The Road to Burnout: A Longitudinal Quantitative Study of Factors Predicting Athlete Burnout in Men and Women Playing Gaelic games.

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Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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List of Abbreviations

Abbreviation	Explanation
ABQ	Athlete Burnout Questionnaire (Raedeke & Smith, 2001)
AGT	Achievement Goal Theory (Ames, 1995)
CA	Camogie Association
CFA	Confirmatory Factor Analysis
COVID-19	Corona Virus Disease 2019
DtE	Desire to Excel
EABI	Eades Athletic Burnout Inventory (Eades, 1990)
EO climate	Ego-Orientated Climate (Ames, 1995)
GAA	Gaelic Athletic Association
GDPR	General Data Protection Regulation
GPA	Gaelic Players' Association
LGFA	Ladies Gaelic Football Association
LGM	Latent Growth Modelling
MAR	Missing at Random
MBI-GS	Maslach Burnout Inventory – General Survey (Schaufeli et al., 1996)
MCAR	Missing Completely at Random
MI	Modification Indices
MNAR	Missing Not at Random
MR	Multiple Regression
PEE	Physical and Emotional Exhaustion
PLS	Plain Language Statement
PMCSQ-2	Perceived Motivation Climate in Sport Questionnaire-2 (Newton et al., 2000)
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSS-10	Perceived Stress Scale-10 (Cohen et al., 2014)
RSA	Reduced Sense of Accomplishment
SCM	Sport Commitment Model (Scanlan et al. 1993)
SCQ-2	Sport Commitment Questionnaire-2 (Scanlan et al., 2016)
SD	Sport Devaluation
SDT	Self-Determination Theory (Ryan & Deci, 2000)
SEM	Structural Equation Modelling
SMS-II	Sport Motivation Scale-II (Pelletier et al., 2013)
SOP	Self-Orientated Perfectionism
SPP	Socially Prescribed Perfectionism
TB	Total Burnout
TO climate	Task-Orientated Climate (Ames, 1995)
WEIRD	Western, Education, Industrialised, Rich and Democratic (Henrich et al., 2010)
WGPA	Women's Gaelic Players' Association
WMA	Weighted Meta-Analysis (Cerin et al., 2017)

Abstract

Thesis Title: The Road to Burnout: A longitudinal quantitative study of factors predicting athlete burnout in men and women playing Gaelic games.

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Athlete burnout is associated with serious negative consequences, including sport dropout, depression and ill-health, and athletes are experiencing burnout at a higher rate than ever before. However, existing research has failed to reach a consensus on the key predictors of burnout; there is no singular theory of burnout, while longitudinal research and critical comparison between existing perspectives is lacking. As such, the overarching aim of this thesis was to identify key risk and protective factors for development of burnout in Gaelic games, team sports native to Ireland.

A systematic review of factors linked to burnout in team-sport athletes informed the development of a longitudinal, quantitative study, wherein burnout and potential predictors were assessed at six timepoints over 21 months. Cross-sectional structural equation models examining stress-, motivation- and commitment-based perspectives of burnout, and exploration of demographic characteristics, identified key factors associated with the dimensions of burnout.

Latent growth analyses indicated that feelings of exhaustion became less frequent over time, while feelings of sport devaluation increased and feelings of accomplishment remained relatively stable. Predictors identified through the cross-sectional analyses and systemic review were incorporated into these models to assess their utility in explaining inter-individual variability in initial burnout and rate of change over time, in the first such integrated approach. Findings indicated that factors associated with stress (e.g. training demands), motivation (e.g. amotivation) and commitment (e.g. constrained commitment), as well as demographic characteristics (e.g. playing level), predicted initial burnout and change over time, with different predictors identified across burnout dimensions. As such, results provide important and novel insight into the key risk and protective factors for the development of burnout in Gaelic games, which can inform targeted intervention methods. Furthermore, findings provide empirical support for an integrated approach to the study of burnout, and provide a framework that may inform future research

Chapter 1. Introduction

1.1 Introduction to current study

Athlete burnout is a psychological syndrome that is associated with a range of negative consequences, including sport drop-out and depression (De Francisco et al., 2016), and it is affecting athletes at a greater frequency than ever before (Madigan et al., 2022). Sport participation has been commonly identified as a positive contributor to health-related quality of life, and has been associated with psychosocial benefits such as increased self-esteem and reduced depressive symptoms (Eime et al., 2010, 2013). However, since the 1980's (Feigley, 1984), researchers have begun to recognise and explore the potential negative impact of sport participation on psychological health, in the form of athlete burnout. Over the last 40 years, researchers have worked to identify the factors predicting athlete burnout. However, a number of competing models of burnout continue to co-exist and a wide range of factors have been examined in relation to burnout, using predominantly cross-sectional data (Goodger et al., 2007; Lundkvist et al., 2015). As such, we continue to have a somewhat limited understanding of the factors that play a key role in the development of athlete burnout over time (Madigan et al., 2021).

Burnout has been noted as an issue of importance within Gaelic games (GAA; Hughes & Hassan, 2015; Duffy, 2016). Unique pressures experienced by this population, such as the professional-like levels of training despite the amateur status of the sports, the significant importance the games hold in Irish society, a sense of obligation to play for numerous teams, and balancing work and sport commitments, may contribute to their vulnerability to burnout, (Hughes & Hassan, 2015; Liston, 2015). Despite this, burnout is under-studied in this population.

The aim of this chapter is to introduce athlete burnout and discuss existing research relating to determinants of burnout. This chapter will also serve as an introduction to Gaelic games population in the burnout context, and will provide an overview of the current study.

1.2 Athlete Burnout

The term "burnout" first emerged in the employment context, describing a negative psychological response to chronic work-place stressors, which was becoming a particular concern in care-giving and service-based industries (Maslach & Jackson, 1984). Job burnout was defined as a multidimensional syndrome, characterised by feelings of exhaustion, a reduced sense of accomplishment at work and depersonalisation or distancing oneself from work demands (Maslach & Jackson, 1984). Importantly, burnout was distinguished from somewhat similar maladaptive psychological phenomena, such as depression, by its context-dependence, with symptoms related to and manifesting in the working environment specifically (Maslach et al., 2001). While research on job burnout moved beyond the caregiving professions to a range of occupations (Maslach et al., 2001), interest in the phenomenon also spread outside the domain of work. In the sport context, researchers noticed a substantial similarity in the experience of job burnout and anecdotal reports of athletes who were described as "fed up with sport participation" (Raedeke, 1997, p. 396), and this drove initial research interest in burnout in sports (e.g. Smith, 1986). However, researchers in the area also acknowledged the unique nature of the sporting environment and the demands placed on athletes and, consequently, the requirement for a sport-specific definition of burnout (Feigley, 1984; Raedeke, 1997; Smith, 1986). Specifically, it was suggested that athlete burnout should be defined in relation to sport performance, and that this definition should capture the dysfunctional nature of the condition and enable researchers to differentiate the experience of burnout from that of sport withdrawal (Raedeke & Smith, 2001).

As such, drawing on the definition for job burnout (Maslach & Jackson, 1984) and with a view to outlining the characteristics that are central to the experience of burnout in sport, Raedeke (1997) put forward the first operational definition of athlete burnout, which has driven the research in the area ever since (Eklund & DeFreese, 2015). Under this definition, athlete burnout is described as a multidimensional psychological syndrome characterised by enduring feelings of physical and emotional exhaustion (PEE), reduced sense of accomplishment (RSA), and sport devaluation (SD; Raedeke, 1997). Feelings of PEE relate to the intense training and competition associated with sport, and captures both the physical and psychological impact of these demands. RSA refers to an athlete's perceived inability to achieve their sporting goals, perform to their potential or experience a sense of improvement and progress. Finally, SD can be described as a loss of interest in, or resentment towards, one's sport, and athletes may feel that they no longer care about their sport or their performance in it. This definition of athlete burnout is well-supported by both qualitative (Cresswell & Eklund, 2006b; Gustafsson et al., 2008) and quantitative research (Isoard-Gautheur et al., 2010; Martínez-Alvarado et al., 2019; Raedeke et al., 2013), and is recognised as a substantial contribution to the research area (Eklund & DeFreese, 2015; Gustafsson et al., 2014).

Importantly, it is suggested that athletes who are burned out develop and experience a combination of the three burnout symptoms described above over a period of time (Raedeke, 1997). To this end, consideration of each dimension is integral to a comprehensive understanding of burnout, and alternative approaches evident in the literature, wherein researchers have focused solely on the exhaustion dimension of athlete burnout (e.g. Adie, 2012), or have collapsed the burnout dimensions into a single global burnout score (e.g. Amorose et al., 2009) are likely insufficient. This is further highlighted by existing research, which indicates that burnout symptoms can develop at different rates over time (e.g. Isoard-Gautheur et al., 2015), and may be differentially impacted by potential risk factors (e.g. Li et al., 2013).

Athlete burnout symptoms are associated with a range of negative consequences, both within and outside of the sporting environment. In the sport context, consequences can include a reduction in effort and performance levels, and dropout from sport participation (Cresswell & Eklund, 2006b, 2007; Gustafsson et al., 2008). Beyond this sport-specific impact, athlete burnout has been associated with depressive symptoms, disordered eating behaviours, feelings of physical illness, and insomnia (Cresswell & Eklund, 2006b; De Francisco et al., 2016; Gerber et al., 2018; Gustafsson et al., 2008). As such, for athletes who are experiencing burnout, as with other mental health challenges in sport (Newman et al., 2016), their sport participation can have a substantial negative impact on their lives.

Notably, a recent meta-analysis by Madigan et al. (2022) suggests the prevalence of athlete burnout is increasing; in a review of 91 studies conducted from 1997 to 2019 they found that, while levels of PEE appeared to have remained stable, there has been a significant increase in average levels of RSA and SD reported over time. Previously, researcher exploring the frequency of symptoms reported across athlete populations suggested that, at any one time, 1 – 9% of athletes in a sport are experiencing frequent symptoms of burnout (Dubuc-Charbonneau et al., 2014; Gustafsson et al., 2007). However, the potential increase in challenges to mental health experienced by athletes (MacIntyre et al., 2017; Moesch et al., 2018; Schinke et al., 2018), ever-growing demands associated with sport participation (Madigan et al., 2022), and evidence of diminished mental health among the population more broadly (e.g. Duffy et al., 2019) may be contributing to an increased risk of burnout (Madigan et al., 2022). As such, despite substantial contributions to research on athlete burnout over the last two decades (see Bicalho & Costa, 2018; Goodger et al., 2007; Gustafsson et al., 2017; Lin et al., 2021; Li et al., 2013; see also Chapter 2 for a review) athletes are now experiencing burnout at a higher rate than ever before (Madigan et al., 2022). This highlights the urgent need for increased awareness and understanding of the symptoms and aetiology of athlete burnout, and a concerted effort to reverse this trend.

1.3 The Development of Athlete Burnout: Current Understandings and Gaps in the Literature

1.3.1 Measurement of Athlete Burnout

Importantly, in addition to outlining a sport-specific definition of burnout, Raedeke and Smith (2001) also developed a measure of athlete burnout, namely the Athlete Burnout Questionnaire (ABQ). The development of the ABQ (Raedeke & Smith, 2001), which replaced existing job-burnout based measures and those lacking in strong theoretical underpinnings (e.g. EABI, Eades, 1990; MBI-GS, Schaufeli et al., 1996), enabled researcher to assess athlete burnout in line with its multidimensional conceptualisation (Gustafsson et al., 2017). Existing research supports the reliability and validity of the measure across different athlete populations (Isoard-Gautheur et al., 2010; Martínez-Alvarado et al., 2019; Raedeke et al., 2013). As such, the ABQ is regarded as having added significantly to research in the area of athlete burnout (Gustafsson et al., 2017).

However, it should be acknowledged that the absence of cut-off points to distinguish potentially clinically relevant levels of burnout and relatively low correlations between dimensions have been identified as potential weaknesses of the

ABQ (Gerber et al., 2018). As such, researchers are encouraged to be cautious when interpreting prevalence rates of burnout, and the use of a global burnout score is not recommended (Gerber et al., 2018). Additional research pointing to the distinct development of burnout symptoms also highlights the importance of taking a multidimensional approach to measurement (e.g. Lundkvist et al., 2018). Importantly, the validity and consistency of ABQ is not in question, its stability over time is supported (Gerber et al., 2018), and it remains the most widely-used and well-validated measure of athlete burnout (Gustafsson et al., 2014).

1.3.2 Theoretical Perspectives

Although the definition of athlete burnout is now well-accepted, a lack of clarity remains as to the key risk and protective factors for its development (Gustafsson et al., 2011). At the broadest level, this is most evident in the multiple theoretical models of athlete burnout that continue to co-exist; varying perspectives suggest that burnout develops as a result of chronic stress (Smith, 1986), entrapment-based commitment (Raedeke, 1997), and maladaptive forms of motivation respectively (Gustafsson et al., 2017; Madigan, 2021). A detailed overview of these perspectives is provided in the subsections below.

1.3.2.1 The Stress-Based Perspective. Smith's (1986) cognitive-affective model, which positioned burnout as a result of chronic stress, was the first theoretical model of athlete burnout. This stress-based perspective, which was also in line with the prevailing conceptualisation of job burnout (Maslach & Jackson, 1984), posits that a period of significant and sustained demands, or stressors, that an athlete feels ill-equipped to face will result in a physiological response in the form of anxiety and fatigue, and finally a behavioural response including avoidance of, or withdrawal from, sport (Smith, 1986). Notably, it is not just the experience of potential stressors, but rather athletes' appraisal of such demands as being stressful that is said to lead to burnout (Smith, 1986). In addition, the stress perspective highlights the potential negative impact of training demands associated with sport participation on burnout (Silva, 1990; Smith, 1986). Specifically, Smith (1986) refers to training demands and overload as potential sources of stress, while Silva's (1990) "training stress syndrome" theory suggests that burnout occurs as a response to substantial training demands and an associated negative psychophysiological response (Silva, 1990).

The conceptualisation of burnout as a response to stressors more broadly has been supported by the consistent positive correlation between athlete burnout and stress in the literature to date (Goodger et al., 2007; Lin et al., 2021). Furthermore, results of a recent meta-analysis (Lin et al., 2021) indicate that this positive correlation was evident both for sport-specific measures of stress, which include some measures of physical stress (Kellmann & Kallus, 2001), and more general measures of perceived life stress. The strength of the stress-burnout association was found to differ slightly across the dimensions of burnout, with stress most strongly correlated with RSA, and the lowest correlation evident with SD (Lin et al., 2021). Lin et al. (2021) suggest that this may be explained by the relationship between stress and negative appraisal of performances being more closely linked to RSA than the valuation of sport participation. In contrast, although existing qualitative work supports the role of training load in the onset of burnout (Cresswell & Eklund, 2006b; Gustafsson et al., 2008), quantitative exploration has provided more inconsistent results (Appleby et al., 2018; Black & Smith, 2007; Gustafsson et al., 2007; Smith et al., 2010). For example, Appleby and colleagues (2018) identified average training hours as a positive predictor of total burnout, while Smith and colleagues (2010) found that average training hours negatively predicted PEE, RSA and SD.

Furthermore, while the stress perspective was the first and most parsimonious theory of athlete burnout and stress has shown strong links to burnout (e.g. Lin et al., 2021), it has been suggested that this is oversimplification of the burnout process, in that there is a failure to account for why all athletes experiencing high stress do not dropout of sport, and why some athletes who experience high stress do not suffer from burnout (Schmidt & Stein, 1991). It is possible that this oversimplification is a consequence of the fact that the stress-based perspective predated the specific multidimensional conceptualisation of athlete burnout (Raedeke, 1997) and, as such, theories were not developed in line with this more nuanced definition. For example, while Smith (1986) did describe burnout as consisting of complex physical, mental and behavioural components, Silva (1990) defined it specifically as an exhaustive psychophysiological response. Consequently, Silva's (1990) theory has also been criticised due to potential conflation with "overtraining syndrome" (Gustafsson et al., 2011).

With these critiques in mind, recent research that has emerged since the acceptance of the multidimensional conceptualisation of burnout has explored the importance of additional individual and environmental components in contributing to burnout symptoms (Gustafsson et al., 2011), as discussed in the following sections. However, stress continues to be considered a key component in the athlete burnout process (e.g. Gustafsson et al., 2011).

1.3.2.2 The Commitment-Based Perspective. Schmidt and Stein (1991) theorised that, in contrast to the stress-specific model, focusing on athletes' commitment could allow us to distinguish those at risk of athlete burnout from those at risk of dropout from sport. The commitment literature, which explores why individuals continue to engage in an activity, focuses on two opposing drivers of commitment;

commitment based on an enthusiasm for involvement, and commitment based on a feeling of having to be involved (Brickman, 1987). Viewing burnout through this commitment-based lens, Schmidt and Stein (1991) argued that athletes whose commitment was based on feelings of entrapment in their sport were more likely to experience burnout than those whose commitment was based on enthusiasm, while athletes with relatively low commitment levels were at risk of dropping out (Schmidt & Stein, 1991). Drawing on Rusbult's (1983) investment model, the primary determinants of commitment were theorised to be perceived rewards and costs associated with sport participation, attractiveness of alternative options, and the resources invested in sport to date (Schmidt & Stein, 1991). As such, enjoyment-based commitment was characterised by high perceived rewards from, satisfaction with, and investments in sport participation, along with low costs from and attractive alternatives to sport (Schmidt & Stein, 1991). In contrast, entrapment-based commitment was associated with lower perceived rewards, satisfaction and attractive alternatives, with higher costs and investments (Schmidt & Stein, 1991).

Raedeke (1997) was the first to empirically test the commitment perspective of athlete burnout. Although theoretically aligned with Schmidt and Stein's (1991) work, Raedeke (1997) drew on the advancements made in the sport commitment literature, which included an explicit sport commitment model (SCM; Scanlan et al., 1993). Within this model, building on the concepts of rewards and costs associated with participation (Rusbult 1983), Scanlan et al. (1993) identified sport enjoyment, involvement opportunities, involvement alternatives, personal investments and social constraints as the key factors impacting sport commitment. Raedeke (1997) found substantial support for the impact of different commitment profiles on athlete burnout; in line with Schmidt and Stein's (1991) theory, 'enthusiastic' athletes, who, reported high levels of enjoyment, perceived benefits, and investments, and low costs, social constraints and attractive alternatives to sport participation showed the lowest levels of burnout. In contrast, the 'malcontented' athletes, whose commitment was characterised by lower levels of sport enjoyment, perceived benefits, athletic identity, investments, and control of sport participation, along with higher perceived costs, attractive alternatives, and social constraints, reported significantly higher levels of burnout than the other groups. However, it was notable that high levels of attractive alternatives reported by the malcontented, or entrapped, athletes was in contrast to Schmidt and Stein's (1991) theory, and suggested that athletes felt trapped in their sport despite being aware of alternatives (Raedeke, 1997).

While the commitment-based perspective received relatively limited interest in the burnout literature following Raedeke's (1997) work (De Francisco et al., 2022; Madigan et al., 2021), De Francisco et al. (2022) recently revisited the model, with a specific focus on the three commitment profiles put forward by Schmidt and Stein (1991). That is, rather than employing the conceptualisation of commitment outlined in the SCM (Scanlan et al., 1993), they assessed perception of benefits, costs, satisfaction, alternatives and investments only (De Francisco et al., 2022). Their findings again indicate that commitment characterised by greater satisfaction, investments and benefits, and lower costs is associated with lower levels of burnout (De Francisco et al., 2022). However, in contrast to the original sport commitment theory of burnout (Schmidt & Stein, 1991) and in line with Raedeke's (1997) findings, high perceived attractive alternatives to sport were identified in athletes who reported entrapment-based commitment (De Francisco et al., 2022). This suggests that additional factors that were not assessed by De Francisco et al. (2022), such as social constraints, may be contributing to continued sport commitment despite the presence of perceived alternatives (De Francisco et al., 2022). In addition, this study focused on total burnout, rather than exploring the impact of commitment factors on the individual burnout dimensions (De Francisco et al., 2022).

Notably, the SCM has been updated since Raedeke's (1997) original work; Scanlan et al. (2013, 2016) conducted additional extensive qualitative and quantitative research with team-sport athletes and subsequently put forward a more comprehensive model, which included updated conceptualisations of certain constructs (e.g. *involvement alternatives* were refined as *other priorites*), additional constructs (e.g. *desire to excel)*, and new higher-order variables (Scanlan et al., 2013, 2016). Specifically, the updated SCM specified twelve distinct antecedent factors that contribute to overarching feelings of constrained and/or enthusiastic commitment, as outlined in Table 1.1., with the aim of providing a more comprehensive insight into commitment in team sports (Scanlan et al., 2013, 2016).

Table 1.1

Descriptions of the Commitment Antecedents in the Sport Commitment Model

Commitment Antecedents	Description
Sport Enjoyment	The positive affective response to sport.
Personal Investment - Loss	Personal resources put into a sport that cannot be recovered in participation is discontinued.
Personal Investment – Quantity	The amount of personal resources put into a sport.
Social Support -Emotional	Encouragement, care and empathy received from significant others in a sport.
Social Support - Informational	The provision of useful information, guidance, or advice received from significant others in a sport.
DtE – Social Achievement	Wanting and/or striving to improve and achieve mastery in a sport.
DtE – Mastery Achievement	Wanting and/or striving to win and establish superiority over opponents in a sport.
Valuable Opportunities	Important opportunities that are only present through continued involvement in sport.
Other Priorities	Attractive and/or pressing alternatives that conflict with continued sport participation.
Social Constraints	Social expectations or norms that create perceptions of obligation to remain in a sport.

Note. DtE = Desire to Excel; Adapted from "The development of the Sport Commitment Questionnaire-2 (English version)" by T.K Scanlan, G.M Chow, C. Sousa, L.A Scanlan, and C.A Knifsend, 2016, *Psychology of Sport and Exercise, 22,* p.765.

