfect.	1	2	3	4	5

Part 10 Please indicate your response by circling the number that best describes you.

	Strongly disagree				Strongly agree
1. I am often confused about what I feel exactly.	1	2	3	4	5
2. It is difficult to describe my feelings easily.	1	2	3	4	5
3. I have sensations in my body that even doctors do not understand.	1	2	3	4	5
4. I am able to describe my feelings easily.	1	2	3	4	5
5. I would rather solve problems than just describe them.	1	2	3	4	5
6. When I am upset, I do not know if I am sad, scared, or angry.	1	2	3	4	5
7. I am often confused by sensations in my body.	1	2	3	4	5

8. I would rather let things happen than to understand the reasons why they happened this way.	1	2	3	4	5
9. I have feelings that I am unable to define completely.	1	2	3	4	5
10. It is essential for people to know about their feelings.	1	2	3	4	5
11. I find it hard to describe how I feel about people.	1	2	3	4	5
12. People demand to talk about my feelings more.	1	2	3	4	5
13. I do not know what is going on inside me.	1	2	3	4	5
14. I do not know most of the time why I am angry.	1	2	3	4	5
15. I would rather talk to people about their daily routines than their feelings.	1	2	3	4	5
16. I would rather watch light entertainment than dramatic shows.	1	2	3	4	5
17. I find it hard to describe my innermost feelings, even to my close friends.	1	2	3	4	5
18. I can feel close to someone, even in moments of silence.	1	2	3	4	5
19. I find it useful to explore my feelings in solving personal problems.	1	2	3	4	5
20. Seeking for hidden meanings in movies or plays kills their enjoyment.	1	2	3	4	5

Part 11 *Please rate to what extent you agree with the following statements*

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
1. I am looking forward to the life ahead of me.	1	2	3	4	5	6
2. Overall, I expect more good things to happen to me than bad	1	2	3	4	5	6
3. The future holds a lot of good in store for me	1	2	3	4	5	6
4. If I should find myself in a jam, I could think of many ways to get out of it	1	2	3	4	5	6
5. I can think of many ways to reach my current goals	1	2	3	4	5	6

6. Right now, I see myself as being pretty successful	1	2	3	4	5	6
7. I am confident that I could deal efficiently with unexpected events	1	2	3	4	5	6
8. I can solve most problems if I invest the necessary effort	1	2	3	4	5	6
9. I can remain calm when facing difficulties because I can rely on my coping abilities	1	2	3	4	5	6
10. I consider myself a person who can withstand a lot	1	2	3	4	5	6
11. Failure does not discourage me	1	2	3	4	5	6
12. I tend to bounce back quickly after serious life difficulties	1	2	3	4	5	6

Part 12 *Please rate to what extent you agree with the following statements*

	Never	Rarely	Sometimes	Mostly	Always
1. During training, I feel the need to be perfect.	1	2	3	4	5
2. During training, I strive to be as perfect as possible.	1	2	3	4	5
3. During training, I want to do everything perfectly.	1	2	3	4	5
4. During training, it is important to me to be perfect in everything I attempt.	1	2	3	4	5
5. During training, I demand nothing less than perfection of myself.	1	2	3	4	5
6. During training, I have extremely high expectations of myself.	1	2	3	4	5

7. During training, I am a perfectionist as far as my targets are concerned.	1	2	3	4	5
8. During training, I have the wish to do everything perfectly.	1	2	3	4	5
9. During competitions, I feel the need to be perfect.	1	2	3	4	5
10. During competitions, I strive to be as perfect as possible.	1	2	3	4	5
11. During competitions, I want to do everything perfectly.	1	2	3	4	5
12. During competitions, it is important to me to be perfect in everything I attempt.	1	2	3	4	5
13. During competitions, I demand nothing less than perfection of myself.	1	2	3	4	5
14. During competitions, I have extremely high expectations of myself.	1	2	3	4	5
15. During competitions, I am a perfectionist as far as my targets are concerned.	1	2	3	4	5
16. During competitions, I have the wish to do everything perfectly.	1	2	3	4	5
17. During training, I feel extremely stressed if everything doesn't go perfectly.	1	2	3	4	5
18. After training, I feel depressed if I have not been perfect.	1	2	3	4	5
19. During training, I get completely furious if I make mistakes.	1	2	3	4	5
20. During training, I set myself such high standards that I cannot fulfill them.	1	2	3	4	5
21. During training, I put myself under pressure with	1	2	3	4	5

my extremely high expectations.					
22. After training, I am disappointed if I my performance was not perfect.	1	2	3	4	5
23. If something doesn't go perfectly during training, I am dissatisfied with the whole training session.	1	2	3	4	5
24. During training, I get frustrated if I do not fulfill my high expectations.	1	2	3	4	5
25. During competitions, I feel extremely stressed if everything doesn't go perfectly.	1	2	3	4	5
26. After competitions, I feel depressed if I have not been perfect.	1	2	3	4	5
27. During competitions, I get completely furious if I make mistakes.	1	2	3	4	5
28. During competitions, I set myself such high standards that I cannot fulfill them.	1	2	3	4	5
29. During competitions, I put myself under pressure with my extremely high expectations.	1	2	3	4	5
30. After competitions, I am disappointed if I my performance was not perfect.	1	2	3	4	5
31. If something doesn't go perfectly during competitions, I am dissatisfied with the whole competition.	1	2	3	4	5
32. During competitions, I get frustrated if I do not fulfill my high expectations.	1	2	3	4	5
33. My coach expects my performance to be perfect.	1	2	3	4	5

34. My coach criticizes everything I do not do perfectly.	1	2	3	4	5
35. My coach is dissatisfied with me if my performance is not top class.	1	2	3	4	5
36. My coach expects me to be perfect.	1	2	3	4	5
37. My coach demands nothing less than perfection of me.	1	2	3	4	5
38. My coach makes extremely high demands of me.	1	2	3	4	5
39. My coach sets extremely high standards for me.	1	2	3	4	5
40. My coach is disappointed in me if my performance is not perfect.	1	2	3	4	5
41. My teammates expect my performance to be perfect.	1	2	3	4	5
42. My teammates criticize everything I do not do perfectly.	1	2	3	4	5
43. My teammates are dissatisfied with me if my performance is not top class.	1	2	3	4	5
44. My teammates expect me to be perfect.	1	2	3	4	5
45. My teammates demand nothing less than perfection of me.	1	2	3	4	5
46. My teammates make extremely high demands of me.	1	2	3	4	5
47. My teammates set extremely high standards for me.	1	2	3	4	5
48. My teammates are disappointed in me if my performance is not perfect.	1	2	3	4	5
49. My parents expect my performance to be perfect.	1	2	3	4	5

50. My parents criticize everything I do not do perfectly.	1	2	3	4	5
51. My parents are dissatisfied with me if my performance is not top class.	1	2	3	4	5
52. My parents expect me to be perfect.	1	2	3	4	5
53. My parents demand nothing less than perfection of me.	1	2	3	4	5
54. My parents make extremely high demands of me.	1	2	3	4	5
55. My parents set extremely high standards for me.	1	2	3	4	5
56. My parents are disappointed in me if my performance is not perfect	1	2	3	4	5
57. I demand nothing less than perfection of my teammates.	1	2	3	4	5
58. I have extremely high expectations of my teammates.	1	2	3	4	5
59. For me, the performance of my teammates has to be perfect.	1	2	3	4	5
60. I expect perfect performance of my teammates.	1	2	3	4	5
61. I want my teammates to do everything as perfectly as possible.	1	2	3	4	5
62. It is important to me that my teammates do everything perfectly.	1	2	3	4	5
63. Everything my teammates do has to be of outstanding quality.	1	2	3	4	5
64. I set extremely high standards for my teammates.	1	2	3	4	5
65. I am dissatisfied with my teammates, even when I know that they are doing their best.	1	2	3	4	5

66. If my teammates make mistakes, I consider them failures.	1	2	3	4	5
67. I get annoyed with my teammates if their performance is not first class.	1	2	3	4	5
68. I get frustrated if my teammates do not fulfill my extremely high expectations.	1	2	3	4	5
69. I get disappointed if my teammates' performance is not perfect.	1	2	3	4	5
70. I get furious if my teammates' performance is not top class.	1	2	3	4	5
71. I cannot stand it when my teammates make mistakes.	1	2	3	4	5
72. I feel extremely stressed if everything doesn't go perfectly for my teammates	1	2	3	4	5

Thank you for your participation in our study.

If you feel any distress from participating, there are a number of support resources available. For immediate support, contact the Samaritans on 116 123 or call NHS mental health services on 111. For non-emergencies, visit <https://www.elefriends.org.uk/> for resources and a supportive online community. There are also a number of NHS recommended apps for managing wellbeing, such as Catch It or Cove. For UoB student specific support, you can contact the Student Hub <https://intranet.birmingham.ac.uk/student/student-hub/hub-services.aspx#s> or your Wellbeing officer <https://intranet.birmingham.ac.uk/student/your-wellbeing/wellbeingofficers.aspx>.

Appendix 8: DASS-21 score guide (Chapters 3, 4, 5 and 6)

NB Scores on the DASS-21 will need to be multiplied by 2 to calculate the final score (Lovibond & Lovibond, 1995).