To the best of the researcher's knowledge, Woods et al. (2020) were the first to explore the relationship between this updated SCM and athlete burnout. In contrast to cluster analysis, this analysis focused on specific relationships between burnout dimensions and the full range of updated SCM constructs. Results indicated that *constrained commitment* was a positive predictor of PEE and SD, while *enthusiastic commitment* was a negative predictor of RSA only (Woods et al., 2020). In addition, *enjoyment* was a negative predictor of all three burnout dimensions while *other priorities*, previously known as *attractive alternatives* to sport participation (Raedeke, 1997), was a positive predictor of RSA and SD (Woods et al., 2020). Notably, a number of the newly added SCM variables (Scanlan et al., 2016) assessed for the first time in the burnout context also emerged as significant predictors of burnout; *emotional social support* and *desire to excel in skill mastery* both negatively predicted RSA, while *quantity* and potential *loss of personal investment* positively predicted PEE and RSA respectively (Woods et al., 2020). As such, the results of this analysis suggest that this more comprehensive conceptualisation of commitment can provide important insight into key risk and protective factors for athlete burnout, and point to the potentially differential impact of commitment-related variables on the three dimensions of burnout.

Taken together, existing research suggests that the commitment antecedents and type of commitment experienced can impact feelings of burnout (De Francisco et al. 2022; Raedeke, 1997; Woods et al., 2020). Furthermore, the sport commitment perspective may provide a more nuanced insight into the factors associated with burnout, in contrast to a broader focus on stress (Raedeke, 1997). Finally, as was evident with the stress-based perspective (e.g. Lin et al., 2021), findings also suggest that the utility of the commitment model as a framework for understanding burnout may vary across the burnout dimensions, with inconsistencies in relationships identified when assessed across PEE, RSA and SD (Woods et al., 2020). To the researcher's knowledge, beyond the studies outlined here, research directly assessing the utility of this perspective of burnout remains limited.

1.3.2.3 The Motivation-Based Perspective. Finally, burnout has also been examined through a broader motivation-based lens (Madigan, 2021). Self-determination theory (SDT) is a commonly employed macro-theory of human motivation, wherein motivation is conceptualised as occurring along a continuum with two extremes, *intrinsic regulation*, which is the most self-determined and adaptive form of regulation, based on inherent enjoyment, and *amotivation*, which is described as an absence of motivation (Deci & Ryan, 2008; Ryan & Deci, 2000). Between these two extremes, varying degrees of externally-driven motivation have been identified; *external regulation* refers to motivation based on reward or avoidance of punishment, *introjected regulation* is more internalized, and centres around avoiding feelings of guilt or improving one's ego, *identified regulation* involves assigning value to a behaviour as personally important, while *integrated regulation* is the most autonomous form of extrinsic motivation, wherein motivation is based on alignment of the behaviour with beliefs or needs (Ryan & Deci, 2000, 2017). A greater degree of autonomous regulation has consistently been associated with positive outcomes, whereas controlled or amotivated regulation is associated with negative outcomes (Ryan & Deci, 2017). Notably, although when viewed at the dichotomous level of autonomous and controlled motivation these concepts show parallels with enthusiastic and constrained motivation, commitment and motivation have been identified as distinct psychology phenomena (O'Neil & Hodge, 2020).

In the context of athlete burnout, the SDT-based framework suggests that burnout becomes more likely as an athlete moves further along the continuum away from autonomous *intrinsic motivation*, and towards controlled regulation or *amotivation* (Lonsdale et al., 2009). This theory is generally well-supported by the athlete burnout literature, with recent reviews indicating that self-determined motivation is consistently negatively correlated with burnout and *amotivation* is positively correlated with burnout (Bicalho & Costa, 2018; Li et al., 2013). However, support for the association between burnout and additional forms of regulation, including *introjected* and *external regulation* have been less consistent, with positive, negative and non-significant associations identified in the literature to date (Bicalho & Costa, 2018; Goodger et al., 2007; Li et al., 2013). Furthermore, variability in the strength of associations between the different regulations and the dimensions of burnout has also been identified (e.g. Li et al., 2013), suggesting that the key motivational factors at play may differ for feelings of PEE, RSA and SD.

In addition to the SDT theory of motivation, the motivation-based perspective of burnout has also included examination of the 'motivational climate' (Ames, 1995) in which athletes operate. Achievement goal theory (AGT; Ames, 1995) posits that we view our competence at achievement-based tasks within one of two different frames of reference; task- or mastery-involving, whereby competence is self-referenced and related to skill-mastery, effort and improvement, and ego- or performance-involving, whereby competence is judged relative to others, leading to an emphasis on competition and comparison (Ames, 1995). An athlete's training environment, or motivational climate, can also be classified as either ego-orientated or task-orientated, based on how competence is assessed by significant others, such as coaches, within that environment (Ames, 1995). In the context of burnout, it is suggested that athletes who operate within a climate they perceive as ego-orientated (EO), are at a greater risk of experiencing burnout, while those operating within a perceived task-orientated (TO) climate are less likely to experience burnout. Existing research has provided support for the relationship between motivational climate and burnout, with TO climates negatively correlated with burnout, while EO climates have been positively linked to burnout (Lemyre et al., 2008; Reinboth & Duda, 2004; Vitali et al., 2015). However, the utility of this theory again appears to vary across the dimensions of burnout, with inconsistencies in the relationship between the climates and burnout dimensions identified. For example, Lemyre et al. (2008) found that an EO climate was associated with increased feelings of PEE and SD, but not RSA, while a TO climate appeared to be a protective factor against PEE and RSA, but not feelings of SD (Lemyre et al., 2008)

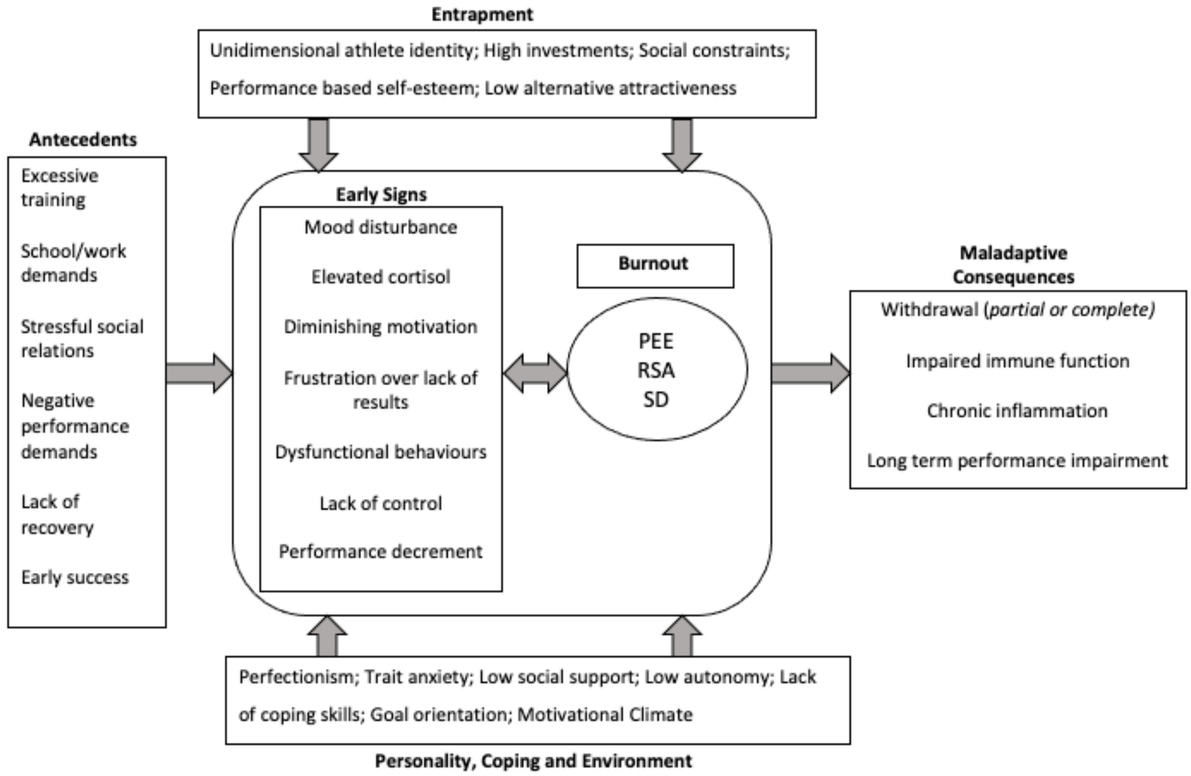
Furthermore, while AGT and SDT can be viewed as distinct theories of motivation, they are complementary and have been integrated both theoretically and empirically in the sport context (Ntoumanis, 2001; Standage et al., 2003). Specifically, it has been argued that the focus on self-referenced effort and improvement that characterises a TO climate supports the satisfaction of basic psychological needs for autonomy, competence and relatedness, which inturn promote more self-determined regulations (Ntoumanis, 2001; Standage et al., 2003). In contrast, the emphasis on competition and judgement relative to others that is evident in an EO climate thwarts these basic needs and promotes more controlled regulations (Ntoumanis, 2001; Standage et al., 2003). Existing research exploring this proposed tripartite hierarchical model of motivation has been somewhat mixed, with some support for basic psychological needs as a mediator of the relationship between motivational climate and regulations, and other research indicating a direct relationship from motivational climate to motivational regulation (Baena-Extremera et al., 2015; Chen et al., 2020; Kipp & Amorose, 2008; Sarrazin et al., 2002).

The SDT and AGT motivation theories have also been integrated in the context of burnout; focusing specifically on motivational climate and regulations, Russell et al. (2021) identified amotivated regulation, intrinsic regulation and EO climate as significant predictors of PEE in a combined model, while RSA was significantly predicted by amotivated regulation, intrinsic regulation and TO climate, and feelings of SD were significantly predicted by amotivated regulation, intrinsic regulation and EO climate. In addition, Sarrazin et al. (2002) and Standage et al. (2003) found that self-determined motivation mediated the impact of motivational climate on dropout from sport and intention to continue participation respectively.

1.3.2.4 Integrated Model of Athlete Burnout. As outlined in the preceding sections, each of the theories discussed contribute in some way to our understanding of athlete burnout, with all receiving some support in the existing literature. Consequently, Gustafsson et al. (2011) argued that our understanding of athlete burnout would benefit both from additional research and from efforts to combine key components into a more comprehensive model of burnout. As outlined in Figure 1.1 (Gustafsson et al. 2011, p.10) below, they put forward such an integrated model of burnout based on the existing empirical research at the time, which incorporates a range of proposed antecedents and early signs of burnout, as well entrapment-related, and personality and environmental factors that contribute to burnout susceptibility (Gustafsson et al., 2011). Key antecedents refer to specific stressors identified in existing quantitative and qualitative work, while the "early signs" section was included in recognition of the dynamic nature of burnout, and incorporates diminished self-determined motivation and a lack of control among other factors (Gustafsson et al., 2011). The "entrapment" component draws strongly on the commitment-based perspective of burnout, and aims to account for why athletes remain in sport long enough for burnout to occur. Similarly, "personality, coping and environment" describes factors that may increase susceptibility to burnout, including coping and motivational climate which are referenced under the cognitive-affective and motivation-perspectives specifically, as well as additional personality variables such as perfectionism, which has been closely linked to burnout (Gustafsson et al., 2011). Finally, potential maladaptive consequences of burnout are also included (Gustafsson et al., 2011).

However, this integrated model does have limitations. When viewed in its entirety, the model is clearly quite complex, and this has been highlighted as a limiting factor in terms of its empirical utility (e.g. DeFrancisco et al., 2022). Furthermore, the model components were largely identified based on findings from the first systematic review of the athlete burnout literature (Goodger et al., 2007), which included studies utilising measures that do not assess athlete burnout in line with the multidimensional definition outlined above, such as the Eades Burnout Inventory (Eades, 1990) and the Recovery-Stress Questionnaire (RESTQ-Sport; Kellman & Kallus, 2001), as well as a number of qualitative studies (e.g. Gustafsson et al., 2007), and did not distinguish between predictors of PEE, RSA and SD. While some components, such as motivation, stress, perfectionism and social constructs, are supported by more recent systematic reviews of the literature (Bicalho & Costa, 2018; Li et al., 2013; Lin et al., 2021; Pacewicz et al., 2019), an updated review of the full range of variables examined in relation to burnout, akin to Goodger et al.'s (2007) review on which the integrated model was based, has yet to be conducted. In addition, due to limited longitudinal research at the time (Goodger et al., 2007), the model is based largely on findings from cross-sectional research, and as such, there appears to be limited support for the delineation of variables into the distinct antecedent, early-signs and maintenance categories suggested.

Figure 1.1. *Integrated Conceptual Model of Burnout*



Note. Adapted from "Athlete burnout: an integrated model and future research directions", by H. Gustfasson, G. Kentta, and P. Hassmén, 2011, *International Review of Sport and Exercise Psychology, 4*(1), p.10.

However, this integrated model was developed with the aim of synthesizing the existing research to facilitate an improved conceptual understanding of burnout for key stakeholders (Gustafsson et al., 2017), and it is stressed that some features are more tentatively included than others (Gustafsson et al., 2011). As such, while it is likely not feasible to explore this model in its entirety, it does provide a conceptual framework and rationale for the integration of variables from different theoretical perspectives of burnout, and focusing on a subset of components of the model may be useful. For example, Russell (2021) utilised an integrated approach to explore the effects of training demands, athletic identity and social support on burnout.

1.3.2.5 Conclusions. Taken together, the existing literature appears to provide support for the stress-, commitment-, and motivation-based perspectives in explaining the onset of burnout symptoms. However, findings from the burnout literature also point to inconsistencies in the relationships between key variables under each of these perspectives and the dimensions of burnout, suggesting that key predictors of PEE, RSA and SD likely vary. The integrated model put forward by Gustafsson et al.'s (2011) acknowledges that variables from across these perspectives provide insight into our understanding of burnout, and attempts to collate existing findings into a single conceptual model. However, this model is complex with limited empirical support, and fails to account for potential differences in predictors of PEE, RSA and SD. Furthermore, despite this effort at integration, multiple theories have continued to co-exist for a number of decades and, as stressed in a recent editorial on future directions in the burnout literature (Madigan et al., 2021, p.7), researchers to date have failed to "compare the predictive utility of variables from opposing theories or…purposefully sought to set different theories against each other in a competitive fashion". Consequently, researchers are without a specific guide in research direction and design (Osanloo & Grant, 2016), and thus it can be argued that consideration of multiple perspectives is appropriate. Such an approach can facilitate the critical comparison suggested, allows integration of perspectives where appropriate, and can contribute to a more comprehensive understanding of athlete burnout.

1.3.3 Multidimensional Development over Time

Although a lack of consensus about the causes of burnout remain, it is notable that within each of the theoretical perspectives outlined above, athlete burnout is conceptualised as a process that occurs over time (e.g. Gustafsson et al., 2011). Furthermore, qualitative research exploring the burnout experience provides support for the now well-accepted definition of burnout as an enduring, multi-dimensional syndrome (Gustafsson et al., 2014). However, much of the earlier research on athlete burnout employed a cross-sectional design, and thus provided limited insight into how athlete burnout develops over time or the temporal impact of the variables discussed above in that development (Eklund & DeFreese, 2015; Gustafsson et al., 2017). As such, with the aim of addressing this shortcoming, more accurately assessing the prevailing burnout theories and thus improving our understanding of the development of burnout, longitudinal approaches have been identified as essential to the research area (Eklund & DeFreese, 2015; Gustafsson et al., 2017; Madigan, 2021; Madigan et al., 2021).

Importantly, longitudinal exploration of burnout has received increased attention in recent years, with multi-wave studies allowing for the comparison of burnout levels across time and exploration of the temporal nature of the relationships between proposed predictors of burnout and burnout symptoms (Gustafsson et al., 2017). However, considering changes in burnout over time, contrasting results are evident in the existing longitudinal work, with different studies identifying consistent growth or decline in symptoms across timepoints, and others identifying curvilinear change or stability in burnout symptoms over time (e.g. Adie et al., 2012; Cresswell & Eklund, 2005b; Cresswell & Eklund, 2006; Isoard-Gautheur et al., 2015). This inconsistency can likely be somewhat attributed to the substantial variability in the research design employed across these longitudinal studies, including variability in the number and spacing of data collection points and the methods of analysis employed. While the athletic season can vary across sports, for example, an 81-day competitive season for collegiate athletes (DeFreese & Smith, 2021) compared to a 30-week rugby season (Cresswell & Eklund, 2006), taken together and in line with the enduring conceptualisation of the syndrome, existing research suggests that a relatively substantial spread in data collection points may be more appropriate for capturing the development of burnout symptoms over time (Lonsdale & Hodge, 2011). For example, Lundkvist et al. (2018) found no significant changes in burnout when assessed at weekly intervals, but significant positive growth in PEE and SD was identified when burnout was assessed at 6-month intervals (Lundkvist et al., 2018).

Furthermore, the limited number of data collection points commonly utilised in existing studies (e.g. Cresswell & Eklund, 2006; Lunkdkvist et al., 2018) has meant that researchers have commonly compared mean scores across timepoints or assessed linear models, but have generally been unable to explore more complex trajectories of change (Flora, 2008). Notably, where design has facilitated such analyses (e.g. Adie et al., 2012; Isoard-Gautheur et al., 2015), the identification of significant curvilinear change (Adie et al., 2012; Isoard-Gautheur et al., 2015) indicates that burnout symptoms may not always be best described by a pattern of linear development (Cresswell & Eklund, 2006). Importantly, the richness of longitudinal data increases with a greater number of data collection waves; in addition to allowing for the assessment of different functional forms, multi-timepoint studies produce higher quality research findings, allow for testing of hypotheses about inter-individual differences in growth, make it possible to identify factors associated with growth, and are associated with increased precision and reliability of growth measurement compared to two-wave data (Singer & Willett, 2003; Willett & Sayer, 1994). However, it is notable that both Adie et al.'s (2012) and Isoard-Gautheur et al.'s (2015) analyses focused solely on the development of burnout during adolescence, and provide little insight into the changes that may occur across an athletic season for adult athletes.

Examination of longitudinal research exploring predictors of burnout also highlights a tendency for similarly limited number of data collection waves, and a focus on early time-point predictors of later burnout scores; for example, stress-related variables such as money- and sport-related hassles (Cresswell & Eklund, 2006), overall stress, sport-specific stress (Fagundes et al., 2021), and training hours (Appleby et al., 2018) early in the season identified as positive predictors of burnout later in the season, thus providing additional support for the temporal nature of the predictor-burnout relationships outlined in the theoretical perspectives above. Support for aspects of the motivation and commitment perspectives of burnout is also evident, with early-season *amotivated regulation* (Fagundes et al., 2021) and *EO climate* (Isoard-Gautheur et al., 2013) identified as positive predictors of burnout later in the season, while *social support* mid-season negatively predicts end-of-season burnout (Cresswell, 2009).

However, these analysis do not provide insight into the role of predictors in relation to the growth or development of burnout over time, which would more closely align with the relationships proposed in the theories discussed above. In contrast, more complex latent growth and multi-levelling modelling approaches, which allow for the estimation of factors predicting change (Preacher et al., 2008), have been employed to great effect more recently in the burnout literature, with variables including avoidant coping style (Madigan et al., 2020), self-determined motivation and perceived stress (DeFreese & Smith, 2014) identified as predictors of change in burnout over an athletic season. Notably, calls remain for exploration of predictors of burnout over more substantial windows of time (Madigan et al., 2020), and such an approach can provide further insight into the utility of the existing theoretical perspectives.

Overall, it is evident that our current understanding of how burnout symptoms develop over time remains relatively limited. However, the existing research suggests that multi-timepoint studies tracking burnout over extended periods of time (Lunkdvist et al., 2018) and efforts to identify factors predicting change in burnout may be especially useful contributions to the research area.

1.4 Population of Interest and the Burnout Context

This section will introduce the specific population of interest in this study, namely Gaelic games athletes. An insight into the key characteristics of this population will be provided, while our current understanding of the experience of athlete burnout in this group will also be discussed.

1.4.1 Burnout in Team Sports

Conceptually, team sports can be viewed as distinct from individual sports, with differences identified across characteristics associated with both the environments and the athletes (Bruner, et al., 2020). For example, team sports involve substantial levels of cooperation among a group and shared experiences of failure, while individual-sport athletes may feel sole responsibility for successes and failures (McEwan & Beauchamp, 2020; Rhind et al., 2012). In the context of burnout, higher levels of PEE, RSA and SD have been identified in team sport-athletes compared their individual-sport counterparts (Davis et al., 2019; Nafian et al., 2014; Reche et al., 2018), while existing comparisons also indicate that those involved in team-sport experience increased stress (Nafian et al., 2014) and more ego-orientated climates (van de Pol & Kavussanu, 2012). However, contrasting research has identified lower levels of burnout in team-sport athletes compared to those competing individually (Baella-Vigil et al., 2020; Cremades & Wiggins, 2008) and team-sport athletes have also been shown to report increased enjoyment (van de Pol & Kavussanu, 2012) and positive psychological outcomes (Eime et al., 2013). As such, it is possible that the experience of burnout may differ for team- versus individual-sport athletes.

1.4.2 Gaelic games athletes

Gaelic games are a group of native Irish sports, which include the sports of hurling, Gaelic football, court handball, road balls and rounders. Gaelic football and hurling are the most popular of these sports (Reilly & Collins, 2008), and are team sports played by both men and women; men's Gaelic football and ladies Gaelic football (henceforth ladies football) are the men's and women's versions of a game in which players pass a soccer-style ball with their hand or foot. Hurling and camogie (women's hurling) require players to hit a small, hard ball, or "sliotar", with a wooden stick, or hurl. Games in all four sports involve two teams of 15 players. Henceforth in this thesis, the term "Gaelic games"[1] is used in reference to the four sports of men's Gaelic football, ladies football, hurling and camogie. Gaelic games are played and followed in large numbers across Ireland and the rest of the world; according to nationally representative data, alongside soccer, Gaelic games are the most popular sports among fans in Ireland in 2021 (Teneo Sport and Sponsorship Index, 2021), and are the most participated-in team sports for those under 35 (Sport Ireland, 2019).

While the associations that govern the sports differ, with men's Gaelic football and hurling governed by the Gaelic Athletic Association (GAA), and the women's games governed by the Ladies Gaelic Football Association (LGFA) and Camogie Association (CA) respectively, the competitive structures across the associations are almost identical; athletes can compete across a range of levels, including with their clubs, counties or school/college teams. As all playing members must be registered with

[1] Athletes from additional traditional Gaelic games of court handball and rounders were not included as these sports differ substantially from the four dominant sports referenced, both in terms of game demands and their role in Irish society; in contrast to the 15-person team sports described in the main text, handball can be played as an individual or in pairs, while rounders is a nine-person game with rules similar to American baseball. In addition, the available membership/club numbers for the GAA (>500,000 members; >2,200 clubs), LGFA (≈190,000 members) and the Camogie Association (≈580 clubs) indicate that the popularity of these sports far exceeds that of handball (≈15,000 members; 170 clubs) and rounders (23 clubs) (Cusack, 2021; GAA Rounders, 2022.; GAA, 2022b; the Camogie Association, 2021).

a club, this is recognised as the fundamental unit of the associations (GAA, 2021). Clubs are representative of geographical areas, usually a town, village or parish, and there are over 2,300 across Ireland, with hundreds more globally (GAA, 2021). Players can play competitive inter-club fixtures from the under 12 age group (U12) to adult level, across a range of standards (GAA, 2021). Furthermore, as per the GAA Official Guide (2021), a player is expected to remain with their 'First Club', that is the club with which they played their first competitive fixture aged U12, throughout their playing career. Gaelic games competitions are also run on an inter-school basis, including across primary, post-primary and higher-education. In addition, all Clubs in Ireland operate within one of the 32 geographical counties on the island, and each of these 32 counties, in addition to the regions of London and New York, have an elite representative side for both Gaelic football and hurling/camogie, made-up of the best players in the region. These teams compete against each other in an inter-county All Ireland competition (GAA, 2021). As such, in one season, athletes can represent multiple teams, including their clubs, schools/colleges and counties, as well as competing across different Gaelic sports (e.g. ladies football and camogie) and age groups (Lane, 2015). Furthermore, as competitions for different teams overlap in terms of their timing in the year, demands from different teams commonly co-occur (Duffy, 2015).

Inter-county Gaelic games is recognised as the elite level of the sports (Kelly et al., 2018), with male and female players training an average of 6 days per weeks, and reporting time commitment on training days of up to 6 hours (Kelly, 2018; WGPA, 2020). The premium final across the men's sports routinely draws sell-out crowds of over 82,000 to the national stadium of Croke Park, with over 900,000 people viewing the game on television, while the 2019 All Ireland ladies football final drew a record attendance for the women's sports of over 56,000, with a further 350,000 tuning into the game on television. It is notable that, despite the level of commitment and support associated with Gaelic games, particularly at the intercounty level, the sports have retained an amateur status, which is recognised as being key to the identity and values of Gaelic games (GAA, 2021). As such, Gaelic games athletes balance their sport commitment with external work and/or study commitments.

1.4.3 Burnout in Gaelic games

Existing research on burnout in Gaelic games suggests that the risk of certain burnout symptoms is greater in these sports than that identified in other individual and team sports; Hughes' (2008) unpublished doctoral thesis indicates that young adult intercounty male Gaelic footballers report relatively high levels of PEE and RSA compared to data from team sports such as rugby (Cresswell & Eklund, 2005a) and the individual sport of swimming (Raedeke, 1997), but comparatively low levels of SD. Similarly, Turner and Moore (2016) found that male GAA players reported relatively moderate levels of PEE and RSA on average ($M \approx 2.10$), with lower levels of SD ($M = 1.33$). A previous exploration of burnout in adult male and female Gaelic games players across levels by the researcher (Woods et al., 2020) found that 10% of athletes reported an elevated frequency of all three burnout symptoms ($M \geq 3$; i.e. experience this symptom at least *"sometimes"*), which exceeds estimates ranging from 1 – 9% across other team and individual sports (Dubuc-Charbonneau et al., 2014; Gustafsson et al., 2007).

While it is important to note that a clinically relevant cut-off has not been established for burnout symptoms (Gerber et al., 2018), these findings indicate that Gaelic games athletes are at risk of burnout. Specifically, data from male and female Gaelic games athletes indicates that adult players report a frequency of PEE, RSA and

SD symptoms that is in line with it, if not greater than, athletes from other sports (Hughes, 2008; Turner & Moore, 2016; Woods et al., 2020). In addition, GAA administrators have suggested that different points in the season may be more "problematic" for these athletes (Duffy, 2015, p.5), due to an increase in training and playing demands. To the researcher's knowledge, there was been just one longitudinal exploration of burnout in Gaelic games, wherein burnout was tracked at 6 timepoints over an 8-week window (Turner & Moore, 2016). Results suggested that frequency of PEE symptoms was significantly higher at the second data collection window compared to the fourth and fifth timepoints, but no significant differences in SD or RSA were identified (Turner & Moore, 2016). However, as the intervals between data collections points were relatively short they may not be sufficient to capture change in burnout (Lundkvist et al., 2018), while tracking burnout for 8 weeks cannot provide insight into potential risk periods across a 12-month season. Furthermore, although similar to other field sports in-terms of physical demands (Cullen et al., 2017), it has been suggested that distinct challenges faced by Gaelic games players may contribute to the risk of athlete burnout in these sports (e.g. Hughes & Hassan, 2017). The following paragraphs will consider these challenges in the context of stress-, commitment- and motivation-based perspectives outlined in section 1.3.2.

1.4.3.1 Theoretical Perspectives of Burnout in Gaelic games

A Stress-Based Perspective. Although, to the researcher's knowledge not stated explicitly, the conceptualisation of burnout by Gaelic games administrators to date appears to be informed predominantly by the stress-based perspective and, more specifically, Silva's (1990) "training stress syndrome" theory (Silva, 1990). This is evident in the fact that much of the concern about burnout in Gaelic games has centred around issues related to training and playing demands (Duffy, 2015, 2016), including a number of issues that may be somewhat unique to Gaelic games.

Specifically, and as noted previously, Gaelic games athletes often represent multiple teams simultaneously, with a recent survey of male student athletes indicating that 83% represent at least three Gaelic games teams in one season (GPA, 2019), while female intercounty athletes also represent an average of three teams (WGPA, 2020). This could include their club, college and county, or different age-group and adult teams (Keeler & Wright, 2013). Furthermore, competition periods for different teams often co-occur or run consecutively across the 12 months of the year, with no designated off-season for the sports (Turner & Moore, 2016). A recent survey of almost 1000 intercounty male players (Kelly et al., 2018) found that 40% had no time off, while the remainder reported an average of just 5 weeks off across the 12 months of the year.

Finally, in terms of training load, despite the fundamentally amateur status of Gaelic games, the emergence of increasingly professional-like levels of training, most notably at the elite intercounty level, have been identified (Geary et al., 2021; Hughes & Hassan, 2017). Recent reports indicate that intercounty players dedicate over 30 hours per week to their sporting commitments, including an average of just under 12 hours per week for on-field and physical conditioning demands (Kelly, 2018; WGPA, 2020). Participation at the club level is also highly valued and the on-field physical demands do not differ substantially (Cullen et al., 2017; Lane, 2015). Commentators argue that such a level of time commitment has resulted in a situation whereby some players are described as “professional in most respects except the capacity for rest” (Moran, 2001, p. 280). Such views are supported when the training demands associated with Gaelic games are contrasted with those of other sports; research examining training loads in professional rugby identified an average of under seven hours of physical training per week, including work ranging from full-contact rugby to gym sessions (West et al., 2020), while an exploration of demands experienced by elite amateur university students indicated weekly training hours ranged from under four hours for cricketers, to just over eight hours for soccer players (Hamlin et al., 2019).

The focus on this stress-based perspective (Silva, 1990; Smith, 1986), and the perceived role of training demands specifically (Silva, 1990), is further evident in how Gaelic games administrators have positioned fixture scheduling and restricted player eligibility as key avenues for addressing burnout in Gaelic games (Hughes, 2008; Duffy, 2016); for example, all eight proposals from a GAA Task Force on Player Burnout (2007) centred around amending age-group eligibility, reducing the demands on players and addressing fixture congestion across competitions. When preparing to implement a number of these proposals almost 10 years later, the then director-general of the association stated that "the chances of young players experiencing overtraining, overuse injury and, ultimately, burnout would have been minimised" (GAA 2016, p. 12) as a result.

Support for the utility of this "training load syndrome" theory (Silva, 1990), is evident in qualitative research from Gaelic games (Geary et al., 2021; Hughes & Hassan, 2017), which has identified insufficient time-off, multi-team representation and the perceived "training epidemic", as sources of stress for athletes that contribute to "a susceptibility to developing burnout" (Geary et al., 2021; Hughes & Hassan, 2017). However, quantitative support is more limited; cross-sectional analysis by Hughes (2008) found that the number of teams an athlete represented did not significantly predict symptoms of burnout in male Gaelic games players. In addition, while it has been suggested that periods where fixture congestion is particularly common, for example in the first three months of the calendar year, lead to increased risk of burnout symptoms (Duffy, 2015), Sheehan et al. (2018) found that the mental health of Gaelic games student-athletes significantly improved as the season progressed, despite tracking athletes across one such problematic period (Sheehan et al., 2018). To the researcher's knowledge, the longitudinal implications of multi-team representation or training demands on burnout in Gaelic games, or the accuracy of the GAA's claims of particularly "problematic" periods in the season contributing to the risk of burnout (Duffy, 2015, p.5), have yet to be examined quantitatively.

Importantly, both the broader cognitive-affective stress model (Smith, 1986) and Gustafsson et al.'s (2011) integrated model identify stressors beyond physical training load that may contribute to the risk of burnout, such as stressful social relations or work demands (see Figure 1.1.). However, in line with Smith's (1986) assertion that it is how an event or circumstances is perceived that renders it a stressor and Gustafsson et al.'s (2011) note on the individual nature of burnout, it is impossible to account for all potential stressors that may predict feelings of burnout in each athlete. As such, beyond a focus on training demands, an athletes' general perceived stress level can serve as an important predictor of burnout (Lin et al., 2021). Assessing mental health in elite male Gaelic footballers, Gouttebarge et al. (2016) found that 40% of respondents were experiencing distress, which was characterised by feelings of worry, tension and listlessness (Gouttebarge et al., 2016). This prevalence rate is above that previously identified for professional soccer players (10 – 15%) (Gouttebarge et al., 2015) and the general population (23%) (Bültmann et al., 2002) suggesting that psychological stress is a particular issue of concern for Gaelic games athletes.

A Commitment-Based Perspective. As outlined previously, although stressors may predict burnout, the stress perspective fails to account for why athletes remain in their sport despite facing substantial stressors (Raedeke, 1997). As such, with the aim of expanding beyond the focus on training demands and stressors, existing research has also explored the risk of burnout in Gaelic games from a commitment-based perspective (e.g. Hughes & Hassan, 2017; Woods et al., 2020). Such an approach may be particularly useful in the context of amateur sports such as Gaelic games, wherein athletes are expected to balance their sporting commitments with work, studies and other life demands (Keeler & Wright, 2013; Sheehan et al., 2018; Turner & Moore, 2016), and are not obligated to remain in their sport for employment purposes. Notably, in addition to the time committed to training demands outlined above, intercounty male and female athletes spend over 35 hours a week working or studying (Kelly, 2018; WGPA, 2020). The impact of competing priorities on burnout in Gaelic games has been supported by previous work conducted by this researcher (Woods et al., 2020) and others (Hughes, 2008); perceptions of other demands and priorities competing with sport participation predicted increased RSA and SD in male and female Gaelic games athletes (Woods et al., 2020), while the perceived attractiveness of alternatives to sport reported by athletes experiencing entrapped commitment has also been shown to positively predict burnout symptoms in male intercounty players (Hughes, 2008). Similarly, the perception of a substantial quantity of time and effort invested in the sport and the possibility of losing such investment should one leave sport, was associated with increased PEE and RSA in Gaelic games (Woods et al., 2020).

Notably, Gaelic games hold a substantial level of importance in Irish society (Liston, 2015), and are described as being “stitched inexorably into family, community and parish life like no other sporting or cultural organisation” (Liston, 2015, p.200). However, it has been suggested that this may confound potential challenges faced by these athletes, insofar as it can create a sense of obligation to play (Geary et al., 2021;

Hughes & Hassan, 2017; Liston, 2015). This is reflected in the language used in the GAA Official Guide (2021, part 1, p.71), wherein a player is said to "owe allegiance and loyalty to his First Club and County". While historians have noted that "the great triumph of the GAA is that it means so much to so many people" (Cronin et al., 2009), qualitative explorations of athletes' experiences indicate that this social context can increase perceptions of pressure to play and perform (Geary et al., 2021; Hughes & Hassan, 2017), and contributes to a power imbalance, whereby players lack control and are vulnerable to the agendas of management (Hughes, 2008). Examining this challenge through a commitment-focused lens, Hughes (2008) found that athletes showing characteristics of obligated commitment, namely higher Gaelic identity and social constraints in sport reported relatively high levels of burnout, while this researcher (Woods et al., 2020) identified feelings of constrained commitment as a positive predictor of PEE and SD.

Finally, the commitment perspective also provides insight into potential protective factors against burnout in this population; enjoyment, a desire to master the skills of the sport, and emotional social support have been identified as protective factors against symptoms of burnout in Gaelic games (Woods et al., 2020). The role of enjoyment in Gaelic games is echoed in findings from a survey of inter-county athletes, wherein enjoying training and competition was cited by almost 70% of athletes as the most important aspect of the sporting experience (Kelly et al., 2018). In addition, enjoyment, skill mastery and community or social support all tie-in closely with the key aims and ethos of Gaelic games (GAA, 2022). As such, factors associated with the commitment-based perspective appears to have utility in explaining risk and protective factors for burnout in Gaelic games. However, the cross-sectional nature of existing studies provides limited insight into the impact of commitment-related factors on burnout in Gaelic games over time.

The Motivation-Based Perspective. As discussed earlier, although conceptually related, motivation and commitment factor are distinct constructs (O'Neill & Hodge, 2020), and the motivation-based perspective may also provide additional insight into risk and protective factors for burnout in the amateur sports of Gaelic games. Research examining motivational regulation in Gaelic games athletes identified higher levels of intrinsic regulation compared to amotivated regulation (Sheehan et al., 2018). However, it was notable that intrinsic motivation did not dominate and high levels of extrinsic regulation were also evident (Sheehan et al., 2018). Exploring burnout in amateur New Zealand rugby players through the motivation-based lens, Cresswell and Eklund (2005) suggest that the substantial societal importance and status associated with the sport was a potential contributor to the high levels of extrinsic motivation reported by the athletes, and a similar explanation may be relevant for Gaelic games in the context of Irish society, as discussed above (Hughes & Hassan, 2017).

In addition, the motivation perspective facilitates the exploration of motivational climate. Motivational climate may be particularly impactful in Gaelic games, where players are restricted in their opportunities to change team or seek out more preferable environments as a result of the "first club" and intercounty eligibility policies outlined previously. Existing research on Gaelic games athletes suggests both ego and task-orientated climates are experienced, but a significantly higher level of task-orientated characteristics were reported (Sheehan et al., 2018). Notably, TO climate, intrinsic regulation and extrinsic regulation were identified as protective factors against anxiety in Gaelic games (Sheehan et al., 2018), while EO climate was positively associated with anxiety. These findings highlight the impact of motivational factors on mental ill-health in Gaelic games athletes, and suggests there may be utility in examining this perspective in the context of burnout in Gaelic games.

Overall, it is evident that there are a number of challenges experienced by Gaelic games athletes which may contribute to the risk of burnout in this population. Furthermore, existing research indicates that these challenges may be best explained by different theoretical perspectives of burnout, including the stress-, motivation-, and commitment-based perspectives outlined previously. Such an approach is in line with the integrated model of burnout put forward by Gustafsson et al. (2011), and can contribute to a more comprehensive understanding of risk and protective factors in burnout.

1.5 The Current Thesis

As discussed in the preceding sections, athlete burnout is a psychological syndrome that can have substantial negative implications for athletes affected (e.g. De Francisco et al., 2016). Furthermore, existing research supports substantive concerns among the Gaelic games community relating to the risk of burnout for these athletes, but limited research has explored the factors impacting its development. As such, the overarching aim of this study was *to identify the risk and protective factors for development of feelings of PEE, RSA and SD over time in Gaelic games athletes*, for the first time. A number of additional key aims and considerations were identified with a view to working towards this central aim, as discussed below.

Our understanding of athlete burnout and how it develops over time remains limited, both in Gaelic games and more broadly. As outlined above, theoretical perspectives point to different key predictors of athlete burnout, and existing reviews of the literature provide support for the motivation- (Bicalho & Costa, 2018; Li et al., 2013) and stress-based (Lin et al., 2021) perspectives in particular. Furthermore, Gustafsson et al. (2011) suggest our conceptual understanding of the risk and protective factors for burnout would benefit from drawing on multiple theoretical perspectives. However, to the best of the researcher's knowledge, an updated review exploring the full range of variables associated with athlete burnout has not been conducted since the work by Goodger et al. (2007) over a decade ago. Consequently, our understanding of the relative contribution of each of the existing theoretical perspectives to the existing burnout literature remains limited (Madigan et al., 2021). Such insight can help to identify the practical utility of current theoretical perspectives and approaches, and highlight gaps in the existing literature. In addition, research outlined above suggests the experience of athlete burnout may differ between team- and individual-sport athletes. As such, the first aim of this thesis was to *conduct a systematic review of the full range of factors that have been examined to date in burnout in team sports,* for the first time

In addition to assessing how prevailing theoretical perspectives have informed the existing literature, there have been calls for critical comparison of these theoretical models (e.g. Madigan et al., 2021). As such, this thesis also aimed *to assess models based on the prevailing stress, commitment, and motivation perspectives as predictors of PEE, RSA and SD alongside each other with a critical lens* for the first time. Notably, although it has been acknowledged that statistical comparison and/or integration of multiple theoretical perspectives is challenging due to the heterogeneity in model complexity and an absence of shared variables (De Francisco et al., 2022; Madigan et al., 2021; Rust et al., 1995), analysing the fit and significant pathways across competing models in the same sample can further facilitate exploration of their relative utility as predictors of PEE, RSA and SD. Furthermore, this can be viewed as an important step in narrowing the research focus, insofar as it can help to identify the key predictors of burnout from across existing perspectives that may be most useful to include in efforts at integration. Such work is essential in helping to facilitate a more focused direction in the athlete burnout research, which has been lacking in the area (Goodger et al., 2007).

The importance of longitudinal research has been stressed extensively in the athlete burnout literature, with such an approach essential in order to understand how burnout develops and assess the temporal impact of potential predictors (e.g. Eklund & DeFreese, 2021; Gustafsson et al., 2017; Madigan, 2021). Studies to date have pointed to conflicting trajectories of change in burnout over time (e.g. Cresswell & Eklund, 2006; Isoard-Gautheur et al., 2015; Lundkvist et al., 2018; Martinent et al., 2020), but this may be attributed to differences in study design (Lundkvist et al., 2018). In line with the conceptualisation of burnout as an enduring, chronic phenomenon, multiple data collection points with a relatively substantial spread across an athletic season may be most appropriate for capturing the development of symptoms over time (Lonsdale & Hodge, 2011). Such insight is essential in order to identify of potential “high risk” periods (Cresswell & Eklund, 2006), to explore inter-individual differences in the development of symptoms, and to identify the risk and protective factors that explain these differences. In the context of Gaelic games, it has been argued that the year-round nature of competition and training contributes to feelings of burnout (e.g. Hughes & Hassan, 2017), while GAA administrators have also raised concerns about an increased risk of burnout at particularly busy times in the season GAA (Duffy, 2015). However, researchers have yet to examine burnout in these athletes across a full season or beyond. As such, this thesis also *aimed to track burnout symptoms reported by Gaelic games athletes at six timepoints across two years of competition, and assess the trajectory of change* for the first time, using latent growth modelling.

As discussed above, existing cross-sectional research has identified a number of factors associated with burnout in Gaelic games (e.g. Hughes & Hassan, 2017; Woods et al., 2020), while substantive concerns around the characteristics of Gaelic games and research from other amateur team sports (Cresswell & Eklund, 2006) point to additional predictors from across theoretical perspectives that may be relevant to Gaelic games. However, these variables have yet to be examined as predictors of change in burnout over time. As such, in line with the overarching research objectives and in what can be viewed as a culmination of the previous aims outlined, this thesis also aimed *to identify risk and protective factors for the development of athlete burnout in Gaelic games over time* by incorporating potential predictors of burnout into the latent growth model outlined above, and assessing their utility in accounting for inter-individual differences in the development of PEE, RSA and SD. This represents the first attempt to integrate such a range of variables from across existing perspectives in longitudinal models for each symptom of burnout, and thus facilitates the identification of the variables that are likely most impactful in their development over time. Such insight is essential inform both our understanding of burnout and the development of intervention and prevention methods moving forward. Such insight is essential

Finally, in response to the unprecedented and unanticipated COVID-19 outbreak and the associated suspension of organised sport, an additional aim of this thesis was *to understand how athletes perceived this suspension period, and the impact of the suspension of sport and athletes' responses on feelings of burnout and stress.* This analysis provides novel insight into athletes' experiences of such an unanticipated change event, and how such an event impacts symptoms of athlete burnout.

1.6 Thesis Conspectus

This thesis consists of nine distinct chapters. Following on from the current introductory chapter, Chapter 2 outlines a systematic review of the factor that have been examined in relation to burnout in team-sport athletes to date. This review serves to identify the gaps in our current understanding of athlete burnout, and informed the selection predictors to be explored in the subsequent empirical analyses. Chapter 3 details the methodological design employed in this study, including the specific steps taken across all stages of preparation, data collection and analysis. Chapters 4, 5, 6 and 7 outline the specific rationale and results of the series of analyses conducted in this study, including descriptive statistics and exploration of the impact of demographic and sport-related variables on symptoms of burnout (Chapter 4), analysis of the utility of competing theoretical perspectives of burnout (Chapter 5), identification of the trajectory of burnout symptoms over time (Chapter 6), and examination of key variables impacting these trajectories (Chapter 7). Chapter 8 details an analysis exploring the impact of the COVID-19 pandemic and the suspension of sport on burnout in Gaelic games athlete. Finally, Chapter 9 will conclude this thesis with detailed discussion of the implications of the findings of these analyses, and the contribution of this work to our understanding of athlete burnout.

Chapter 2 Systematic Review of the Factors Associated with Athlete Burnout in Team Sport

2.1 Introduction

This chapter presents a systematic review of studies that have quantitatively examined the link between the dimensions of athlete burnout and any other variable, in team-sport athletes. The aim of this review was to collate and synthesize the existing literature, and in doing so, identify the factors that are consistently positively or negatively associated with the dimensions burnout, factors that may be unrelated to burnout, and relationships that warrant further exploration.