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Appendix 9: Supplementary Table 4.1 (Chapter 4)

Supplementary Table 4.1.

Comparison in demographics between Chapters 3 and 4

	Chapter 3 <i>n</i> (%)	Chapter 4 <i>n</i> (%)	Chi-squared test results
Gender			$\chi^2 = 1.72$, df = 1, $p = .190$
Female	239 (72%)	166 (66.9%)	
Male	93 (28%)	82 (33.1%)	
Sport type			$\chi^2 = 15.61$, df = 1, $p < .001$
Team	162 (49.1%)	162 (65.6%)	
Individual	168 (50.9%)	85 (34.4%)	
Competitive level			$\chi^2 = 7.00$, df = 3, $p = .072$
Recreational	102 (31.3%)	65 (26.5%)	
Club	110 (33.5%)	69 (28.2%)	
Regional	99 (30.2%)	100 (40.8%)	
Elite	17 (5.2%)	11 (4.5%)	
Self-reported mental illness			$\chi^2 = 7.45$, df = 1, $p = .006$
Yes	77 (23.3%)	35 (14.2%)	
No	254 (76.7%)	212 (85.8%)	

Appendix 10: Participant information sheet (Chapters 4 and 5)

Participant Information Sheet

Dear participant,

Thank you for considering taking part in our study entitled 'Risk and Protective factors of Athletes' Mental Health', which has been approved by the School of Sport, Exercise, & Rehabilitation Sciences Ethics Committee.

What is the purpose of the study?

Sport participation has the potential to protect its participants from experiencing mental illness and promote mental health and wellbeing. However, many athletes experience difficulties with their mental health. Therefore, we are interested in understanding the risk and protective factors for mental health and mental illness within the context of sport, and whether these change over time. The findings may have important implications for how wellbeing is promoted through sport.

Why have I been chosen?

You have been chosen because you are a university sport participant who is studying full-time towards a degree and meet the following inclusion criteria:

- Aged 18-25
- Participating in sport
- Be in pre/early competitive season
- Full-time student
- Minimum 1 year of training/competing in current sport

Exclusion criteria:

- Injury that prevents athlete from training and/or competing

Do I have to take part?

Participation in this study is entirely voluntary, if you decide to take part you will be provided with a consent form and will have the opportunity to ask any questions.

What will happen if I decide to take part?

Upon providing your consent, you will be invited to complete a questionnaire pack that will take approximately 30 minutes to 1 hour to complete and then to complete the follow-up questionnaire pack in approximately 5 months. You will also have the option to express interest in being invited to participate in a follow up interview. We will ask your specific consent to be contacted for this interview. Participation in all parts of the study are voluntary, and you can withdraw at any point up to two weeks after completing each questionnaire pack and/or interview. You will be entered into a prize draw once per completion of each questionnaire time point (e.g., if you complete questionnaires at both time points, you will be entered into the ballot twice, or just once if only completing Time 1. Winning prize amounts will be 1 x £100, 2 x £50, 5 x £20, 20 x £5 amazon vouchers. You may alternatively obtain 0.5 research hour per questionnaire time point if you are a student at University of

Birmingham and if these are available within your school (academic year 2022-23). If you chose to take part in the 1:1 interviews and are selected to participate, you will receive an additional £20 voucher or 1 research hour, if you are a student at University of Birmingham and if these are available within your school.

Can I withdraw?

If you decide to participate in this study, you are also free to withdraw at any point up to two weeks after your latest participation in the study. Withdrawal will not have any impact on you. If you wish to withdraw then please contact a member of the research team via the contact details below. Your data will be destroyed and not included in the study.

If you withdraw prior to participating, no compensation will be received. If you withdraw after participating on some or all phases of the research, you will still be entered into the prize draw for the time point in which you participated (for the questionnaires) or retain the voucher for completing the interview. You will also retain acquired research hours (2022-23).

What are the potential benefits and risks of taking part?

Though there are no direct benefits for you if you take part, your participation will help us to find out about risk and protective factors of mental health and mental illness in sport and this may improve how wellbeing is promoted in the future to student-athletes. The data we collect will not be anonymous however, it will be completely confidential and only accessed by the researchers involved in the study. It is not anonymous so that we can destroy your data if you chose to withdraw.

There are no risks to you in taking part outside of those you would experience in everyday life. However, by taking part, you may remember things that you may find upsetting. Some questions may be of a sensitive nature so please be aware that you do not have to answer any questions you may find upsetting or would prefer not to answer.

If you feel any distress from participating in the study, there are a number of support resources available. For immediate support, contact the Samaritans on 116 123 or call NHS mental health services on 111. For non-emergencies, visit <https://www.elefriends.org.uk/> for resources and a supportive online community. There are also a number of NHS recommended apps for managing wellbeing, such as Catch It or Cove. For UoB student specific support, you can contact the Student Hub <https://intranet.birmingham.ac.uk/student/student-hub/hub-services.aspx> or your Wellbeing officer <https://intranet.birmingham.ac.uk/student/your-wellbeing/wellbeing-officers.aspx>.

Will my participation be confidential?

Yes. All information will be kept confidential between the researchers involved in the study.

What will happen at the end of the research study?

A summary of the results and findings will be made available following completion of the study. If you would like a copy of this then please do not hesitate to contact us via the details below.

Thank you for considering to take part in our study. Contact for further information:

Appendix 11: Consent form (Chapter 4)

PARTICIPANT CONSENT FORM

Study Title	Student-athlete well-being survey		
Participant Name:		Date:	
Researcher Name:		Ethics Code:	SPP2324_01

Participant ID: first initial of mothers first name, number of older siblings, day of birth, month of birth (e.g., July = 07), year of birth (e.g., 2001 = 01), and first letter of own middle name (first name if you do not have a middle name).

Example answers: Verity, 2 older brothers, 25th July 2001, Jane = V2250701J

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This section to be completed by the participant:

Please tick the box at the end of each statement if you agree with it.

<p>1. I confirm that I have read and understood the Participant Information Sheet for the above study. I have had the opportunity to ask questions to the named researcher and these have all been answered satisfactorily.</p>	<input type="checkbox"/>
<p>2. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty, without giving any reason. I understand that I can ask to withdraw my data for up to two weeks after my latest participation in the research process.</p>	<input type="checkbox"/> <input type="checkbox"/>
<p>3. I agree to the storage and use of my data for the purposes of this research.</p>	<input type="checkbox"/> <input type="checkbox"/>
<p>4. Based on the above, I agree to take part in this research study.</p>	<input type="checkbox"/>
<p>5. I consent to being contacted about participating in the follow up questionnaire.</p>	<input type="checkbox"/> <input type="checkbox"/>
<p>6. I consent to being contacted about follow up interviews.</p>	<input type="checkbox"/>
<p>7. If you would like to receive results from the study please tick here.</p>	<input type="checkbox"/>
<p>8. I consent for my email to be entered into the prize draw and for the researchers to contact me if I am successful.</p>	
<p>9. If you answered yes to question 5, 6, 7, or 8 please provide your email address.....</p>	
<p>Signed:</p>	
<p>Date:</p>	

This section to be completed by the researcher

I certify that this participant has read, properly completed and signed the screening and consent forms, witnessed by myself:

Signed:

Date:

This information is being collected as part of a research project conducted in the School of Sport, Exercise and Rehabilitation Sciences at the University of Birmingham. By supplying this information you are consenting to the University storing your information for the purposes of the stated research study. The information will be processed by the University of Birmingham in accordance with the provisions of the Data Protection Act 2018. No identifiable personal data will be published.

Questionnaire Pack Time 1

Example answers: Verity, 2 older brothers, 25th July 2001, Jane = V2250701J

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Age:

Education (tick all that apply):

- Full time ☐
- Part time ☐
- Undergraduate ☐
- Postgraduate (masters) ☐
- Postgraduate (PhD) ☐

Year of study:

- 1 ☐
- 2 ☐
- 3 ☐
- 4 ☐
- 5 ☐

Gender:

- Male ☐
- Female ☐
- Transgender male ☐
- Transgender female ☐
- Gender variant/non-conforming ☐
- Prefer not to say ☐
- Not listed:

Ethnicity

- White ☐
- Asian/Asian British ☐
- Black/African/Caribbean/Black British ☐
- Arab ☐
- Mixed/multiple ethnic groups ☐
- Other.....

Did you receive or complete any of the following programmes or offers when coming to university?

A. Reduced grade offer ☐

B. Complete a pre-entry programme or foundation course ☐

If answer yes to B. and a University of Birmingham student, please specify which programme:

Access to Birmingham (A2B) ☐

Inspired@Birmingham ☐

Routes to the Professions (R2P) ☐

Academic Enrichment Programme ☐

National Access Summer School (NASS) ☐

Other

Main sport:

Type:

Team, please state which team this is i.e. 1st, 2nd etc: ☐

Individual ☐

Competitive level:

Recreational (non-competitive) ☐

Club (competition at local level, playing and training at least once a week) ☐

Regional (represent county against other counties, i.e. BUCS) ☐

Elite (represent country) ☐

Years of experience (main sport):

Phase of competitive season:

Pre-season ☐

Competitive season ☐

Off-season ☐

Unsure ☐

Injury status:

Minor injury (i.e. able to train/compete) ☐

Injured (i.e. unable to train/compete) ☐

Not injured ☐

If injured, please state injury.....