2.2 Systematic Review Background

As outlined in Chapter 1, although there is general consensus around the multi-dimensional definition of athlete burnout, debate remains as to the key factors associated with its onset (Gustafsson et al., 2011). This is evident in the existing distinct models of athlete burnout (Lonsdale et al., 2009; Raedeke, 1997; Smith, 1986). It could also be argued that, in the absence of a singular model of burnout, researchers are without an essential guide in research direction and design (Grant & Osanloo, 2014) and, consequently, have continued to examine a variety of potential correlates of burnout (e.g. Chyi et al., 2018; Bicalho & Costa, 2018; Cremades & Wiggins, 2008; Goodger et al., 2007).

To the best of the researcher's knowledge, seven systematic reviews[2] of factors associated with athlete burnout have been undertaken to date, four of which have incorporated a meta-analysis[3]. In the first of these reviews, Goodger et al. (2007)

[2] Systematic reviews involve the use of "systematic and explicit methods to identify, select and critically appraise relevant research, and to collect and analyse data from the studies that are included" (Moher et al., 2009, p.1).
[3] Meta-analyses involve summarizing effect sizes of studies examining the same hypothesis, using a weighted measure of central tendency and information on the uncertainty of the measure (Borenstein, 2009; Siddaway et al., 2019).

included research examining factors associated with burnout in athletes, coaches and officials, and a range of psychological, demographic and situational correlates of burnout were identified. While demographic (e.g. age, gender) and situational (e.g. economic) factors were less commonly explored in the athlete population, psychological correlates identified included variables such as motivation, coping and identity, while situational correlates included training load or volume (Goodger at al., 2007). These findings informed the development of Gustafsson and et al.'s (2011) integrated model of burnout, as noted in Chapter 1.

Two subsequent reviews focused specifically on the motivation perspective of burnout; a comprehensive meta-analysis of the impact of basic psychological needs and motivation regulation on burnout by Li et al (2013) found support for the SDT-based theory of burnout, while a more recent, albeit less thorough, review and synthesis provides further support for this perspective (Andrews, 2021). The most recent comprehensive review and meta-analysis by Lin et al. (2021) specifically examined the relationship between burnout and stress, in line with the stress-based perspective of burnout (Smith, 1986). To our knowledge, these are the only reviews that centred around a specific theoretical framework of burnout. In contrast, Bicalho and Costa (2018) explored variables specifically related to the motivation-based factors as well as psychological constructs more distally linked to motivation, such as passion and perfectionism (Bicalho & Costa, 2018), while Pacewicz et al.'s (2019) meta-analysis centred on social constructs associated with burnout, including social support, relatedness and negative social interactions. Finally, Sarmento et al. (2021) reviewed and synthesized research on burnout and depression in soccer players specifically (Sarmento et al., 2021).

The correlates of burnout identified across these reviews include training load, coping with adversity, the role of significant others, identity (Goodger et al., 2007; Sarmento et al., 2021), the satisfaction/thwarting of psychological needs (Bicalho & Costa, 2018; Li et al., 2013), motivation (Goodger et al., 2007; Bicahlo & Costa, 2018), social support, relatedness, negative social interactions (Pacewicz et al., 2019), passion, perfectionism (Bicalho & Costa, 2018; Sarmento et al., 2021) and athlete stress (Lin et al., 2021). However, the relatively narrow focus of the four most recent meta-analyses of the literature on specific psychological (Bicalho & Costa, 2018; Li et al., 2013; Lin et al., 2021) and social constructs (Pacewicz et al., 2019), may inadvertently have led to the exclusion of, for example, research examining variables associated with the commitment-based perspective of burnout, or relevant situational or demographic variables, such as those identified in Goodger et al.'s (2011) earlier review. In contrast, although the review by Sarmento et al. (2021), does not distinguish specific eligible burnout correlates, the synthesis of the literature is relatively limited, and there is no effort to assess the consistency of results across studies.

As such, a comprehensive review of the literature on the full range of potential correlates of athlete burnout examined, has not been conducted since Goodger et al.'s (2007) review over a decade ago, when the research area was in its relative infancy. Consequently, there is currently limited insight into the extent to which the range of different perspectives and models of burnout, and more integrated approaches, have informed approaches taken in the literature to date. Such insight can inform our understanding of the conceptual utility of these differing perspectives. In addition, Goodger et al.'s (2007) assessment of burnout as a unidimensional construct provided no insight into the impact of variables across the burnout dimensions. Focusing on studies that utilised the ABQ (Raedeke & Smith, 2001), in line with Pacewicz et al.

(2019) review, can ensure that burnout is conceptualised as per its well-accepted, multi-dimensional definition, and allow for the disaggregation of the impact of predictors across symptoms of PEE, RSA and SD.

Finally, an additional limitation of existing reviews is the lack of nuanced insight into burnout experiences of different types of athletes; with the exception of Bicalho and Costa's (2018) review, which focused on elite athletes, and the soccer-specific review by Sarmento et al. (2021), the existing systematic reviews (e.g. Goodger et al., 2007; Li et al., 2013) did not distinguish between different samples of athletes in their inclusion criteria, instead including athletes across all sports and levels. While athletes can be divided into subgroups using different criteria, another potentially useful division in the context of athlete burnout is sport type (Lin et al., 2021), whereby sports are classified as individual or team sports. Team sports can be operationalised as those in which one can compete as a team of two or more players, and individual competition is not possible (e.g. football, basketball or hockey; e.g. Gustafsson et al., 2016; Reche et al., 2018). Conceptually, it can be argued that both the sporting environments and the athletes have unique characteristics that may impact the experience of burnout; team environments are characterised by substantial levels of social-interaction and cooperation among a group, with cohesion and team-work necessary for success, and shared experiences of failure (McEwan & Beauchamp, 2020). In contrast, individual-sport athletes may feel sole responsibility for successes and failures, but also often have a closer coach-athlete relationship (Rhind et al., 2012).

In the context of burnout, existing research highlights potential differences in the experiences of team and individual-sport athletes. In contrast to early claims in the burnout literature that burnout may be more common in individual sports (Coakley, 1992; Smith, 1986), researchers have identified higher levels of RSA (Nafian et al., 2014; Reche et al., 2018), PEE (Davis et al., 2019; Gustafsson et al., 2007; Nafian et al., 2014) and SD (Nafian et al., 2014) in male and female team-sport athletes when compared to their individual-sport counterparts. In addition, team-sport athletes have been shown to experience a more ego-orientated motivational climate (van de Pol & Kavussanu, 2012), higher levels of maladaptive perfectionism (Nixdorf et al., 2016) and perceived stress (Nafian et al., 2014), and lower levels of autonomy (Nia & Besharat, 2010), positivity, resilience, self-esteem and self-efficacy (Laborde et al., 2016) compared to their individual sport counterparts, all of which have been associated with increased levels of burnout (Gustafsson et al., 2018; Koçak, 2019; Martínez-Alvarado et al., 2021; Vitali et al., 2015). These findings suggest that team-sport athletes are at a greater risk of experiencing burnout. However, in contrast, Cremades and Wiggins (2008) identified lower levels of RSA in team-sport athletes compared to those competing individually, and Baella-Vigil et al. (2020) report a protective factor of team-sport participation against total burnout (TB). Team-sport athletes have also been shown to report less depressive symptoms (Nixdorf et al 2016; Sabiston et al., 2016) and higher levels of enjoyment (van de Pol & Kavussanu, 2012), characteristics that are associated with lower levels of burnout (De Francisco et al., 2016; Woods et al., 2021). In addition, a systematic review of the benefits of sport participation indicates that athletes involved in team sports experience more positive social and psychological outcomes than those involved in individual sports (Eime et al., 2013). Finally, the specific stressors reported by team and individual-sport athletes have been shown to differ (Nicholls et al., 2007).

Taken together, the differences identified across sport-types in both levels of burnout reported and factors associated both positively (e.g. maladaptive perfectionism) and negatively (e.g. enjoyment) with burnout in the existing literature suggest that the experience of burnout may differ for team- versus individual-sport athletes. In addition, Gustafsson et al. (2014) noted in their citation analysis of the burnout research that just one of the top 11 most cited articles included team-sport athletes, and suggested that additional exploration of burnout in team-sports is warranted (Gustafsson et al., 2014). As such, it is the researcher's argument that, considering the breadth and variety of the research on athlete burnout, collating and synthesizing the literature from team-sport athletes specifically while simultaneously employing the multi-dimensional conceptualisation of burnout and broadening the variety of variables examined in this review, will provide useful and nuanced insight into the key factors associated with burnout in team sports. Such insight was viewed as in important step in the context of the current thesis.

2.3 Aims and Objectives

The aims of this systematic review were two-fold; firstly, in line with the key purpose of a systematic review (Chandler et al., 2019), we aimed to collate and synthesise the quantitative research that examines the association between any variable and athlete burnout (or one or more of its subcomponents) in team-sport athletes. Secondly, where possible, we aimed to employ a meta-analytic technique to analyse the strength of the evidence for the associations examined most frequently. The specific objectives can be described as follows;

1. Describe the key characteristics of existing quantitative studies on burnout and related variables, including sample size, gender breakdown, the nature of the team sport, playing level, measures used, and study design.
2. Identify the range of variables that have been assessed in relation to the dimensions of athlete burnout in quantitative studies of team-sport athletes.

3. Collate the burnout-variable associations and identify the degree to which they are repeated across studies.
4. Where a burnout-variable relationship was examined in three or more independent samples, it was synthesized using a meta-analytic technique to assess the consistency of this relationship across studies, while relationships examined in less than three independent samples were included in a narrative synthesis.

2.4 Method

2.4.1 Search Strategy

The researcher adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher et al., 2009) guidelines in conducting this. The PRISMA checklist is available as an appendix (see Appendix A). In line with previous systematic reviews conducted in the area (Bicalho & Costa, 2018; Gustafsson et al., 2014; Li et al., 2013), we systematically searched the following electronic databases: SportDiscus, PsychInfo/PsychArticles, ERIC, PubMed, Medline, Web of Science and CINAHL, using the search strategies outlined in Table 2.1 This approach was supplemented with manual searches of the reference lists of each of the full-text papers identified for inclusion in the review, and of the four systematic reviews that have previously been conducted in the area of athlete burnout. The last search of databases took place on 17/11/2021.

Table 2.1

Search strategy used for each database

Database	Search Strategy
SportDiscus	(DE "Burnout (Psychology)" AND Athletes (explode) or Sports (explode))
PsychInfo (including PsychArticles)	(burnout OR "exhaustion" OR "reduced sense of accomplishment" OR "sport devaluation" OR "depersonalisation") AND Athlete (explode) OR Sport (explode)
ERIC	(MAINSUBJECT.EXACT.EXPLODE("Burnout") AND (MAINSUBJECT.EXACT.EXPLODE("Athletics") OR MAINSUBJECT.EXACT.EXPLODE("Athletes"))
MedLine	"Burnout" OR "exhaustion" OR "sport devaluation" OR "reduced sense of accomplishment" OR "depersonalisation" AND (MH "Athletes") OR (MH "Sports+")
PubMed	"burnout" OR "exhaustion" OR "reduced sense of accomplishment" OR "sport devaluation") OR "depersonalisation" AND ("Athletes"[Mesh]) OR "Sports"[Mesh]
Web of Science	TS=(Burnout OR "athlete burnout" OR "exhaustion" OR "reduced sense of accomplishment" OR "sport devaluation" OR "depersonalisation") AND TS=(athlete Or sport OR exercise OR "physical activity") ***Searches limited to social sciences citation index**
CINAHL	"burnout" OR "athlete burnout" OR "exhaustion" OR "reduced sense of accomplishment" OR "sport devaluation" OR "depersonalisation" AND (MH "Athletes+") OR (MH "Sports+")

2.4.2 Eligibility Criteria

To be eligible for inclusion in this review, a study must have (1) quantitatively analysed the relationship between athlete burnout and another factor, (2) been available in English and (3) used the ABQ (Raedeke & Smith, 2001). The decision to exclude papers that did not use the ABQ (Raedeke & Smith, 2001) was taken to ensure consistency in the conceptualisation of burnout as multi-dimensional syndrome characterised by the dimensions of PEE, RSA and SD (Raedeke, 1997), in line the definition employed throughout this thesis. Finally, studies (4) must have included participants from team sports, which could be disaggregated from other data if individual sports were also included. Team sports were are operationalised as those in which one can compete as part of a group of 2 or more players only, and no individual competition exists, such as soccer or basketball (e.g. Gustafsson et al., 2016; Reche et al., 2018). Systematic reviews, theoretical papers, dissertations and conference abstracts were also excluded.

2.4.3 Data Extraction

Articles were screened independently by the researcher and her colleague, using Covidence software. Both reviewers had to reach agreement before an article was excluded or progressed to the next stage. A third reviewer was available if any conflicts could not be resolved. Reviewers screened titles and abstracts first. Papers that passed this stage moved forward to full-text review. The researcher extracted and summarised the key characteristics of the papers that were eligible for inclusion, including (1) authors and year published, (2) population location, (3) sample size and gender breakdown, (4) age of participants, sport (5) level and (6) type, (7) study design, (8) the variable-burnout relationship(s) examined, including any (9) mediating, (10) moderating or (11) predictive relationships in longitudinal studies, and the (12) measures used.

2.4.4 Quality assessment

The researcher and her colleague critically appraised the papers independently using the quantitative research quality appraisal guidelines set out by Jefferies et al. (2012), which were informed by the checklist developed by Crombie (1996). A third reviewer was available to consult where conflicts in quality appraisal could not be resolved. Articles received a score of 1 (met the criteria), 0.5 (partially fulfilled the criteria), or 0 (failed to meet the criteria) across 12 domains, including (1) *clearly identified aims*, (2) *clear description of participant eligibility and recruitment strategy*, (3) *clear description of population features and design*, (4) *description of non-responders and non-participants*, (5) *inclusion of a control group*, (6) *justification of sample size*, (7) *relevant,* (8) *validated and adequately described measures*, (9) *adequate discussion of results*, (10) *limitations identified and acceptable*, (11) *statistical methods described* and (12) *statistical methods appropriate*. Each paper was then rated as either poor quality (score of 0-4), adequate quality (score of 4.5-8), or good quality (score of 8.5-12), as per the cut-offs employed by Dunne et al. (2016) when using the same items.

2.4.5 Data Syntheses

The primary aim of this review was to synthesise the literature examining factors associated with athlete burnout in team sport. However, when considering the range of different factors examined, the limited number of studies examining each relationship, and the substantial variability in study design, it was evident that a traditional meta-analysis would not be appropriate. Specifically, the diversity in measures employed across studies and the limited number of papers for each variable-burnout dimension relationship did not allow for the accurate estimation and averaging of effect sizes associated with traditional methods of meta-analysis (Cerin et al., 2017). Furthermore, traditional methods, such as the random effects model, have been shown to be unreliable when used with a small number of studies (Borenstein et al., 2009), as was the case in this review. As three studies are the median number included in meta-analyses in Cochrane's database (Davey et al., 2011), where no more than two studies examined a relationship this was classified as a 'small number' in the context of this review (Cerin et al., 2017). As such, a narrative synthesis was employed to summarize key findings, as outlined below.

However, Borenstein et al. (2009) note that the utility of a narrative synthesis is reduced where the number of studies involved increases. As such, with the aim of providing greater clarity in data synthesis and ensuring appropriate conclusions could be drawn from this review, where variable-burnout dimension relationships had been examined across three or more independent samples of athletes the researcher employed a conservative weighted meta-analytic technique devised by Cerin et al. (2017). This method allowed for a quantitative assessment of the strength of evidence for the burnout-correlate relationships that were most frequently examined in the literature, and has been employed in a range of existing studies (e.g. Barnett et al., 2018; Chandrabose et al., 2019).

2.4.5.1 Weighted Meta-Analysis (WMA)

Papers were first categorised based on variable(s) examined in relation to burnout. Only variables that were examined in relation to the same dimension of burnout (i.e. total burnout, PEE, RSA, SD) in three or more independent samples of team-sport athletes were eligible for inclusion in the WMA (Cerin et al., 2017). Univariate correlations between each variable and the dimensions of burnout were extracted to allow for comparison across studies; each variable-burnout dimension relationship was coded as significantly positive (P), significantly negative (N), or not statistically significant (∅; Cerin et al., 2017). Papers that reported on multiple different variable-burnout dimension relationships were counted as distinct findings (Cerin et al., 2017). Where papers reported multiple results for the same variable-burnout dimension relationship (e.g. at multiple time-points), each result was assigned a fractional weight, such that the summed weight of results for the same variable-burnout dimension relationship reported in each paper was 1.

Each paper was assigned a score for sample size (*N*; including team-sport athletes only), as follows; $N \leq 100 = 0.25$, N 101 – 300 = 0.5, N 301 – 500 = 1.00, N 501 – 1000 = 1.25, N 1001 – 2500 = 1.5, and $N > 2500 = 1.75$ (Cerin et al., 2017). These sample size scores were combined with the quality appraisal score to create an ‘article weight’ (Cerin et al., 2017). Each P association was assigned a z-score of 1.96 and each N association was assigned a z-score of -1.96 (Cerin et al., 2017). This z-score value is just significant at the *p*-level of 0.05, and as such the results reported herein are conservative. Statistically non-significant (∅) associations were assigned a z-value of 0. In the final step, the 'article weight' was multiplied by the z-score to create a weighted z-value, which was then multiplied by the appropriate fractional weight. The *p*-values associated with the weighted z-value were then obtained, using a method developed by Rosenthal (1980) and also employed by Cerin et al. (2017). Two-tailed *p*-values <0.001 were recognised as providing evidence of very strong significant associations, while *p*-values <0.01 were seen to indicate evidence of strong significant associations (Bland, 2000; Cerin et al., 2017). *P*-values <0.05 were evidence of significant associations.

2.4.5.2 Narrative Synthesis

Variables that did not meet the criteria for inclusion in the WMA were synthesised in a narrative results section.

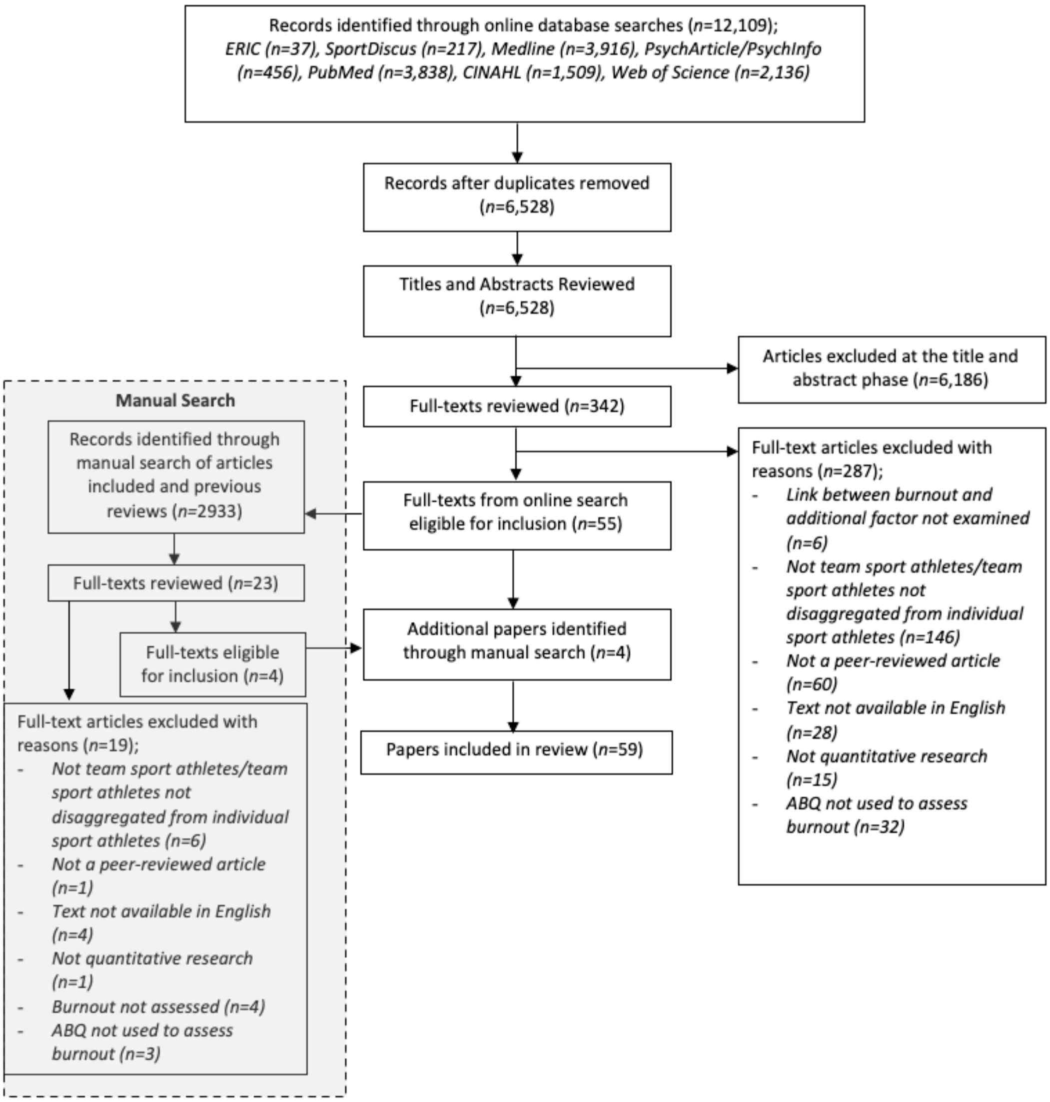
2.5 Results

2.5.1 General Findings and Sample Characteristics of Papers

The researcher identified 12,109 records from the online search, with 55 papers meeting the criteria for inclusion in the review. The PRISMA diagram in Figure 2.1 outlines the steps at which papers were excluded. Cohen's Kappa (Cohen, 1960) indicated strong agreement in inter-rater reliability at title and abstract screening (κ = 0.86; McHugh, 2012) and full-text review (κ = 0.86). Conflicting decisions, for example where a reviewer failed to notice that team and individual sport data was not disaggregated, were resolved through discussion. The third reviewer was not required. The researchers then manually searched the reference lists of these 55 papers and the existing reviews on athlete burnout published by October 2021 (Bicalho & Costa, 2018; Goodger et al., 2008; Li et al., 2013; Lin et al., 2021, Pacewicz et al., 2019; see Figure 2.1), which resulted in the identification four additional eligible papers.

Figure 2.1

PRISMA diagram: Overview of search results included and excluded at each stage of review.