Do you have a previous or current mental illness? (Please circle) Yes/no and previous/current

If yes, has this condition been formally diagnosed? (Please circle) Yes/no

If yes, please state the condition:

You will now begin the questionnaire pack; some questions may be of a sensitive nature so please be aware that you do not have to answer any questions you may find upsetting or would prefer not to answer

Part 1 During the past month, how often did your sport participation make you feel...

	Never	Once or twice	About once a week	About 2 or 3 times a week	Almost every day	Every day
1. Happy	0	1	2	3	4	5
2. Interested in your sport	0	1	2	3	4	5
3. Satisfied	0	1	2	3	4	5
4. That you had something to contribute to your team or sport community	0	1	2	3	4	5
5. That you belonged to your team or sport community	0	1	2	3	4	5
6. That your team or sport community is a good place for all participants	0	1	2	3	4	5
7. That people in your sport are basically good	0	1	2	3	4	5
8. That the way your sport is organized makes sense to you	0	1	2	3	4	5
9. That you liked most parts of your athletic personality	0	1	2	3	4	5
10. Good at managing the daily responsibilities of your sport	0	1	2	3	4	5
11. That you had warm and trusting relationships with others in your sport	0	1	2	3	4	5
12. That you had sport experiences that challenged you to grow and become a better person	0	1	2	3	4	5
13. Confident to think or express your own ideas and opinions to people in your sport	0	1	2	3	4	5

14. That you have a sense of direction or meaning within your sport	0	1	2	3	4	5
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Part 2 In the last week...

	Did not apply to me at all	Applied to me to some degree or some of the time	Applied to me a considerable degree or a good part of the time	Applied to me very much or most of the time
1. I found it hard to wind down	0	1	2	3
2. I was aware of dryness of my mouth	0	1	2	3
3. I couldn't seem to experience any positive feeling at all	0	1	2	3
	Did not apply to me at all	Applied to me to some degree or some of the time	Applied to me a considerable degree or a good part of the time	Applied to me very much or most of the time
4. I experienced breathing difficulty (eg. excessively rapid breathing, breathlessness in the absence of physical exertion).	0	1	2	3
5. I found it difficult to work up the initiative to do things.	0	1	2	3
6. I tended to over-react to situations.	0	1	2	3
7. I experienced trembling (eg. in the hands)	0	1	2	3
8. I felt that I was using a lot of nervous energy	0	1	2	3
9. I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10. I felt that I had nothing to look forward to	0	1	2	3
11. I found myself getting agitated	0	1	2	3
12. I found it difficult to relax	0	1	2	3
13. I felt down-hearted and blue	0	1	2	3
14. I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15. I felt I was close to panic	0	1	2	3
16. I was unable to become enthusiastic about anything	0	1	2	3

17. I felt I wasn't worth much as a person	0	1	2	3
18. I felt that I was rather touchy	0	1	2	3
19. I was aware of the action of my heart in the absence of physical exertion (eg. sense of heart rate increase, heart missing a beat)	0	1	2	3
20. I felt scared without any good reason	0	1	2	3
21. I felt that life was meaningless	0	1	2	3

Part 3 How do you cope with events?

Everyone gets confronted with negative or unpleasant events now and then and everyone responds to them in his or her own way. By the following questions you are asked to indicate what you generally think, when you experience negative or unpleasant events.

	(almost) never	some- times	regularly	often	(almost) always
1. I feel that I am the one to blame for it	1	2	3	4	5
2. I think that I have to accept that this has happened	1	2	3	4	5
3. I often think about how I feel about what I have experienced	1	2	3	4	5
4. I think of nicer things than what I have experienced	1	2	3	4	5
5. I think of what I can do best	1	2	3	4	5
	(almost) never	some- times	regularly	often	(almost) always
6. I think that it all could have been much worse	1	2	3	4	5
7. I often think that what I have experienced is much worse than what others have experienced	1	2	3	4	5
8. I feel that others are to blame for it	1	2	3	4	5
9. I feel that I am the one who is responsible for what has happened	1	2	3	4	5
10. I think that I have to accept the situation	1	2	3	4	5