As such, 59 papers met the criteria for inclusion in this systematic review, with 55 independent participant samples and four pairs of papers using the same sample (viz. Gonzalez et al., 2017; Grobbelaar et al., 2010; Isoard-Gautheur et al., 2012; Lopes-Veradi et al., 2015). As outlined in Table 2.2, 33 papers included male participants only, with 26 papers including a mixed-gender sample, and one including female athletes only (Amorose et al., 2009). Five papers did not specify the gender breakdown for team-sport athletes. As such, data was available from 8,723 male athletes, and 2,391 female athletes. Participants ranged in age from 10 – 60 years old. Athletes from a variety of different sports were examined; while the majority of papers included soccer (19 papers) and rugby players (ten papers), athletes from 16 other named team sports, namely volleyball (ten papers), basketball (eight papers), field hockey (five papers), handball (five papers), netball (four papers), cricket (2 papers), Gaelic games (two papers), baseball (two papers), ice hockey, roller hockey, water polo, futsal, lacrosse, American football, softball and Ultimate Frisbee (one paper each), were also represented. European samples were by far the most common (32 papers; total N = 7,706), followed by Oceania (seven papers; total N = 1,555), Asia (six papers; total N = 980), North America (including Mexico; six papers, total N = 1247), and South America (five papers; 4 independent samples, total N = 465). There were two papers from South Africa (total N = 41), with the same sample used for both. Thirty-seven papers employed a cross-sectional design, with the remaining 22 using a longitudinal design. Sixteen papers also examined moderating/mediating relationships.

Of the 22 papers utilising a longitudinal design, ten papers gathered data at two time points; the gap between data collection points ranged from three to six months. Three papers reported on data from three time points, with the time between data collection varying from one month to ten weeks. Nine studies reported on data that had been gathered at ≥ 4 timepoints; data was collected over periods ranging from eight weeks (Turner & Moore, 2016), to 2½ years (Isoard-Gautheur et al., 2015). A male-only sample was used in 14 of the longitudinal papers, while a female-only sample was used in one (Amorose et al., 2009). Seven studies used a mixed-gender sample. In total, 2,677 male athletes were included in longitudinal studies, compared to 781 female athletes. Soccer (nine papers) and rugby (five papers) were the team sports examined most often in the longitudinal papers included.

Table 2.2

Descriptive data extracted from all studies included in this review.

Ref. No.	Author(s) (Date)	Country	Sample Characteristics: *N* (Gender)	Age	Playing level	Sport(s)	Design	Quality appraisal	Variables examined in relation to burnout (measure used)
1	Adie, Duda & Ntoumanis (2008)	UK	539 (M=271, F=268)	18-36	Club (*n*=370), county (*n*=39), regional (*n*=70), national (*n*=48), international (*n*=12)	field hockey (n=135), cricket (n=108), netball (*n*=86), Ultimate Frisbee (*n*=55), basketball (*n*=42), American football (*n*=37), soccer (*n*=35), rugby (*n*=19), lacrosse (*n*=13), volleyball (*n*=9)	cross-sectional	8.5, Good quality	**Autonomy** (3 item measure; Sheldon et al., 2001), **relatedness** (Need for Relatedness Scale acceptance subscale; NRS; Richer & Vallerand, 1998), **competence** (Intrinsic Motivation Inventory (IMI) perceived competence subscale; McAuley et al., 1989), **autonomy supportive coach** (modified Health Care Climate Questionnaire, Williams et al. 1996)
2	Adie, Duda & Ntoumanis (2012)	UK	54 (all Male)	11-18	Youth elite	Soccer	longitudinal (6 time points)	10, Good quality	**Autonomy** (3 item measure; Sheldon et al., 2001), **relatedness** (Need for Relatedness Scale acceptance subscale; NRS; Richer & Vallerand, 1998), **competence** (Intrinsic Motivation Inventory (IMI) perceived competence subscale; McAuley et al., 1989), **autonomy supportive coach** (modified Health Care Climate Q'aire, Williams et al. 1996)
3#	Ahmed et al. (2015)	India	215 (all Male)	14-18	School state level	Soccer (*n*=70), basketball (*n*=65), volleyball (*n*=80)	cross-sectional	6.5, Adequate quality	**Sport type**
4	Al-Yaaribi & Kavussana (2017)	UK	272 (M=96, F=176)	16-35	Local (*n*=84), district (*n*=26), academy (*n*=73), club (*n*=13), national (*n*=76)	Netball (*n*=148), field hockey (*n*=79), soccer (*n*=45)	cross-sectional	9, Good quality	**Affect** (International Positive and Negative Affect Schedule-Short Form; PANAS; Thompson, 2007), **pro/anti-social behaviour** (Prosocial and Antisocial Behaviour in Sport Scale; Kavussanu & Boardley, 2009), **task cohesion** (Youth Sport Environment Questionnaire task cohesion subscale; Eys et al., 2009)
5	Alvarez et al. (2019)	Spain	360 (M=324, F=36)	12-18	Junior	Soccer	cross-sectional	8.5, Good quality	**Transformational parenting** (Transformational Parenting Q'aire; Morton e al., 2011), **Perceived Parental Autonomy Support** (Perceived Parental Autonomy Support Scale; Mageau et al., 2015)
6	Amorose et al. (2009)	U.S.	93 (all Female)	13-18	Club	Volleyball	longitudinal (2 time points)	9.5, Good quality	**Autonomy** (6-item measure; Hollembeak & Amorose, 2005), **relatedness** (sport orientated Feelings of Relatedness Scale; Richer & Vallerand, 1998), **competence** (IMI subscale; McAuley et al., 1989)

Ref. No.	Author(s) (Date)	Country	Sample Characteristics				Design	Quality appraisal	Variables examined in relation to burnout (measure used)
			N (Gender)	Age	Playing level	Sport(s)			
7#	Appleby et al. (2018)	UK	140 (M=64, F=76)	18-34	regional to professional	Rugby (*n*=33), soccer (*n*=20), netball (*n*=14), field hockey (*n*=13), Gaelic football (*n*=10)	longitudinal (2 time points)	8.5, Good quality	**Training load** (number of hours training per week), **teammate burnout** (Team Burnout Questionnaire, adapted ABQ; Raedeke & Smith, 2001)
8#	Baella-Vigil et al (2020)	Peru	352; team sport = 171 (M=126, F=45)	16-34	Not specified	Soccer (*n*=77), basketball (*n*=37), volleyball (*n*=36), rugby (*n*=21)	cross-sectional	8.5, Good quality	*Body image dissatisfaction*, **Sport Type** (team v. individual)
9	Balaguer et al. (2012)	Spain	597 (all Male)	11-14	Youth team	soccer	longitudinal (2 time points)	9, Good quality	**Coach autonomy support** (Sport Climate Questionnaire; SCQ; Balaguer et al., 2009); **coach controlling style** (Controlling Coach Behaviours Scale; CCBS; Bartholomew et al., 2010), **psychological need satisfaction** (composite score including IMI, perceived competence subscale, McAuley et al., 1989, 10-item measure, Reinboth & Duda, 2006, and NRS acceptance subscale, Richer & Vallerand, 1998), **psychological need thwarting** (Psychological Need Thwarting Scale; PNTS; Bartholomew et al., 2011)
10#	Chen et al. (2008)	Taiwan	200 (M=93, F=46)	16-18	high-level national competition	volleyball	longitudinal (2 time points)	6, Adequate quality	**Optimism** (Life Orientation Test; Scheier & Carver, 1985)
11	Cheval et al. (2017)	France	110 (all Male)	13-21	elite clubs	soccer	longitudinal (3 time points)	9, Good quality	**Autonomy, competence** (Need Satisfaction-Thwarting Scale; Cheval & Sarrazin, 2011), **coach autonomy support** (SCQ; Balaguer et al., 2009), **coach controlling style** (CCBS; Bartholomew et al., 2010)
12	Chiou et al (2020)	Taiwan	159 (M=139, F=20)	M≈20 SD≈2	collegiate	Soccer	cross-sectional	8.5, Good quality	**Student athletes life Stress** (College student-athletes' life stress scale; CSALSS, Lu et al., 2012), **Mental Energy state** (Athletic Mental Energy Scale, AMES; Lu et al., 2018)
13#	Chyi et al. (2018)	Taiwan	195 (M=138, F=57)	M=19.9;SD=1.3	Intercollegiate	basketball , volleyball, baseball	cross-sectional	9, Good quality	**Student athletes life Stress** (CSALSS; Lu et al., 2012), **Distress and Counter Stress** (Perceived Stress Scale;PSS; Cohen et al., 1983)
14#	Cremades & Wiggins (2008)	U.S.	130 (M=56, F=74); team *n*=91	18-25	NCAA Div1 (*n*= 96) and Div2 (*n*=39) athletes	Team: Basketball (*n*=29), baseball (*n*=22), ice hockey (*n*=40)	cross-sectional	8, Good quality	*Anxiety,* **sport type** (team v. individual; demographic question), *Gender*

Ref. No.	Author(s) (Date)	Country	Sample Characteristics				Design	Quality appraisal	Variables examined in relation to burnout (measure used)
			N (Gender)	Age	Playing level	Sport(s)			
15	Cresswell (2009)	England	183 (all Male)	18-36	professional	rugby	longitudinal (2 time points)	9, Good quality	**Rugby hassles, money hassles, Social support** (3 subscales on 16-item inventory; Cresswell & Eklund, 2004)
16	Cresswell & Eklund (2004)	New Zealand	199 (all male)	19-33	Semi- and full-professional	rugby	cross-sectional	8.5, Good quality	**Money hassles, rugby hassles, competence, perceived control, social support** (5 subscales on 21-item inventory; Cresswell & Eklund, 2004)
17	Cresswell & Eklund (2005)	New Zealand	102 (all male)	19-32	professional	rugby	longitudinal (3 time points)	9.5, Good quality	**Motivation** (intrinsic, amoviation, extrinsic) (Sport Motivation Scale; SMS; Pelletier et al., 1995)
18	Creswell & Eklund (2005b)	New Zealand	392 (all male)	18-42	amateur	rugby	cross-sectional	9.5, Good quality	**Motivation** (intrinsic, amoviation, extrinsic) (SMS; Pelletier et al., 1995)
19	Cresswell & Eklund (2005c)	New Zealand	199 (all male)	19-33	professional	rugby	cross-sectional	9.5, Good quality	**Motivation** (intrinsic, amoviation, extrinsic) (SMS; Pelletier et al., 1995)
20	Cresswell & Eklund (2006)	New Zealand	109 (all male)	19-32	professional	rugby	longitudinal (3 time points)	9, Good quality	**Playing experience, playing position, injury, starting status** (demographic questions)
21	Curran et al. (2011)	UK	173 (all Male)	13-18	professional academies	soccer	cross-sectional	9.5, Good quality	**Passion** (Passion Scale; Vallerand et al., 2003), **self-determined motivation** (SMS; Pelletier et al., 1995)
22	Curran et al. (2013)	UK	149 (all Male)	12-21	elite players	soccer	cross-sectional	9, Good quality	**Passion** (Passion Scale; Vallerand et al., 2003), **basic psychological need satisfaction** (composite score including: 6-item measure, Standage et al., 2005, IMI competence subscale, McAuley et al., 1989, and acceptance scale; Richer & Vallerand, 1989)
23	da Silva et al (2021)	Brazil	228 (all Male)	*M*=18.1*;* *SD*=1.2	Professional (*n*=69); amateur (*n*=169)	soccer	cross-sectional	9, Good quality	**Coping** (Athletic coping skills inventory; Miranda et al., 2018)
24#	Davis et al. (2019)	UK	210(F=59, M=151); 74% team sports	15-31	Regional, national and international	Team: hockey, soccer, rugby, netball, handball, volleyball	cross-sectional	9, Good quality	*Age, gender,* **sport type (team v. individual)***, years of competitive experience, years played with current team, level of sport competition (demographic questions),* **coach-athlete relationship quality** (Coach-Athlete Relationship Questionnaire, Jowett & Ntoumanis, 2004)
25#	DeFreese & Smith (2013a)	U.S.	227 (all Male)	18-24	collegiate Div. 2 and 3	American football	cross-sectional	9.5, Good quality	**Athlete engagement** (Athlete Engagement Q'aire; Lonsdale et al., 2007), **areas of work life** (Areas of Worklife Survey, adapted sport team context; Leiter & Maslach, 2000)

Ref. No.	Author(s) (Date)	Country	Sample Characteristics				Design	Quality appraisal	Variables examined in relation to burnout (measure used)
			N (Gender)	Age	Playing level	Sport(s)			
26	DeFreese & Smith (2013b)	U.S.	235 (M=88, F=144)	18-25	college athletes	63 different teams across 11 fall or winter sports; specific sports not specified	cross-sectional	8.5, Good quality	**Perceived teammate support availability** (Social Provisions Scale; Cutrona & Russell, 1987), **received support from teammates** (Inventory of Socially Supportive Behaviours; Barrera et al., 1981), **teammate support satisfaction** (Social Support Questionnaire; Sarason et al., 1987), **self-determined motivation** (SMS; Pelletier et al., 1995)
27#	Dubuc-charbonneau et al. (2014)	Canada	145 (M=83, F=62); 110 team sport	17-27	college athletes	Team sports = hockey (*n*=78), basketball (*n*=36), volleyball (*n*=10)	cross-sectional	9, Good quality	**Sport type** (demographic question) *gender, year of university, academic programme*
28#	Esmaeili et al (2012)	Iran	201 (M=91, F=110)	Not speci-fied	Preferred league	basketball	Cross-sectional	6, Adequate quality	**Perception of Coaches decision-making** (Decision-making styles scale; Scott & Bruce, 1995)
29#	Fagundes et al (2019)	Brazil	32 (all male)	*M*=24.2,*SD*=4.6	Professional	Soccer	longitudinal (8, grouped as 2)	9, Good quality	**Motivation** (SMS; Pelletier et al., 1995), **rest/stress** (RESTQ-Sport 76; Kellman & Kallus, 2001; Costa & Samulski, 2005)
30#	Gomes et al. (2017)	Portugal	673 (M=588, F=85)	12-19	National first and second division	Soccer (*n*=323), volleyball (*n*=86), basketball (*n*=76), rugby (*n*=36), futsal (*n*=33), handball (*n*=33), water-polo (*n*=27), roller hockey (*n*=14)	cross-sectional	9, Good quality	**Anxiety** (Sport Anxiety Scale-2; Cruz & Gomes, 2007), **cognitive appraisal** (Cognitive Appraisal Scale, 2016)
31	Gonzalez et al. (2016)	Spain	360 (all Male)	11-13	grassroots youth	soccer	longitudinal (4 time points)	9.5, Good quality	**Coach autonomy support** (SCQ; Balaguer et al., 2009), **Coach controlling style** (CCBS; Bartholomew et al., 2010), **autonomy** (Perceived Autonomy Scale; Reinboth & Duda, 2006), **competence** (IMI perceived competence subscale; McAuley et al., 1989), **relatedness** (NRS acceptance subscale; Richer & Vallerand, 1998), **need thwarting** (Psychological Need Thwarting Scale; Bartholomew et al., 2011)
32*	Gonzalez et al. (2017)	Spain	597 (all Male)	11-14	Players in a soccer school	soccer	longitudinal (2 time points)	9, Good quality	**Coach autonomy support** (SCQ; Balaguer et al., 2009), **Coach controlling style** (CCBS; Bartholomew et al., 2010), **autonomy** (Perceived Autonomy Scale; Reinboth & Duda, 2006), **competence** (IMI perceived competence subscale; McAuley et al., 1989), **relatedness** (Need for Relatedness Scale acceptance subscale; Richer & Vallerand, 1998)

Ref. No.	Author(s) (Date)	Country	Sample Characteristics				Design	Quality appraisal	Variables examined in relation to burnout (measure used)
			N (Gender)	Age	Playing level	Sport(s)			
33	Grobbelaar et al. (2010)	South Africa	41 (all Male)	19-24	students in senior training squad	rugby	longitudinal (7 time points)	9, Good quality	**Playing experience, playing position, starting status** (demographic questions)
34*	Grobbelaar et al. (2011)	South Africa	41 (all Male)	19-24	students in senior training squad	rugby	longitudinal (7 time points)	9, Good quality	**Positive/Negative affect** (Stellenbosch Mood Scale; Terry et al., 2003)
35	Gustafsson et al. (2013)	Sweden	238 (M=166, F=71)	15-19	elite national development programme	soccer	cross-sectional	8.5, Good quality	**Positive/Negative affect** (PANAS; Kercher, 1992), **perceived stress** (PSS; Cohen et al., 1983), **hope** (Trait Hope Scale; Snyder et al., 1991)
36	Hill (2013)	England	171 (all Male)	13-19	junior elite academies	soccer	cross-sectional	9, Good quality	**Perfectionism** (Brief Multidimensional Perfectionism Scale; H-MPS; Cox et al., 2002)
37	Hill, & Appleton (2011)	UK	202 (all Male)	16-24	professional & semi-professional	rugby	cross-sectional	9, Good quality	**Perfectionism** (MPS; Hewitt & Flett, 1991), **perfectionist cognitions** (Perfectionism Cognitions Inventory; Flett et al., 1998)
38	Hill et al. (2008)	UK	151 (all Male)	10-18	selected for centre of excellence	soccer	cross-sectional	9, Good quality	**Perfectionism** (MPS; Hewitt & Flett, 1991), **unconditional self-acceptance** (unconditional self-acceptance questionnaire; Chamberlain & Haaga, 2001)
39	Hodge et al. (2008)	New Zealand	133 (all Male)	16-26	provincial development academies	rugby	cross-sectional	9, Good quality	**Autonomy, competence, relatedness** (8-item measure; Deci et al., 2001; McAuley et al., 1989)
40*	Isoard-Gautheur et al. (2013)	France	309 (M=152, F=157)	M=15.4 SD=0.90	elite training centres	handball	longitudinal (2 time points)	9, Good quality	**Competence** (adapted Perceived Competence in Life Domains Scale), **achievement goals** (Achievement Goals Questionnaire; Conroy et al., 2003), **coach climate** (Q'aire of the Roles of Significant Others in the Involvement of the Achievement Goals in Sport; LeBars et al., 2006)
41#	Isoard-Gautheur et al. (2015)	France	895 (M=469, F=426)	13-18	elite training centres	handball	longitudinal (5 time points)	9.5, Good quality	**Gender, age** (demographic questions)
42	Isoard-Gautheur et al. (2012)	France	309 (M=152, F=157)	*M*=15.4 *SD*=0.90	elite training centres	handball	longitudinal (2 time points)	9.5, Good quality	**Competence** (Perceived Competence in Life Domains Scale; Losier et al., 1993), **autonomy** (Perceived Autonomy Toward Life Domains Scale; Blais et al., 1990), **relatedness** (adapted Feelings of Relatedness Scale, Richer & Vallerand, 1998), **motivation** (SMS; Briere et al., 1995), **coaching style** (Interpersonal Behaviour Scale; Otis & Pelletier, 2000)
43#	Li et al. (2018)	China	10 (all male)	*M*=24.80	Blind national team	soccer	longitudinal (5 time points)	9, Good quality	**Sleep** (Pittsburgh Sleep Quality Index; Buysse, reynolds, Monk, Berman, & Kupfer, 1989)

Ref. No.	Author(s) (Date)	Country	Sample Characteristics				Design	Quality appraisal	Variables examined in relation to burnout (measure used)
			N (Gender)	Age	Playing level	Sport(s)			
44	Lopes Veradi et al. (2014)	Brazil	134 (all Male)	*M* Pro. =22; Amat = 17.8	Pro. (*n*=71), amateurs (*n*=63)	soccer	cross-sectional	8.5, Good quality	**Playing experience, playing position** (demographic questions)
45# *	Lopes Verardi et al. (2015)	Brazil	134 (all Male)	*M* Pro. =22 Amat. =17.2	professional (*n*=71), amateurs (*n*=63)	soccer	cross-sectional	7.5, Adequate quality	**Playing experience** (demographic questions)
46	Martinez-Alvardo et al (2021)	Mexico	453 (M=249, F=204)	12-18	Not specified	football (*n*=193), soccer (*n*=142), volleyball (*n*=61), basketball (*n*=45), softball (*n*=12)	cross-sectional	8.5, Good quality	**Passion** (Passion Scale; Vallerand et al., 2003), **Positivity** (P-Scale; Caprara et al., 2012), **Social Support** (Scale of perceived social support by athletes; Cresswell & Eklund, 2004)
47	Morales-Sanchez et al (2020)	Spain	103 (all male)	12-17	Local, regional	soccer	cross-sectional	9, Good quality	**Perception of coach's controlling interpersonal style** (Controlling Coach Behaviours Scale, Bartholomew et al, 2010); **Basic psychological need thwarting** (Psychological Need Thwarting Scale; Bartholomew et al, 2011)
48	Pires et al (2021)	Not specified	54 (M=28, F=26)	18-35	professional	volleyball	longitudinal (4 time points)	9, Good quality	**Coping** (Athletic Coping Skills Inventory; Miranda et al., 2018)
49#	Reche et al. (2018)	Spain	449(M=320, F=129), team=325	14-60	train at least twice a week	Sports not specified	cross-sectional	8.5, Good quality	*Exercise dependence, sport dedication, gender, age,* **sport type** (demographic questions)
50	Reinboth & Duda, (2004)	UK	256 (all Male)	*M*≈16; *SD*≈1	club or school teams	Soccer and cricket	cross-sectional	8.5, Good quality	**Motivational climate** (Perceived Motivational Climate in Sport Questionnaire-2; Newton et al., 2000)
51	Schellenberg et al, (2013)	Australia	421 (Male=219, F=202)	M=19.68;SD =1.83	college players	volleyball	longitudinal (2 time points)	9.5, Good quality	**Goal attainment** (Attainment of Sport Achievement Goals Scale; Gaudraeu et al., 2004), **passion** (Passion Scale; Vallerand, 2010), **coping** (Coping Inventory for Competitive Sport; Gaurdreau & Blondin, 2002)
52#	Skwiot et al (2020)	Poland	207; team = 72 (all male)	M≈20, SD≈1	Not specified	soccer	cross-sectional	7, Adequate quality	**Perfectionism** (Sport Multidimensional Perfectionism Scale-2); **Sport Type (**soccer compared to dancing and karate)
53#	Smith et al. (2010)	Sweden	206(M=133, F=73) team=102,	16-19	students in sport colleges	Specific sports not specified	cross-sectional	9, Good quality	**motivational climate** (PMCSQ-2; Newton et al., 2000), **training load** (hours training), **perceived stress** (PSS; Cohen et al., 1983)

Ref. No.	Author(s) (Date)	Country	Sample Characteristics				Design	Quality appraisal	Variables examined in relation to burnout (measure used)
			N (Gender)	Age	Playing level	Sport(s)			
54	Smith et al. (2018)	England	108 (all Male)	14-21	professional clubs	soccer	longitudinal (2 time points)	9, Good quality	**Perfectionism** (MPS; Cox et al., 2002)
55#	Torrado et al. (2017)	Spain	219 (all Male)	17-38	regional 79%, national 18.7%,local 1.4%,international 0.9%	Soccer (*n*=132), basketball (*n*=87)	cross-sectional	9, Good quality	**Perceived peer leadership** (Sports Peer Leadership Scale; Torrado et al., 2015)
56#	Turner & Moore (2016)	Ireland	46 (all Male)	U15 and U16	county development squad	Gaelic football	longitudinal (6 time points)	9, Good quality	**Irrational beliefs** (shortened General Attitudes and Beliefs Scale; Lidner et al., 1999)
57	Vitali et al. (2015)	Italy	87 (M=41, F=46)	15-18	Club level	Basketball (*n*=45), volleyball (*n*=42)	cross-sectional	9, Good quality	**Competence** (single item measure), **motivational climate** (PMCSQ -2; Newton et al., 2000), **resilience** (adapted 10-item scale)
58#	Woods et al (2020)	Ireland	201 (M=97, F=104)	18-41	Any competitive team	Gaelic games	cross-sectional	9, Good quality	**Sport Commitment** (The Sport Commitment Questionnaire; Scanlan et al., 2016)
59#	Yildiz (2015)	Turkey	102 (all Male)	Avg. age 25.55	Professional 2nd division	soccer	cross-sectional	8.5, Good quality	**Bullying** (Negative Acts Questionnaire – Football; Yildiz, 2015)

Note: Quality Appraisal Rating: poor quality = score of 0-4, adequate quality = score of 4.5-8, good quality = score of 8.5-12 (Jeffries et al., 2012); # = results included in narrative synthesis only. * = Studies that use a sample which has previously been used in another study. *Variable in Italics* = results for athletes competing in team and individual sports are not disaggregated. These variables are not included in the results section.

2.5.2 Quality Appraisal

Inter-rater reliability in independent quality appraisal indicated substantial agreement among the reviewers (κ = 0.8). Where there were conflicting scores, the reviewers discussed and agreed on a final value. As outlined in Table 2.2, 53 papers received a 'good quality' rating of 8.5 or above and six papers received an 'adequate quality' rating between 6.5 and 8. We found none of the papers to be of poor quality. Across the 12 criteria on which quality was appraised, all papers fully met the criterion of *no evidence of selective reporting*. Papers also consistently met, either in full or partly in a small a number of cases, the criteria *for clearly stated aims*, the *description of features of population and design*, *appropriate use and adequate description of statistical methods*, *use of relevant, validated and adequately-described measures*, and the *adequate discussion of results*. Only three papers met the criterion of sample size justification, with all other papers failing to do so. Finally, while some papers did provide some description of non-responders and non-participants, this criterion was not met in full by any paper (see Appendix B).

2.5.3 Burnout Correlates Identified

Across the 59 papers included, 125 different variables have been examined in relation to total burnout (TB) or at least one dimension of burnout. The variables examined in each paper are outlined in Table 2.2. These variables can be grouped under 41 different overarching constructs; for example, *socially-prescribed perfectionism* and *self-oriented perfectionism* are both forms of perfectionism. Twenty variables were examined in ≥3 independent samples. However, the 'playing position' and 'sport type' variables could not be included in the WMA as no direction (i.e. positive or negative) can be assigned to the relationship between these categorical variables and burnout, in line with requirements for the analysis. As such, WMA was conducted to assess the relationships between 18 variables and athlete burnout. Table 2.3 outlines the variable-burnout dimension relationships included in the WMA, paper reference numbers (as per Table 2.2), the number of results reported (i.e. where papers report multiple findings for the same relationship), and whether the relationship(s) reported were P, N or ∅. The number of P, N and ∅ relationships reported for each variable-burnout dimension relationship is outlined in Table 2.4.

One-hundred-and-five variable-burnout relationships were not assessed in at least two other independent samples, and thus were not eligible for inclusion in the WMA. See the narrative synthesis section for results relating to these variables, as well as ‘sport type’ and ‘playing position’, and longitudinal and mediating/moderating relationships.

2.5.4 Weighted Meta-Analysis

The 39 papers examined using WMA included 36 independent participant samples, with three sets of papers using the same sample (viz. Gonzalez et al., 2017; Isoard-Gautheur et al., 2012). Nine over-arching variables, which are divided into 18 different correlates of athlete burnout, were examined (see Table 2.3). For the purpose of analysis, papers examining *self-oriented perfectionism (SOP)* were included under *personal standards perfectionism* and those examining *socially prescribed perfectionism (SPP)* were included under *evaluative concerns*, as *SOP* and *SPP* are sub-dimensions of *personal standards* and *evaluative concerns perfectionism* respectively (Hewitt & Flett, 1991; Hill, 2013). The subscales of *concern over mistakes, perceived parental pressure,* and *perceived coach pressure* (Skwiot et al., 2020) were also included under the SPP dimension of perfectionism (Dunn et al., 2006). *Perceived social support*, *actual social support received* and *satisfaction with social support* (DeFresse and Smith, 2013b) were included under the *social support* variable. In line with the method outlined above, where multiple subscales were used to assess the same overarching variable-burnout dimension relationship, a fractional weight was assigned such that the total weight of the paper was 1.

As outlined in Table 2.4, sufficient papers were available to conduct WMA across TB, PEE, RSA and SD for the *competence, harmonious passion* and *obsessive passion* variables only. WMA were conducted across PEE, RSA and SD for nine of the variables and across TB and PEE for three variables. Three variables were analysed in relation to TB alone. This resulted in a total of 48 independent WMA, the results of which are outlined in Table 2.4 and below. Significant relationships identified for TB, PEE, RSA and SD are also outlined in Figure 2.2.

2.5.5 Narrative Synthesis of Additional Results

2.5.5.1 Additional Cross-Sectional Relationships. Narrative syntheses of the additional 107 variables assessed in relation to at least one dimension of burnout are provided in Table 2.5.

2.5.5.2 Longitudinal Relationships. Twenty-two papers employed a longitudinal research design, wherein researchers assessed whether burnout at a later time-point was predicted by scores on a related variable at an earlier timepoint. Fourteen overarching variables, with 33 specific subscales, were examined as temporal predictors of burnout. A narrative synthesis of the results are provided in Table 2.6. Excluding *time in the season*, *age* and the *overall* and *sport-specific stress* and *recovery* subscales (Fagundes et al., 2019), all other relationships were also analysed cross-sectionally, as such, are reported in the WMA or cross-sectional narrative sections.

Table 2.3.

Breakdown of the papers examining each variable-burnout dimension relationship included in the WMA

	Athlete burnout correlates	Burnout dimensions examined Study Reference *(# of associations)*				# of studies [k]			
		TB	PEE	RSA	SD	TB	PEE	RSA	SD
Satisfaction of BPN	Autonomy	5, 6(*2*), 11,32, 39	1, 2(*6*), 16, 42(*2*)	/	/	5 [5]	5 [5]	/	/
	Competence	6(*2*), 11,16,32, 39	1, 2(*6*), 16, 40(*2*)*, 42(*2*), 53	16, 40(*2*)*, 42(*2*), 57	16, 40(*2*)*, 42(*2*), 57	5 [5]	6 [5]	4 [3]	4 [3]
	Relatedness	6(*2*), 30, 39	1, 2(*6*), 42(*2*)			3 [3]	3 [3]		
Motiv a-tion	Intrinsic Motiv.	/	17, 18, 19, 42(*4*)	17, 18, 19, 42(*4*)	17, 18, 19, 42(*4*)	/	4 [4]	4 [4]	4 [4]
	Amotivation	/	17, 18, 19, 42(*2*)	17, 18, 19, 42(*2*)	17, 18, 19, 42(*2*)	/	4 [4]	4 [4]	4 [4]
	Extrinsic/External Mot.	/	17, 18, 19, 42(*2*)	17, 18, 19, 42(*2*)	17, 18, 19,42(*2*)	/	4 [4]	4 [4]	4 [4]
Affect	Positive Affect	/	4, 34(*7*), 35	4, 34(*7*), 35	4, 34(*7*), 35	/	3 [3]	3 [3]	3 [3]
	Negative Affect	/	4, 34(*35*), 35	4, 34(*35*), 35	4, 34(*35*), 35	/	3 [3]	3 [3]	3 [3]
Pass-ion	Obsessive Passion	22, 46, 51	21, 22, 46	21, 22, 46	21, 22, 46	3 [3]	3 [3]	3 [3]	3 [3]
	Harmonious Passion	22, 46, 51	21, 22, 46	21, 22, 46	21, 22, 46	3 [3]	3 [3]	3 [3]	3 [3]
Perfecti on-ism	Personal standards/self-oriented	/	36, 37, 38, 52(*2*)	36, 37, 38, 52(*2*)	36, 37, 38, 52(*2*)	/	4 [4]	4 [4]	4 [4]
	Evaluative concerns/ socially prescribed	/	36, 37, 38, 52(*2*)	36, 37, 38, 52(*2*)	36, 37, 38, 52(*2*)	/	4 [4]	4 [4]	4 [4]
Coa ch-ing	Controlling coach	9(*2*), 11, 31(*4*), 32*	/	/	/	4 [3]	/	/	/
	Autonomy Supportive	9(*2*), 11, 31(*4*), 32*	1, 2(*6*), 42(*2*)	/	/	4 [3]	3 [3]	/	/
Motiv ati-onal	Mastery/task-involving	/	40(*2*), 50, 57	/	/	/	3 [3]	/	/
	Performance/ Ego-involving	/	40(*2*), 50, 57	/	/	/	3 [3]	/	/
Other	Social Support	/	15, 16(*2*), 26(*3*), 46, 55	15, 16(*2*), 26(*3*), 46, 55	15, 16(*2*), 26(*3*), 46, 55	/	5 [5]	5 [5]	5 [5]
	Playing Experience	/	20, 33, 44, 45*	20, 33, 44, 45*	20, 33, 44, 45*	/	4 [3]	4 [3]	4 [3]
	Playing Position	/	20, 33, 44	20, 33, 44	20, 33, 44	/	3 [3]	3 [3]	3 [3]

Note: see Table 2.2 to match study reference number with relevant the study; * = not an independent sample i.e. the same sample is used in another paper which examines the same relationship; [k] = number of independent samples; *(# of associations)* = the number of associations reported for that variable-burnout dimension relationship in a paper, where this is more than 1. / = this variable-burnout dimension relationship was not examined in at least 3 independent samples

Table 2.4.

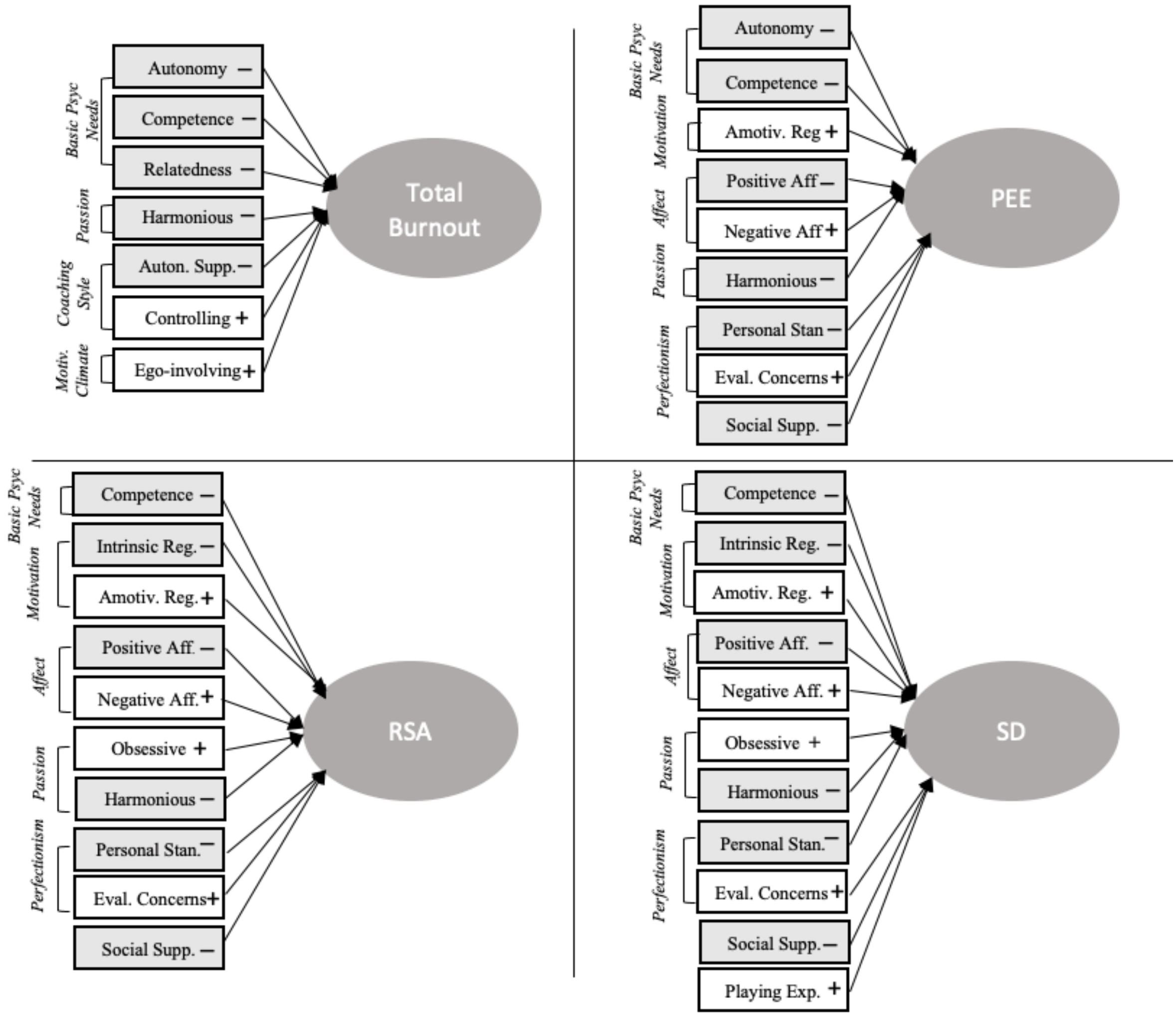
Results of the weighted meta-analysis.

Variable	TB					PEE					RSA					SD				
	P	∅	N	p_a	D	P	∅	N	p_a	D	P	∅	N	p_a	D	P	∅	N	p_a	D
Basic Psych Needs																				
Autonomy	**0**	**0**	**5**	**<0.001**	**N**	**0**	**1.5**	**2.5**	**0.003**	**N**	/	/	/	/	/	/	/	/	/	/
Competence	**0**	**1**	**4**	**<0.001**	**N**	**0**	**2.17**	**2.83**	**0.03**	**N**	**0**	**1**	**3**	**0.003**	**N**	**0**	**1**	**3**	**0.003**	**N**
Relatedness	**0**	**1**	**2**	**<0.001**	**N**	0	1.83	2.17	0.06	∅	/	/	/	/	/	/	/	/	/	/
Motivation																				
Intrinsic Reg.	/	/	/	/	/	0	3.75	0.25	0.77	∅	**0**	**1**	**4**	**0.001**	**N**	**0**	**0.25**	**3.75**	**<0.001**	**N**
Amotivated Reg.	/	/	/	/	/	**4**	**0**	**0**	**<0.001**	**P**	**4**	**0**	**0**	**<0.001**	**P**	**4**	**0**	**0**	**<0.001**	**P**
Extrinsic/External	/	/	/	/	/	0.5	3.5	0	0.58	∅	0.5	0	3.5	0.58	∅	0.5	0	3.5	0.58	∅
Affect																				
Positive Affect	/	/	/	/	/	**0**	**0.29**	**2.71**	**0.003**	**N**	**0**	**0.29**	**2.71**	**0.003**	**N**	**0**	**0.57**	**2.43**	**0.001**	**N**
Negative Affect	/	/	/	/	/	**2.83**	**0.17**	**0**	**<0.001**	**P**	**2.86**	**0.14**	**0**	**<0.001**	**P**	**2.43**	**0.57**	**0**	**<0.001**	**P**
Passion																				
Obsessive Passion	1	1	1	0.908	∅	1	2	0	0.266	∅	**3**	**0**	**0**	**<0.001**	**P**	**2**	**1**	**0**	**0.022**	**P**
Harmonious Passion	**0**	**0**	**3**	**<0.001**	**N**	**0**	**1**	**2**	**0.026**	**N**	**0**	**0**	**3**	**<0.001**	**N**	**0**	**1**	**2**	**0.022**	**N**
Perfectionism																				
Personal standards	/	/	/	/	/	**1**	**1.5**	**2.5**	**0.009**	**N**	**0**	**2.5**	**2.5**	**0.016**	**N**	**1**	**0**	**4**	**<0.001**	**N**
Evaluative concern	/	/	/	/	/	**4.67**	**0**	**0.33**	**<0.001**	**P**	**3.5**	**0**	**1.5**	**<0.001**	**P**	**3**	**2**	**0**	**0.002**	**P**
Coaching Style																				
Controlling	**3**	**0**	**1**	**<0.001**	**P**	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Autonomy-support	**0**	**0**	**4**	**<0.001**	**N**	0	2.33	0.67	0.5	∅	/	/	/	/	/	/	/	/	/	/
Motiv. Climate																				
Task-involving	0	2	1	0.23	∅	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Ego-involving	**2**	**0**	**1**	**0.02**	**P**	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Other																				
Social Support	/	/	/	/	/	**0**	**2**	**3**	**<0.001**	**N**	**0**	**1**	**4**	**<0.001**	**N**	**0**	**4.67**	**0.33**	**<0.001**	**N**
Playing Experience	/	/	/	/	/	1	3	0	0.3	∅	0	0	4	1.00	∅	**2**	**0**	**0**	**0.04**	**P**

Note: **P** = significant positive association; **N** = significant negative association; ∅ = no significant association; **p_a** = *p*-value adjusted for sample size and quality appraisal weighting; **D** = direction of association supported by the research

Figure 2.2.

Significant correlates of TB, PEE, RSA and SD identified in the WMA



Notes: PEE = Physical and Emotional Exhaustion, RSA = Reduced Sense of Accomplishment, SD = Sport Devaluation; Auton Supp. = Autonomy Supportive Coaching, Controlling = Controlling coaching, Amotiv Reg = Amotivated regulation, Positive Aff = Positive Affect, Negative Aff = Negative Affect, Harmonious = Harmonious Passion, Obsseive = Obsessive Passion, Personal Stan = Personal Standards Perfectionism, Eval Concer = Evaluative Concerns Perfectionism, Social Supp = Social Support, Playing Exp = Playing experience; +/- = positive/negative relationship with burnout dimensions;

Table 2.5.

Narrative synthesis of results relating to variables ineligible for inclusion in the weighted meta-analysis.

Correlates	Ref No.	Narrative Synthesis of Results
Achievement Goal Theory	40	*Mastery avoidance-focused goals:* No significant association found with PEE, RSA or SD in the first phase of data collection (pre-season). There was a significant negative relationship between mastery avoidance and both RSA and SD at the second data collection point (post-season). *Mastery approach-focused goals*: Significantly negatively correlated with RSA and SD pre and post-season, PEE not significant *Performance avoidance-focused goals:* Significantly positively related to RSA and SD at the first data collection point and to PEE at the second data collection point. *Performance approach-focused goals:* Significantly negatively correlated with RSA and SD at the first and second data collection points, but showed no significant relationship with PEE
Anxiety	30	*Somatic anxiety:* Significantly positively associated with all 3 dimensions of athlete burnout *Concentration disruption:* Significantly positively associated with all 3 dimensions of athlete burnout. *Worry:* Significantly positively associated with both PEE and RSA. No significant association with SD.
Areas of work Life (in sport)	25	Subscales of *workload, reward, community, fairness* and *values* all significantly negatively correlated with PEE, RSA and SD.
Athlete Engagement	26	The athlete engagement subscales of *confidence, vigor, dedication* and *enthusiasm* were all significantly negatively correlated with PEE, RSA and SD
Bullying	59	Significantly positively correlated with PEE, RSA and SD
Coach-athlete relationship	24	Significantly negatively correlated with PEE, RSA and SD
Coach decision-making	28	All aspects of coach decision-making (overall *decision-making style* and dimensions of *intellectual, perceptual, sudden, avoiding,* and *dependency* decision making) were significantly negatively correlated with TB, PEE, RSA and SD
Cognitive Appraisal	30	*Threat perception*: Significantly positively correlated with PEE, RSA and SD *Challenge perception*: Significantly negatively correlated with PEE, RSA and SD
Coping/ Coping Skills	45	*Disengagement-oriented coping*: Significantly negatively correlated with change in TB from beginning to the end of the season *Task-oriented coping:* No significant correlation was found with change in TB
	23, 48	*Coping with adversity:* A mixture of significant negative correlations and non-significant correlations with PEE, RSA and SD *Peaking under pressure:* A mixture of significant negative correlations and non-significant correlations with PEE, RSA and SD *Goal setting/mental prep.:* Significant negative correlation with RSA (48); no significant correlation with PEE, RSA or SD (23) *Concentration:* No significant correlation with PEE, RSA or SD *Freedom from worry:* Significantly positively correlated with PEE and RSA, no significant correlation with SD (23); A mixture of significant negative correlations and non-significant correlations with PEE, RSA and SD (48) *Confidence/motivation:* Significantly negatively correlated with PEE, RSA, SD (48); No significant correlation with PEE, RSA or SD (23) *Coachability:* Significantly positively correlated with PEE, no significant correlation with RSA or SD (23); A mixture of significant negative correlations and non-significant correlations with PEE, RSA and SD (48)

Correlates	Ref No.	Narrative Synthesis of Results
Coping/ Coping Skills	45	*Disengagement-oriented coping*: Significantly negatively correlated with change in TB from beginning to end of the season *Task-oriented coping:* No significant correlation was found with change in TB
	23, 48	*Coping with adversity:* A mixture of significant negative correlations and non-significant correlations with PEE, RSA and SD *Peaking under pressure:* Mixture of significant negative correlations and non-significant correlations with PEE, RSA and SD *Goal setting/mental prep:* Significant negative correlation with RSA (48); no significant correlation with PEE, RSA or SD (23) *Concentration:* No significant correlation with PEE, RSA or SD *Freedom from worry:* Significantly positively correlated with PEE and RSA, no significant correlation with SD (23); A mixture of significant negative correlations and non-significant correlations with PEE, RSA and SD (48) *Confidence/motivation:* Significantly negatively correlated with PEE, RSA, SD (48); No significant correlation with PEE, RSA or SD (23) *Coachability:* Significantly positively correlated with PEE, no significant correlation with RSA or SD (23); A mixture of significant negative correlations and non-significant correlations with PEE, RSA and SD (48)
Extrinsic Motivation	42	*Identified regulation:* No significant association was found with PEE. A significant positive relationship was reported with SD. An inconsistent relationship was found with RSA; researchers report no association when assessed at T1, but a significant positive association when variables were assessed at T2.
	42	*Introjected regulation:* No significant association was found with PEE or SD. An inconsistent relationship was found with RSA; researchers reported no association at T1, but a significant negative association when variables were assessed at T2.
Gender	41	Women scored significantly higher than men on RSA. There was no significant difference in PEE or SD.
Goal Attainment	51	Significant negative correlation between goal attainment and TB
Hope	35	Significantly negatively correlated with all 3 burnout dimensions
Injury	20	Time out of sport due to injury was significantly positively correlated with PEE, RSA and SD
Irrational Beliefs	56	Significantly positively correlated with PEE. No significant association with either RSA or SD.
Mental Energy State	12	All aspects of mental energy (*total mental energy* and the dimensions *of vigor, confidence, motivation, concentration, tirelessness, and calm*) were significantly negatively correlated with TB
Perfectionism	37	*Perfectionist cognitions:* Significantly positively correlated with both RSA and PEE. No association with SD.
	52	*Total perfectionism:* No significant correlation with PEE, RSA or SD
	52	*Doubts about actions:* Significant positive correlation with PEE. No association with SD or RSA.
	52	*Need for organisation:* No significant correlation with PEE, SD or RSA.
Playing position	20	No significant association with PEE or RSA. Backs (rugby) reported higher scores on SD
	33	Backs (rugby) reported higher scores on PEE. No significant association with RSA or SD
	44	No significant association with PEE, RSA or SD
Positivity	46	Significantly negatively correlated with TB, PEE, RSA and SD
Resilience	57	Significant negatively correlated with and both RSA and SD. No significant relationship with PEE.