11. I am preoccupied with what I think and feel about what I have experienced	1	2	3	4	5
12. I think of pleasant things that have nothing to do with it	1	2	3	4	5
13. I think about how I can best cope with the situation	1	2	3	4	5
14. I think that other people go through much worse experiences	1	2	3	4	5
15. I keep thinking about how terrible it is what I have experienced	1	2	3	4	5
16. I feel that others are responsible for what has happened	1	2	3	4	5
17. I think about the mistakes I have made in this matter	1	2	3	4	5
18. I think that I cannot change anything about it	1	2	3	4	5
19. I want to understand why I feel the way I do about what I have experienced	1	2	3	4	5
20. I think of something nice instead of what has happened	1	2	3	4	5
21. I think about how to change the situation	1	2	3	4	5
22. I think that it hasn't been too bad compared to other things	1	2	3	4	5
23. I often think that what I have experienced is the worst that can happen to a person	1	2	3	4	5
24. I think about the mistakes others have made in this matter	1	2	3	4	5
25. I think that basically the cause must lie within myself	1	2	3	4	5
26. I think that I must learn to live with it	1	2	3	4	5
27. I dwell upon the feelings the situation has evoked in me	1	2	3	4	5

28. I think about pleasant experiences	1	2	3	4	5
29. I think about a plan of what I can do best	1	2	3	4	5
30. I tell myself that there are worse things in life	1	2	3	4	5
31. I continually think how horrible the situation has been	1	2	3	4	5
32. I feel that basically the cause lies with others	1	2	3	4	5

Part 4 Indicate how often each of the statements below is descriptive of you.

	Never	Rarely	Sometimes	Often
1. How often do you feel that you are "in tune" with the people around you?	1	2	3	4
2. How often do you feel that you lack companionship?	1	2	3	4
3. How often do you feel that there is no one you can turn to?	1	2	3	4
4. How often do you feel alone?	1	2	3	4
5. How often do you feel part of a group of friends?	1	2	3	4
6. How often do you feel that you have a lot in common with the people around you?	1	2	3	4
7. How often do you feel that you are no longer close to anyone?	1	2	3	4
8. How often do you feel that your interests and ideas are not shared by those around you?	1	2	3	4
9. How often do you feel outgoing and friendly?	1	2	3	4
10. How often do you feel close to people?	1	2	3	4
11. How often do you feel left out?	1	2	3	4
12. How often do you feel that your relationships with others are not meaningful?	1	2	3	4
13. How often do you feel that no one really knows you well?	1	2	3	4
14. How often do you feel isolated from others?	1	2	3	4
15. How often do you feel you can find companionship when you want it?	1	2	3	4
16. How often do you feel that there are people who really understand you?	1	2	3	4
17. How often do you feel shy?	1	2	3	4
18. How often do you feel that people are around you but not with you?	1	2	3	4
19. How often do you feel that there are people you can talk to?	1	2	3	4

20. How often do you feel that there are people you can turn to?	1	2	3	4
Item	Often/always	Some of the time	Occasionally	Hardly ever Never
How often do you feel lonely?	1	2	3	4

Part 5 If needed, to what extent would someone...

	Not at all				Extremely so
Provide you with comfort and security	0	1	2	3	4
Always be there for you	0	1	2	3	4
Care for you	0	1	2	3	4
Show concern for you	0	1	2	3	4
Reinforce the positives	0	1	2	3	4
Enhance your self-esteem	0	1	2	3	4
Instil you with the confidence to deal with pressure	0	1	2	3	4
Boost your sense of competence	0	1	2	3	4
Give you constructive criticism	0	1	2	3	4
Give you tactical advice	0	1	2	3	4
Give you advice about performing in competitive situations	0	1	2	3	4
Give you advice when you're performing poorly	0	1	2	3	4
Help with travel to training and matches	0	1	2	3	4
Help with tasks to leave you free to concentrate	0	1	2	3	4
Do things for you at competitions/matches	0	1	2	3	4
Help you organise and plan your competition/matches	0	1	2	3	4

Part 6 In relation to competing and training generally in sport...

	Strongly Disagree			Neutral			Strongly Agree
When I want to feel more <i>positive</i> emotion (such as joy or amusement), I <i>change what I'm thinking about</i> .	1	2	3	4	5	6	7
I keep my emotions to myself.	1	2	3	4	5	6	7
When I want to feel less <i>negative</i> emotion (such as sadness or anger), I <i>change what I'm thinking about</i> .	1	2	3	4	5	6	7
When I feel <i>positive</i> emotions, I am careful not to express them.	1	2	3	4	5	6	7
When I'm faced with a stressful situation, I make myself <i>think</i>	1	2	3	4	5	6	7

<i>about it</i> in a way that helps me stay calm.							
I control my emotions by <i>not expressing them</i> .	1	2	3	4	5	6	7
When I want to feel more <i>positive</i> emotion, I <i>change the way I'm thinking</i> about the situation.	1	2	3	4	5	6	7
I control my emotions by <i>changing the way I think</i> about the situation I'm in.	1	2	3	4	5	6	7
When I am feeling <i>negative</i> emotions, I make sure not to express them.	1	2	3	4	5	6	7
When I want to feel less <i>negative</i> emotion, I <i>change the way I'm thinking</i> , about the situation.	1	2	3	4	5	6	7

Thank you for your participation in our study.

If you feel any distress from participating, there are a number of support resources available. For immediate support, contact the Samaritans on 116 123 or call NHS mental health services on 111. For non-emergencies, visit <https://www.elefriends.org.uk/> for resources and a supportive online community. There are also a number of NHS recommended apps for managing wellbeing, such as Catch It or Cove. For UoB student specific support, you can contact the Student Hub <https://intranet.birmingham.ac.uk/student/student-hub/hub-services.aspx#s> or your Wellbeing officer <https://intranet.birmingham.ac.uk/student/your-wellbeing/wellbeingofficers.aspx>.

PARTICIPANT CONSENT FORM

Study Title

Participant Name:

Date:

Participant ID: first initial of mothers first name, number of older siblings, day of birth, month of birth (e.g., July = 07), year of birth (e.g., 2001 = 01), and first letter of own middle name (first name if you do not have a middle name).

Example answers: Verity, 2 older brothers, 25th July 2001, Jane = V2250701J

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This section to be completed by the participant:

Please tick the box at the end of each statement if you agree with it.

1. I confirm that I have read and understood the Participant Information Sheet for the above study. I have had the opportunity to ask questions to the named researcher and these have all been answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty, without giving any reason. I understand that I can ask to withdraw my data for up to two weeks after my latest participation in the research process.
3. I agree to the storage and use of my data for the purposes of this research.
4. Based on the above, I agree to take part in this research study.

☐☐☐☐

Signed:

Date:

This section to be completed by the researcher

I certify that this participant has read, properly completed and signed the screening and consent forms, witnessed by myself:

Signed:

Date:

This information is being collected as part of a research project conducted in the School of Sport, Exercise and Rehabilitation Sciences at the University of Birmingham. By supplying this information you are consenting to the University storing your information for the purposes of the stated research study. The information will be processed by the University of Birmingham in accordance with the provisions of the Data Protection Act 2018. No identifiable personal data will be published.

Questionnaire Pack Time 2

Example answers: Verity, 2 older brothers, 25th July 2001, Jane = V2250701J

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Phase of competitive season:

Pre-season ☐

Competitive season ☐

Off-season ☐

Unsure ☐

Injury status:

Minor injury (i.e. able to train/compete) ☐

Injured (i.e. unable to train/compete) ☐

Not injured ☐

If injured, please state injury.....

Do you have a previous or current mental illness? (Please circle) Yes/no and previous/current

If yes, has this condition been formally diagnosed? (Please circle) Yes/no

If yes, please state the condition:

You will now begin the questionnaire pack; some questions may be of a sensitive nature so please be aware that you do not have to answer any questions you may find upsetting or would prefer not to answer

Part 1 During the past month, how often did your sport participation make you feel...

	Never	Once or twice	About once a week	About 2 or 3 times a week	Almost every day	Every day
1. Happy	0	1	2	3	4	5
2. Interested in your sport	0	1	2	3	4	5
3. Satisfied	0	1	2	3	4	5
4. That you had something to contribute to your team or sport community	0	1	2	3	4	5
5. That you belonged to your team or sport community	0	1	2	3	4	5
6. That your team or sport community is a good place for all participants	0	1	2	3	4	5
7. That people in your sport are basically good	0	1	2	3	4	5
8. That the way your sport is organized makes sense to you	0	1	2	3	4	5
9. That you liked most parts of your athletic personality	0	1	2	3	4	5
10. Good at managing the daily responsibilities of your sport	0	1	2	3	4	5
11. That you had warm and trusting relationships with others in your sport	0	1	2	3	4	5
12. That you had sport experiences that challenged you to grow and become a better person	0	1	2	3	4	5
13. Confident to think or express your own ideas and opinions to people in your sport	0	1	2	3	4	5
14. That you have a sense of direction or meaning within your sport	0	1	2	3	4	5

Part 2 In the last week...