Correlates	Ref No.	Narrative Synthesis of Results
Satisfaction/thwarting of basic psychological needs	9, 22	*Need satisfaction (combination of autonomy, relatedness and satisfaction):* Significantly negatively correlated with TB, RSA, SD and PEE
	9, 31	*Need thwarting (combination of autonomy, relatedness and satisfaction):* Significantly positively related to TB
	52	*Need thwarting (individual measures of autonomy, relatedness and satisfaction):* Autonomy and competence thwarting significantly positively related to PEE, RSA and SD. Relatedness thwarting significantly positively related to SD only.
Self-Acceptance	38	Significantly negatively correlated with PEE and RSA.
Sleep Quality	43	Higher level of sleep quality was significantly related to lower levels of burnout.
Sport Commitment	58	*Enthusiastic Commitment:* Significantly negatively with PEE, RSA and SD. *Constrained Commitment:* Significantly positively with PEE, RSA and SD. *Sport Enjoyment:* Significantly negatively with PEE, RSA and SD. *Other priorities:* Significantly positively with PEE, RSA and SD. *Valuable opportunities:* Significantly negatively with PEE, RSA and SD. *Social constraints:* Significantly positively with PEE and RSA. No significant correlation with SD. *Social support:* Dimensions of e*motional* and *informational* support significantly negatively correlated with RSA. No sig. correlation with PEE or SD *Desire to excel:* Dimensions of *mastery achievement* significantly negatively correlated with PEE and RSA, but not SD. No significant association between the *social achievement* dimensions and PEE, RSA or SD *Perceived investment: Loss* dimension significantly positively correlated with RSA and SD but not PEE. *Quantity* dimensions significantly positively correlated with PEE only. *Team importance:* No significant correlation with PEE, RSA or SD
Sport Type	3	Volleyball players reported significantly higher levels of PEE than their football-playing counterparts. There was no significant difference between the groups on the RSA or SD dimensions of burnout.
	27	Hockey players reported significantly lower PEE than basketball players. Hockey and basketball players reported significantly lower levels of SD than the athletes participating in the individual sport of fencing.
	8	Team sport participation is a protective factor against TB
	14	Team sport athletes reported significantly lower RSA scores than individual sport athletes. There were no significant differences in PEE or SD.
	50	Team sport athletes had significantly higher RSA scores than athletes competing in individual sports.
Starting Status	20	Players who were not regular starters on their team reported significantly higher levels of RSA
	33	No significant difference between regular starters and non-starters in PEE, RSA or SD

Correlates	Ref No.	Narrative Synthesis of Results
Stress	12, 13	*General college life stress*: Significantly positively correlated with TB
		Sport-specific college life stress: Significantly positively correlated with TB
	13	*Counter stress*: Significantly negatively correlated with TB
		Perceived distress: Significantly positively correlated with TB
	35, 53	*Perceived stress*: Significantly positively correlated with PEE, RSA and SD
	15, 16	*Money Hassles:* significantly positively correlated with RSA, but showed no significant relationship with PEE or SD
	15, 16	*Rugby Hassles:* Significantly positively correlated with all 3 dimensions of athlete burnout
Teammate Behaviour	55	*Perceived Peer Leadership*: The subscales *influence on decision making*, *sports values*, *training orientation*, *social orientation task orientation* and *total sport leadership* scale score, were significantly negatively related to PEE, RSA and SD. *Empathy* and *competition orientation* were significantly negatively correlated with RSA, SD and TB.
	4	*Task cohesion*: Significantly negatively correlated with PEE, RSA and SD
	4	*Pro/Anti-social behaviour*: *Prosocial* behaviour was significantly negatively correlated with PEE, RSA and SD. *Antisocia*l teammate behaviour was significantly positively related to all burnout dimensions
	54	*Peer-created motivation climate*: Climates that emphasise *improvement, relatedness support* and *effort* were all negatively correlated with the 3 burnout dimensions. *Intra-team conflict* was significantly positively correlated with PEE, RSA and SD. No significant relationship was found between *intra-team competition* and any of the dimensions of burnout.
	7	*Teammate burnout*: Both perceived and actual teammate burnout were positively correlated with TB.
Training Load	7, 53	No significant association between training load and any of the dimensions of burnout was evident for team sport athletes.
Transformational parenting	5	Transformational parenting by both mothers and fathers was significantly negatively correlated with TB.

Table 2.6.
Narrative synthesis of existing longitudinal research.

Variables Examined	Ref No.	Narrative Synthesis of Results
Achievement Goal Theory	40	*Mastery avoidance-focused goals*: Lower scores in pre-season were predictive of lower scores on all burnout dimensions at the end of the season *Mastery approach-focused goals*: Lower scores in pre-season was predictive of higher RSA and SD at the end of the season. *Performance approach-focused goals*: Higher scores at the beginning of the season were predictive of lower burnout at the end of the season. *Performance avoidance-focused goals*: Not a significant predictor of burnout.
Age	41	PEE increased between the age of 14 and 16, and decreased from 16-19. RSA significantly decreased from age 14-19. SD significantly increased from age 14-19.
Basic Psychological Needs	6, 11, 31, 32, 42 2 2, 6, 31, 32, 42 6, 11, 31, 32, 42 2, 6, 40, 42	*Autonomy:* Higher levels at the beginning of the season are a negative predictor of TB, PEE, RSA and SD at the end of the season. No significant predictive relationship was found between autonomy and PEE in study 2. *Relatedness*: Higher levels at the beginning of the season are a negative predictor of TB, SD and RSA at the end of the season. Relatedness was not a significant predictor of TB in study 6 or PEE in study 40. *Competence*: Higher levels at the beginning of the season are a negative predictor of TB, SD and RSA at the end of the season. Competence was not a significant predictor of TB in study 6, PEE in study 2, 38 or 40, or SD in study 40.
Coping	51	*Disengagement-oriented*: Negatively correlated with change in TB from the beginning to the end of the season *Task-oriented coping:* This was not a significant predictor of TB.
Goal Attainment	51	Goal attainment at the beginning of the season is not a significant predictor of change in TB. Change in goal attainment was significantly negatively correlated with change in TB score.
Motivation	29	*Intrinsic regulation:* Scores at baseline do not significantly predict TB or PEE in pre- or competitive-season; scores in pre-season do not significantly predict TB or PEE in competitive-season
Motivation Cont'd		*Extrinsic regulation:* Scores at baseline do not significantly predict TB or PEE in pre- or competitive-season; scores in pre-season do not significantly predict TB or PEE in competitive-season *Amotivated regulation:* Score at baseline is a significant positive predictor of TB and PEE in pre- or competitive-season; scores in pre-season is a significant positive predictor of TB and PEE in competitive-season *Self-determination Index:* Scores at baseline do not significantly predict TB or PEE in pre- or competitive-season; score in pre-season is a significant positive predictor of PEE in competitive-season, but not TB.
Optimism	10	Higher levels of optimism at the beginning of the season was predictive of lower TB levels at the end of the season.

Variables Examined	Ref No.	Narrative Synthesis of Results
Passion	51	Neither *harmonious* nor *obsessive* passion at the beginning of the season was a significant predictor of change in TB from the beginning to the end of the season.
Recovery	29	*Overall recovery:* Scores at baseline do not significantly predict TB or PEE in pre- or competitive-season; scores in pre-season do not significantly predict TB or PEE in competitive-season *Sport-specific recovery:* Score at baseline is a significant negative predictor of TB and PEE in competitive season, but not in pre-season; scores in pre-season do not significantly predict TB or PEE in competitive-season
Sleep quality	24	Lower burnout levels positively predicted better sleep quality, but sleep quality did not predict burnout.
Social support	15	Social support in the middle of the season negatively predicted PEE, RSA and SD at the end of the season.
Stress	15	*Money hassles:* Money hassles in the middle of the season were significantly positively related to RSA at the end of the season. There was no significant relationship with PEE or SD. *Rugby hassles*: Rugby hassles in the middle of the season were significantly positively related to PEE, RSA and SD at the end of the season.
	29	*Overall stress:* Score at baseline is a significant positive predictor of TB and PEE in competitive season, but not in pre - season; scores in pre-season do not significantly predict TB or PEE in competitive-season *Sport-specific stress:* Score at baseline is a significant positive predictor of TB and PEE in competitive season, but no in pre -season; scores in pre-season do not significantly predict TB or PEE in competitive-season
Teammate Burnout	7	*Perceived teammate burnout*: Scores in mid-season were significantly positively related to individual TB at the end of the season. *Actual teammate burnout*: Not a significant predictor of individual TB.
Time in the season	15, 20	Players reported significantly higher levels of RSA during the season compared to pre-season.
	34	PEE was the only burnout dimension to show significant change over time, with scores significantly lower during competition compared to pre-season.
	56	Report small but significant changes in TB over time.
Training environment		*Perceived controlling coach style:*
	11	Higher scores in pre-season positively predicted TB at the end of the season.
	9	Higher scores in pre-season positively predicted changes in TB from the beginning to the end of the season.
		Autonomy supportive coaching style:
	11	Higher scores in pre-season negatively predicted TB at the end of the season.
	9	Higher scores in pre-season negatively predicted changes in TB from the beginning to the end of the season.
	40	*Ego-involving climate:* Perceptions of an ego-involving climate in pre-season predicted higher levels of SD and RSA 6 months later.
Training Hours	7	Training hours in the middle of the season positively predicted burnout at the end of the season.

2.5.5.3 Mediating and Moderating Relationships. Fifteen variables were examined as possible mediators and four variables were examined as moderators of variable-burnout dimension relationships, across seventeen papers.

Basic Psychological Needs. The basic psychological needs of *autonomy, competence* and *relatedness*, either as one group or as individual variables, were the most commonly assessed mediators, examined in six papers. The following relationships were identified: *thwarting of psychological needs* in combination (Balaguer et al., 2012; Gonzalez et al., 2016), and the *relatedness* and *competence* needs specifically (Gonzalez et al., 2017), mediated the positive relationship between *controlling coach style* and TB; the *satisfaction of basic psychological needs*, both in combination and individually, mediated the positive relationship between TB and *harmonious passion* (Curran et al., 2013), *transformational parenting* (Alvarez et al., 2019), and *autonomy-supportive coaching style* (Gonzalez et al., 2016; Gonzalez et al., 2017) respectively; satisfaction of *competence* and *autonomy* partially mediated the relationship between *autonomy supportive coaching style* and RSA, but not PEE or SD (Isoard-Gautheur et al., 2012); neither *relatedness* nor *autonomy* mediated the relationship between *controlling coach style* and any of the burnout dimensions (Isoard-Gautheur et al., 2012).

Affect. *Positive affect* mediated the negative relationships between *prosocial behaviour* and TB (Al-Yaaribi et al., 2017) and *hope* and PEE (Gustafsson et al., 2013), and partially mediated the relationship between *hope* and RSA and SD. *Negative affect* mediated the positive relationship between *antisocial behaviour* and TB (Al-Yaaribi et al., 2017) and had no mediating effect on the relationship between *hope* and any burnout dimension (Gustafsson et al., 2013).

Stress. *Stress* mediated the negative relationship between *hope* and PEE, and partially mediated the relationship between *hope* and RSA and SD (Gustafsson et al., 2013). *Perceived distress* mediated the effect of *life stress* on increased TB (Chyi et al., 2018).

Motivational Regulation. *Self-determined regulation* mediated the negative relationship between *harmonious passion* and TB (Curran et al., 2011), *identified regulation* partially mediated the negative relationship between perceived *autonomy supportive coaching style* and RSA, and *external regulation* partially mediated the negative relationship between *perceived competence* and RSA (Isoard-Gautheur et al., 2012).

Other. *Cognitive appraisal* mediated the positive relationship between *trait anxiety* and TB (Gomes et al. 2017), *unconditional self-acceptance* partially mediated the relationship between both dimensions of *perfectionism* and TB (Hill et al., 2008), and *coping* mediated the negative relationship between *passion* and change in burnout (Schellenberg et al., 2013). *Social support* mediating the relationship between both *harmonious passion* and TB and *positivity* and TB (Martínez-Alvardo et al., 2021). *Playing level* mediated the relationship between coping and RSA (da Silva et al. 2021).

Moderating Variables. *Total athletic mental energy* and the subscales of *confidence, concentration* and *calm* moderated the positive impact of sport-specific stress on TB. *Total athletic mental energy* and the *concentration* subscale moderated the positive relationship between *general life stress* and TB (Chiou et al., 2020). *Gender* moderated the impact of increasing age on SD; female athletes showed a greater increase in SD with age than males. No significant moderating effects of gender were identified for PEE or RSA (Isoard-Gautheur et al., 2015). *Sport type* (team v.

individual) did not moderate the impact of coach-athlete relationship quality on burnout (Davis et al., 2019).

Direct relationship between these variables and dimensions of burnout are outlined in the WMA or narrative synthesis, as appropriate.

2.6 Discussion

The aim of this systematic review was to collate and synthesize the research on burnout in team-sport athletes and, where possible, to identify the variables that show significant associations with the dimensions of burnout using a conservative weighted meta-analytic technique. We identified 59 papers that have examined a total of 125 variables in relation to athlete burnout in team sports. Relationships between 18 variables and at least one dimension of burnout were eligible for inclusion in a WMA. The remaining 107 variables were included in a narrative synthesis, in order to ensure all eligible papers were represented in this review.

Through the WMA, which allowed us to assess the strength of relationships across studies, we identified significant relationships between 16 variables and at least one dimension of burnout or TB in team-sport athletes; results indicate that there is sufficient evidence in the research conducted to date to support a significant negative association between *autonomy, competence, relatedness, self-determined motivation, positive affect, autonomy supportive coach, self-oriented perfectionism, harmonious passion* and *social support* and various dimensions of burnout, while *amotivation, negative affect, socially-prescribed perfectionism, obsessive passion, EO climate, playing experience* and *controlling coach style* were significantly positively related to burnout. As a result of our decision to expand the inclusion criteria beyond the relatively limited scope of previous reviews (e.g. Bicalho & Costa, 2018; Li et al., 2013; Lin et al., 2021; Pacewicz et al., 2019) five of these variables, namely *ego-*

involving motivational climate, playing experience, *positive affect*, and both *autonomy supportive* and *controlling coaching style* have been included in a review of the burnout literature for the first time, highlighting their impact on burnout in team-sport athletes. *TO climate* was also included in a review of the literature for the first time; the results of the WMA suggest this variable does not significantly impact burnout in team sports.

2.6.1 Relevance to Existing Theoretical Perspectives of Athlete Burnout

In the context of existing theories of athlete burnout, and in line with Li et al.'s (2013) review, results of the WMA appear to provide the most substantial support for the motivation-based perspective of burnout; higher levels of *intrinsic regulation* and feelings of *autonomy, competence* and *relatedness*, as well as an *autonomy-supportive coaching style* are associated with lower burnout, while an *EO climate* and *controlling coaching style* have an opposing impact. The emergence of these relationships in the WMA suggest burnout in team-sport is more commonly examined from the motivation-based perspective. Furthermore, examination of the rationale for the exploration of additional variables highlights that the motivation-based perspective has also informed research beyond direct measures of motivation; for example, research on the impact of more internally versus externally driven forms of passion (Curran et al., 2012) and perfectionism (Hill et al., 2013) is also underpinned by this framework.

In addition, the broader focus of our review also reveals support for aspects of other theoretical frameworks, for example the negative relationship between *social support* and burnout is in line with that suggested by the sport commitment model of burnout (Raedeke, 1997) and the consideration of available resources referenced in the cognitive affective stress-based model (Smith, 1986). Similarly, the impact of affect also provides support for the affective response component of the cognitive-affective model (Smith, 1986). Notably, while five different papers did explore stress-related variables (see Table 2.5), the specific stress constructs and measures differed substantially, and thus were not eligible for inclusion in the WMA. Some support for variables related to commitment-based (e.g. Woods et al., 2021) perspective was evident, but the number of papers exploring these specific relationships in team-sport athletes appears to be more limited and therefore they were not eligible for inclusion in the WMA. Importantly, consideration of the publication dates of papers included indicates that each of the prevailing stress- (Chiou et al., 2020), motivation- (Morales-Sánchez et al., 2020) and commitment- (Woods et al., 2020) perspectives continue to inform research approaches across studies. These findings support recent calls for further critical review of existing theories of athlete burnout (Madigan et al., 2021). Finally, a number of the studies (Appleby et al., 2018; Schellenberg et al., 2013; A. L. Smith et al., 2010) utilised an integrated approach, examining predictors from across key theoretical perspectives in line with Gustafsson and colleagues' (2011) conceptual model.

2.6.2 Consistency of Relationships across Burnout Dimensions

By focusing on studies using the multi-dimensional ABQ, we were also able to examine the impact and consistency of correlates of burnout across TB and the dimensions of PEE, RSA and SD. Of the 15 variables that were examined across multiple dimensions of burnout using WMA, only *amotivated regulation* and *negative affect* showed evidence of a very strong significant association with all three dimensions, suggesting that team-sport athletes who report higher levels of *amotivated regulation* or *negative affect* are more likely to experience increased feelings of PEE, RSA and SD. These results are in line with previous reviews examining a mix of individual and team-sport athletes (Bicalho & Costa, 2018; Li et al., 2013).

However, variability in the evidence of relationships between the remaining variables and the different burnout dimensions, which was evident through the use of the WMA technique, serves to highlight the importance of the multi-dimensional conceptualisation of athlete burnout (Pacewicz et al., 2019; Raedeke & Smith, 2001). Specifically, in the case of *intrinsic motivation, obsessive passion, playing experience, relatedness* and *autonomy-supportive coach style*, different results emerged in relation to PEE, RSA, SD and TB; there was very strong evidence suggesting *intrinsic motivation* is significantly associated with lower levels of both RSA and SD, but there was no significant relationship with PEE. Similarly, there was a strong significant negative association between *relatedness* and TB, but a non-significant relationship between this variable and PEE. These results are in contrast to results from previous reviews (Bicalho & Costa, 2018; Li et al, 2013), in which these variables showed consistent significant relationships across the burnout dimensions, suggesting that these variables may not only have a differential impact across burnout dimensions, but also on team-sport athletes compared to elite/mixed-sport athletes. Inconsistencies in the association between *obsessive passion* and the dimensions of burnout identified here also emerged in Bicalho and Costa's (2018) review, although they found positive associations with PEE and RSA and negative association with SD, while we identified positive associations with both RSA and SD, and no significant association with PEE. This variability is also evident in the correlates examined in a review for the first time; there was an absence of a significant association between *playing experience* and PEE or RSA, despite evidence of a strong association with SD, while the strong association between *autonomy-supportive coach style* and TB, was not evident with the PEE dimension, suggesting these variables may not impact all aspects of burnout equally.

In addition, use of the WMA also highlighted that the strength of the negative associations between *competence, positive affect, personal standards perfectionism* and *social support* and the dimensions of burnout differed, ranging from very strong to weaker associations. In the context of the existing literature, while weaker associations between both *competence* and *social support* and PEE in comparison to RSA and SD were also reported by Li et al. (2013) and Pacewicz et al. (2019) respectively, the results of our WMA show RSA has the weakest association with *personal standards/self-oriented perfectionism*, which is in contrast to Bicalho and Costa's (2018) review. This suggests this variable may be less important in relation to RSA in team-sport athletes.