	Did not apply to me at all	Applied to me to some degree or	Applied to me a considerable degree or a	Applied to me very much or
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		some of the time	good part of the time	most of the time
1. I found it hard to wind down	0	1	2	3
2. I was aware of dryness of my mouth	0	1	2	3
3. I couldn't seem to experience any positive feeling at all	0	1	2	3
	Did not apply to me at all	Applied to me to some degree or some of the time	Applied to me a considerable degree or a good part of the time	Applied to me very much or most of the time
4. I experienced breathing difficulty (eg. excessively rapid breathing, breathlessness in the absence of physical exertion).	0	1	2	3
5. I found it difficult to work up the initiative to do things.	0	1	2	3
6. I tended to over-react to situations.	0	1	2	3
7. I experienced trembling (eg. in the hands)	0	1	2	3
8. I felt that I was using a lot of nervous energy	0	1	2	3
9. I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10. I felt that I had nothing to look forward to	0	1	2	3
11. I found myself getting agitated	0	1	2	3
12. I found it difficult to relax	0	1	2	3
13. I felt down-hearted and blue	0	1	2	3
14. I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15. I felt I was close to panic	0	1	2	3
16. I was unable to become enthusiastic about anything	0	1	2	3
17. I felt I wasn't worth much as a person	0	1	2	3
18. I felt that I was rather touchy	0	1	2	3
19. I was aware of the action of my heart in the absence of physical exertion (eg. sense of heart rate increase, heart missing a beat)	0	1	2	3

20. I felt scared without any good reason	0	1	2	3
21. I felt that life was meaningless	0	1	2	3

Part 3 Indicate how often each of the statements below is descriptive of you.

	Never	Rarely	Sometimes	Often	
1. How often do you feel that you are "in tune" with the people around you?	1	2	3	4	
2. How often do you feel that you lack companionship?	1	2	3	4	
3. How often do you feel that there is no one you can turn to?	1	2	3	4	
4. How often do you feel alone?	1	2	3	4	
5. How often do you feel part of a group of friends?	1	2	3	4	
6. How often do you feel that you have a lot in common with the people around you?	1	2	3	4	
7. How often do you feel that you are no longer close to anyone?	1	2	3	4	
8. How often do you feel that your interests and ideas are not shared by those around you?	1	2	3	4	
9. How often do you feel outgoing and friendly?	1	2	3	4	
10. How often do you feel close to people?	1	2	3	4	
11. How often do you feel left out?	1	2	3	4	
12. How often do you feel that your relationships with others are not meaningful?	1	2	3	4	
13. How often do you feel that no one really knows you well?	1	2	3	4	
14. How often do you feel isolated from others?	1	2	3	4	
15. How often do you feel you can find companionship when you want it?	1	2	3	4	
16. How often do you feel that there are people who really understand you?	1	2	3	4	
17. How often do you feel shy?	1	2	3	4	
18. How often do you feel that people are around you but not with you?	1	2	3	4	
19. How often do you feel that there are people you can talk to?	1	2	3	4	
20. How often do you feel that there are people you can turn to?	1	2	3	4	
Item	Often/always	Some of the time	Occasionally	Hardly ever	Never
How often do you feel lonely?	1	2	3	4	5

Part 4 If needed, to what extent would someone...

	Not at all	Extremely so
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Provide you with comfort and security	0	1	2	3	4
Always be there for you	0	1	2	3	4
Care for you	0	1	2	3	4
Show concern for you	0	1	2	3	4
Reinforce the positives	0	1	2	3	4
Enhance your self-esteem	0	1	2	3	4
Instil you with the confidence to deal with pressure	0	1	2	3	4
Boost your sense of competence	0	1	2	3	4
Give you constructive criticism	0	1	2	3	4
Give you tactical advice	0	1	2	3	4
Give you advice about performing in competitive situations	0	1	2	3	4
Give you advice when you're performing poorly	0	1	2	3	4
Help with travel to training and matches	0	1	2	3	4
Help with tasks to leave you free to concentrate	0	1	2	3	4
Do things for you at competitions/matches	0	1	2	3	4
Help you organise and plan your competition/matches	0	1	2	3	4

Part 5 In relation to competing and training generally in sport...

	Strongly Disagree			Neutral			Strongly Agree
When I want to feel more <i>positive</i> emotion (such as joy or amusement), I <i>change what I'm thinking about</i> .	1	2	3	4	5	6	7
I keep my emotions to myself.	1	2	3	4	5	6	7
When I want to feel less <i>negative</i> emotion (such as sadness or anger), I <i>change what I'm thinking about</i> .	1	2	3	4	5	6	7
When I feel <i>positive</i> emotions, I am careful not to express them.	1	2	3	4	5	6	7
When I'm faced with a stressful situation, I make myself <i>think about it</i> in a way that helps me stay calm.	1	2	3	4	5	6	7
I control my emotions by <i>not expressing them</i> .	1	2	3	4	5	6	7
When I want to feel more <i>positive</i> emotion, I <i>change the way I'm thinking about the situation</i> .	1	2	3	4	5	6	7
I control my emotions by <i>changing the way I think about the situation I'm in</i> .	1	2	3	4	5	6	7

When I am feeling <i>negative</i> emotions, I make sure not to express them.	1	2	3	4	5	6	7
When I want to feel less <i>negative</i> emotion, I <i>change the way I'm thinking</i> , about the situation.	1	2	3	4	5	6	7

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