Finally, *extrinsic motivation* and *TO climate* were the only variables that showed non-significant association with all of the dimensions of burnout with which they were examined. While *TO climate* has been assessed in a review for the first time, results relating to *extrinsic motivation* are somewhat in contrast to previous reviews, which reported relationships ranging from indeterminate (Goodger et al., 2007) to significant positive associations with PEE and SD, and a negative association with RSA (Bicalho & Costa, 2018). The WMA provided key insight into the complexities of these relationships, and highlights the importance of assessing each variable-burnout dimension relationship individually; a clearer understanding of the key factors associated with each dimension of burnout (see Figure 2.2) can inform a more nuanced approach for interventions aimed at reducing or preventing the onset of PEE, RSA or SD specifically. Furthermore, additional variability in some of these relationships when compared to past reviews of mixed-sport samples suggests that some burnout correlates may have a differential impact on athletes operating within different sports, which both provides novel and nuanced insight into potential differences in these populations, and again may have implications for targeted intervention and prevention strategies. For example, while Li et al. (2013) identified the feeling of *relatedness* as a factor strongly negatively related to PEE in a mixed sample of elite athletes, the results of this review suggest that this variable does not significantly impact this dimension of burnout in team sports athletes specifically.

2.6.3 Breadth of the Existing Research

A summary of an additional 107 variable-burnout relationship was provided in a narrative table. These variables are diverse, including *injury rate* (Cresswell & Eklund, 2006), *intra-team conflict* (Smith et al., 2010), *resilience* (Vitali et al., 2015) and *hope* (Gustafsson et al., 2013), among a host of others. While this narrative synthesis provides a useful overview of the results reported to date, our understanding of the relationships between these variables and burnout in team-sport athletes would benefit from additional replication research and subsequent meta-analyses; with over 100 variables examined across just one or two independent samples of team-sport athletes, it appears there is a focus in the literature on continuing to explore new correlates of burnout, at the expense of replication studies. This is reflective of 'psychology's replication crisis' (Hughes, 2018, p. 6), and suggests the apparent 'scattergun approach' identified by Goodger et al. (2007, p.144) in their review over a decade ago continues to be an issue in the athlete burnout literature. As such, the findings of this review highlight the need for more focused replication studies on athlete burnout in team sports. Furthermore, and in line with recommendations for the future of burnout research (Madigan et al., 2021), with such an array of variables studied to date, it could be argued that the most useful starting point for such work would be critical exploration of existing theoretical perspectives of athlete burnout; as outlined previously, this review found support for aspects of these perspectives, but more research is needed to allow us to examine the strength of these relationships across studies, and, more importantly, their predictive ability (Madigan et al., 2021). This includes a need to explore variables associated with the commitment (Raedeke, 1997), stress (Smith, 1986) and the motivation (Horn & Smith, 2018) perspectives, and their links with each of the three dimensions of burnout over time.

With the aim of providing an accurate representation of the quantitative research on team-sport athletes to date, we also included a narrative synthesis of longitudinal and mediating/moderating relationships examined in the literature. The sixteen different variable types (33 unique variables) that have been examined longitudinally in relation to athlete burnout in team-sports are a substantial increase on those that have emerged in previous reviews, wherein the number of variables examined longitudinally ranged from two (Li et al., 2013) to nine (Bicalho & Costa, 2018). In addition, previous reviews have provided no analysis or synthesis of the longitudinal relationships in the literature. Our synthesis indicates that lower levels of burnout were predicted by *approach-focused goal setting*, the fulfilment *of basic psychological needs, optimism, sport-specific recovery, social support* and *autonomy supportive coach style* in the existing literature. In contrast, higher levels of burnout were predicted by *avoidance-focused goals, disengagement-orientated coping, amotivated regulation, self-determined index of motivation, stress, teammate burnout, controlling coach style* and increased *training hours.* Longitudinal research is essential in identifying the factors that might predict or protect against the development of athlete burnout and, as outlined previously, the results of this review suggest that researchers should continue to prioritise longitudinal work moving forward.

The range of mediators/moderators of burnout-correlate relationships also further highlight the complex nature of athlete burnout and its associated variables;

results suggest that variables such as the fulfilment of *basic psychological needs, affect, stress* and *regulation* can mediate the impact of a range of burnout correlates. The summary provided of these relationships can improve our understanding of the mechanisms through which burnout occurs in team-sport athletes, and may again have important implications for the development of a model of burnout. Furthermore, this synthesis is an important addition that has been absent from previous systematic reviews of the burnout literature (e.g. Bicalho & Costa, 2018, Li et al., 2013).

2.6.4 Characteristics of Team-sport Studies

Finally, examination of the characteristics of the papers included in this review is also revealing; while North American samples dominate the literature included in previous reviews of mixed-sport athletes (e.g. Goodger et al. 2007), the vast majority of samples in this review were drawn from European countries, followed by countries from Oceania. In line with previous reviews (e.g. Li et al., 2013), Western nations are significantly over-represented in comparison to Asian, African or South American populations. Henrich et al. (2010) have previously highlighted the tendency for the psychological literature to focus on samples from WEIRD (Western, Educated, Industrialised, Rich and Democratic) societies. Notably, just 23 papers included a mixed-gender sample, in comparison to the 34 mixed-gender sample papers included in the recent review of burnout in elite mixed-sport athletes (Bicalho & Costa, 2018). Taking participant numbers into consideration, males comprised over 70% of the sample of team-sport athletes included in this review. The lack of gender balance in the papers examined may be linked to the fact that, when accessing players in team sports, researchers appear to look to specific teams (Grobbelaar et al., 2011), academies (Curran et al., 2011), or leagues (Cresswell, 2009), which tend to be gender-specific in team sports. Regardless of the reasoning, female team-sport athletes appear to be seriously under-represented in the burnout literature. The importance of understanding the experiences of female athletes in the still-male-dominated world of sport continues to be stressed in the feminist literature (e.g. Roper & Polasek, 2019). The need for a gender-balanced approach is further evident when considering differences in levels of burnout that have been identified between male and female athletes in some of the existing literature (e.g. Isoard-Gautheur et al., 2015; Reche et al., 2018).

2.6.5 Strengths and Limitations of this Review

While we believe this review adds substantially to our understanding of burnout in team-sport athletes, we also acknowledge some limitations of the work. Firstly, this review is only representative of the existing English-language papers. Secondly, qualitative research or studies using measures of burnout other than the ABQ (Raedeke & Smith, 2001) are not represented. However, these criteria were employed with the aim of ensuring burnout was conceptualised and assessed in a consistent, multi-dimensional manner across studies, using the most well-accepted and commonly used definition and measure of the syndrome (Gustafsson et al., 2011). Such consistency in measurement, which was particularly important to allow for data synthesis across studies, cannot be guaranteed in the case of qualitative studies or those using alternative measures of athlete burnout. This review is also limited by the inclusion of published work only; this leads to a risk of results being impacted by publication-bias, whereby studies with significant results are more likely to be published than those reporting non-significant results (Joober et al., 2012), and the possibility that additional correlates of burnout in team-sport athletes exist in the grey literature. However, the decision to focus on published research was made with the aim of ensuring that the studies included had been rigorously scrutinized by experts in the area through the peer review process, which is not the case for grey literature (Gunnell et al., 2020). Future systematic reviews can build on this work by expanding the search beyond English-language and quantitative-only papers. Furthermore, a move towards pre-registration of studies in this area could help to ensure future reviews of this kind are not impacted by potential publication bias or the "file drawer effect".

Notwithstanding these limitations, this review has a number of strengths. This is the first systematic review and WMA to assess the variables related to burnout in team-sport athletes specifically, without limiting these variables to any one sport, category or theoretical perspective. Furthermore, where the burnout dimensions were delineated, data was examined separately in this review for TB and the subscales of PEE, RSA and SD, in order to further our understanding of the potential differential impact of variables across these dimensions. While a traditional meta-analysis was not possible due to the limited number of studies for each variable-burnout dimension relationship and the considerable heterogeneity in variable measures (Borenstein et al., 2009; Cerin et al., 2017), the use of the WMA (Cerin et al., 2017) in addition to the narrative synthesis allowed us to assess the strength of the evidence in relation to variable-burnout dimension relationships examined most frequently, and thus to identify the variables that appear to be strongly related to burnout in team-sport athletes. We feel the combination of narrative synthesis and WMA ensures the breadth of the existing literature is represented and provides an accessible synthesis of the burnout literature to date.

2.6.6 Conclusions and General Implications

The results of this review serve to highlight the variables that have shown consistent relationships with burnout in team-sport athletes across studies (i.e. those with strong associations evident in the WMA), those with less support across studies (i.e. those with limited support in the WMA), and the range of relationships that have been explored to a limited degree (i.e. those not eligible for inclusion in the WMA) and may benefit from further exploration (e.g. commitment-related factors). Notably, the variables identified are linked to multiple theoretical perspectives of burnout, thus providing further support for the utility of an integrated approach (Gustafsson et al., 2011). Findings also point to variability in some relationships across the dimensions of burnout, and tentatively suggest that the team-sport population may differ from mixed-sample athletes, both in terms of some the relationships reported, and the characteristics of the samples studied. Identifying the key factors associated with PEE, RSA and SD in team-sport athletes can inform applied practitioner work and the development of intervention strategies targeted to address specific burnout symptoms. While existing research on interventions for athlete burnout is very limited (Madigan, 2021), our findings provide further support for a coach-focused intervention developed by Langan et al.(2015) that promotes the satisfaction of basic psychological needs and reduced controlling style. In addition, findings suggest that similar one-to-one training for both team-sport coaches and players related to the promotion of *self-determined motivation, positive affect, social support* and *self-oriented perfectionism* may reduce the risk of burnout. Such interventions may also be useful for targeting reductions in feelings of *amotivation, negative affect* and *socially-prescribed perfectionism* among team-sport athletes. Those working with team-sport athletes who have greater *playing experience* should also be aware of a potentially increased risk of burnout.

2.6.7 Implications for the Thesis

In the context of this thesis more specifically, the wide variety of burnout correlates included in this review served to highlight the breadth of research in the area, but also suggested that the athlete burnout literature is lacking in a specific research focus. As such, in line with recent recommendations (Gustafsson et at., 2018; Madigan

2021; Madigan et al., 2021), it was considered that exploring the predictive utility of existing theories of athlete burnout and considering an integrated conceptual approach would be an especially useful, focused direction for future research, in contrast to the existing 'scattergun approach' (Goodger et al., 2007). In addition, the results of this review suggested that such work may benefit from distinguishing between team and individual-sport athlete populations and focusing on increasing female athlete representation, and should continue to examine burnout as a multi-dimensional syndrome in order to gather a more nuanced insight into the factors associated with athlete burnout. This review also highlighted the need for a continued focus on longitudinal research, with a view to identifying the key risk and protective factors for the development of athlete burnout. Such research has the potential to inform targeted interventions for the prevention and treatment of athlete burnout.

The systematic review guided the researcher's decision to integrate each of the key theoretical perspectives of burnout with a view to predicting the development of burnout symptoms, using a longitudinal study design. However, although the review highlighted various predictors that fall within the multiple existing theoretical perspectives, for example, motivational regulation, basic psychological needs, coaching style and motivational climate fall under the motivation-based perspective, the decision was taken to attempt to further narrow the focus to potentially core components that are representative of the key tenants of these perspectives. Furthermore, the selection of materials and key demographic variables for inclusion in the analysis was also informed by the results of this review. Specific details on the impact of the systematic review on the study design and methods are outlined across the subsequent chapters. Finally, the results of the WMA informed key decisions around hypothesised relationships and potential predictors of change in burnout, as discussed in detail in Chapter 7.

Chapter 3. Aims and Method for the Empirical Phases of the Project

3.1 Introduction

This chapter outlines the specific aims, objectives, and design across the empirical phases of the project, including participants and recruitment strategy, data collection procedure, materials, ethical considerations and the planned procedure for data analyses.

3.2. Overview of the Empirical Phases of the Thesis

As outlined in Chapter 1, the overarching aim of this thesis was to identify the risk and protective factors for the development of feelings of PEE, RSA and SD over time in Gaelic games athletes. To achieve this broader aim, and following the systematic review conducted as a first phase in this project, the researcher identified four key empirical phases; a cross-sectional analysis of the prevalence of burnout in Gaelic games and demographic and sport-specific characteristics as predictors of burnout, a cross-sectional comparison of the utility of existing theoretical perspectives of burnout, and longitudinal exploration of the trajectories of change in burnout symptoms over time and the factors that predict change in burnout. The longitudinal, quantitative study designed to address these research aims is described below.

3.3 Study Design

3.3.1 Overview of Study Design

Overall, the empirical phase of this project had a longitudinal design, consisting of six data-collection points over a 21-month period, with a view to tracking burnout over time. When considering the need to assess burnout at theoretically meaningful timepoints in the Gaelic games season, ensure adequate spacing of timepoints, and gather data at a sufficient number of timepoints to allow for the modelling of complex trajectories of change (Isoard-Gautheur et al., 2015; Lundkvist et al., 2018; Preacher et al., 2018), the decision was taken to assess levels of burnout in windows broadly representing the early-, mid-, and late-stages of the 12-month Gaelic games season. Specifically, data was collected in March – May 2019 (T1), July – September 2019 (T2), November 2019 – January 2020 (T3), March – April 2020 (T4), T5 July – August 2020 (T5) and T6 November – December 2020 (T6). This longitudinal design is in line with recommendations for future research in the area, as burnout is consistently conceptualised as a process that occurs over time (Cresswell & Eklund 2007).

3.3.2 Participant Eligibility

Individuals who were aged 18 or over and a member of Gaelic games team playing Ladies football, Camogie, Gaelic football or Hurling at the time of initial recruitment (March 2019) were eligible for participation at T1. Individuals who were not competent in the English language were ineligible for participation.

3.3.3 Recruitment and Continued Participation

3.3.3.1 Initial Recruitment (T1). The researcher aimed to share the recruitment message as widely possible, although no accessible centralized register of Gaelic games athletes exists. As such, the decision was taken to contact key stakeholders and administers for Gaelic games across clubs, counties and player groups throughout Ireland, using a combination of online and face-to-face recruitment methods. This combined approach is in line with recruitment methods used in previous research with athlete populations (Gabana et al., 2017). Initial recruitment took place in-season, over a two-month period from March – May 2019. Specific recruitment details are outlined below.

Email. An email outlining the study aims was sent to the administrative bodies across the Gaelic games sports of interest, namely the GAA, LGFA and CA. The recipients were asked to forward the recruitment email and the associated survey link to all playing members. Gaelic games activities across the four provinces of Ireland are overseen by provincial boards, while each of the 32 counties also have their own county board, such that there is a GAA provincial/county board in each province/county, and also respective LGFA and CA boards. As such, with the aim of reaching as many Gaelic games players as possible, the recruitment email was also sent to the chief administrator of the GAA, LGFA and CA county and provincial boards across the country. That equates to contact with over 100 administrative officers. Each officer was asked to forward the recruitment email and the associated survey link to all clubs and members operating within their region. In addition, the recruitment email was also sent to the administrative officers associated with Gaelic games clubs in Third Level Institutions, the GAA Club Players' Association, and the men's and Women's Gaelic Players' Associations, which were the representative bodies for intercounty players at the time.

Social Media. With the aim of reaching players directly, recruitment messages were also shared via Twitter, Facebook, Instagram and Whatsapp. Across platforms, the message included information about the project and a link to the plain language statement (PLS; Appendix C1 and C2) and survey. All messages were shared via the researcher's personal accounts, which included >2,700 direct followers or friends in total. On Twitter, targeted recruitment messages were used, whereby accounts associated with GAA/LGFA/CA clubs, county boards, provincial boards, administrative bodies, media and fan accounts were asked to share, or 'retweet', the message. Such messages were viewed over 130,000 times on the platform. On Whatsapp, the recruitment message was shared in groups of Gaelic games players, again with a request to forward on to any other player groups. As such, targeted recruitment was supplemented with a snowball sampling strategy, whereby those contacted were asked to forward the link to others who may meet the eligibility criteria.

Face-to-Face Recruitment. The online recruitment was supplemented by a face-to-face strategy, whereby team representatives in the greater Dublin area were contacted directly and the researcher arranged to visit a training session to inform players about the study. At these sessions, the researcher spoke to players after their session, providing a brief overview of the project and outlining the requirements for participation.

3.3.3.2 Follow-up Contact for Subsequent Phases (T2 – T6). Only athletes who participated at T1, indicated that they consented to be contacted at subsequent phases, and provided an email address for this contact were targeted for participation at subsequent waves of data collection. Athletes received an email with reminder information about the study, and a link to the consent form and the questionnaire for the relevant data collection point. On-going consent was required, whereby participants were asked to re-affirm their consent to future contact at each time-point, or to opt out of future contact if they wished. Participants who stated that they did not consent to future contact at any stage were removed from the contact list. In addition, participants who initially provided consent to future contact but subsequently did not respond to two concurrent time-points, were also removed from this list.

When considering the longitudinal nature of participation, it was noted that the time-lag between windows should be consistent for all participants (Byrne & Crombie, 2003). As such, the two-month recruitment window employed at T1 was maintained for T2 and T3, and contact with participants at each timepoint was staggered based on the date they had completed their questionnaire at the previous timepoint. This ensured that there was a time-lag of circa 15 weeks for all participants between the date they submitted their response at T1 or T2, and the date they were contacted about participation in the next phase. However, the data collection window was shortened at T4 in response to the COVID-19 outbreak; specifically, we decided to restrict data collection to a one-month period in an effort to limit the possible impact of changes in restrictions associated with sport across the data collection window. This one-month data collection window was maintained for T5 and T6. Due to the shortened data collection window in year two (T4 – T6), the time-lag was extended to circa 18 weeks for each participant. At each timepoint athletes who had yet to submit their questionnaire received up to three reminder emails with a view to maximising response rates.

3.4 Procedure

3.4.1 T1 Procedure

3.4.1.1 Online Participation (T1). Upon clicking the link shared in the recruitment message, participants were directed to a plain language statement (PLS; Appendix C1). Those interested in participation could then select the option to progress to the consent form. Participants who did not provide consent or did not meet the appropriate eligibility criteria were directed to the end of the questionnaire. Those who successfully completed the consent form (Appendix D1) were directed through to the online questionnaire (Appendix E). Details of measures included in the questionnaire are provided in the materials section below. The questionnaire took approximately 15 minutes to complete.

3.4.1.2 In-person Participation T1. In a small number of cases where the preference was to the receive hard-copy questionnaires, these were given to team managers or representatives in envelopes marked with a unique identifying code. Each envelope contained a PLS (Appendix C2), a consent form (Appendix D2), a questionnaire, a pen and an additional envelope marked with the same unique ID code. Players were offered the envelopes to take away and review in their own time. They were given instructions to first review the PLS, and if interested in participation to then complete the consent form and questionnaire, and to seal them in the separate numbered envelopes provided. Players were asked to return the envelopes, either complete or incomplete, to the team gatekeeper at the following training session, and the researcher arranged collection. The unique code on the forms enabled the researcher to match participant consent forms and contact details with their questionnaire data, thus ensuring appropriate consent was provided and allowing for future contact and tracking of responses over time.

3.4.2 T2-T6 Procedure

All responses from T2 onwards were gathered online. Participants received an email which included reminder information about the project and a link to the PLS, consent form and relevant questionnaire. When participants clicked through the relevant link they were directed to the PLS, followed by the consent form. Athletes who successfully completed the consent form were directed through to the online questionnaire, the material included in which are described below. Athletes who did not meet the criteria outlined in the consent form were directed to the end of the questionnaire.

3.5 Rationale for Key Variables of Interest

As discussed in Chapter 1, a lack of consensus remains as to how burnout develops, with no singular, well-accepted theory identified (Gustafsson et al., 2017; Gustafsson et al., 2018). This has contributed to a scattergun approach in the literature, as evidenced by the more than 100 variables examined in relation to burnout in team sports identified through the systematic review. Clearly, further exploration of this range of variables in the subsequent phases of this project was not possible. To this end, and in line with existing calls in the literature (e.g. Gustafsson et al., 2018), the researcher made the decision to focus on core elements of existing key theoretical perspectives of burnout, namely the stress-, commitment-, and motivation-based perspectives which have come to the fore (Gustafsson et al., 2018; Madigan, 2021; Madigan et al., 2021). In addition, exploration of the impact of characteristics of sport participation which may be especially relevant in the Gaelic games context, such as playing level and number of teams, was also undertaken. This is reflected in the materials outlined below, and the underpinning rationale is discussed in greater detail in Chapter 4 and Chapter 5.

This rationale also underpins the decision not to explore additional variables, such as affect, perfectionism and passion, which were consistently associated with feelings of PEE, RSA and SD in the WMA (see Table 2.4), in the programme of empirical research. Specifically, as noted in Chapter 2, the relationship between these variables and burnout are underpinned by the theoretical perspectives discussed above; the broader self-determined motivation-based perspective underpins research examining the impact of more internally versus externally driven forms of passion (Curran et al., 2012) and perfectionism (Hill et al., 2013), while research exploring affect has been based on the cognitive-affective model of the stress-based perspective (Gustafsson et al., 2013).

3.6 Materials

The researcher developed an online (T1-T6) and hard-copy (T1 only) version of the questionnaire (Appendix E). The online version was developed through Qualtrics, the survey development platform. The measures that form the questionnaire are outlined below.

3.6.1 Athlete Burnout

The ABQ was used to measure athlete burnout (Raedeke & Smith, 2001). The 15-item questionnaire consists of three subscales to assess how frequently an athlete experiences symptoms of each of the three burnout dimensions; PEE, RSA and SD. Each subscale has five items, measured on a 5-point Likert scale from "almost never" to "almost always" (Raedeke & Smith, 2001). Participants' scores are averaged on each subscale, such that the maximum score is five, with higher scores indicative of stronger feelings of PEE, RSA and SD respectively. The ABQ subscales have shown good reliability and internal consistency (Cronbach's alpha > .70) across a number of studies (e.g. Gerber et al., 2018; Raedeke & Smith, 2001).

3.6.2 Sport Motivation

The Sport Motivation Scale-II (SMS-II; Pelletier et al., 2013) is based on the SDT of motivation (Deci & Ryan, 2008; Ryan & Deci, 2000), and is a measure of the type of motivation underlying sport participation. The 18-item measure includes three questions on each of the six subscales of motivational regulation; *intrinsic regulation* is the most self-determined motivation based on inherent enjoyment, *integrated regulation* is the most autonomous form of external regulation and refers to motivation based on values and needs, *identified regulation* refers to external motivation driven by personal importance, *introjected regulation* is external drive based on perceptions of worth or avoidance of guilt, *external regulation* refers to motivation based on external reward or punishment, and *amotivated regulation* refers to an absence of motivation (Pelletier et al., 2013). Responses are measured on a 7-point Likert scale and higher scores on each subscale indicate that the athlete is driven by the specific type of motivation assessed. Validation of the SCM-II found support for the factor structure, reliability and consistency (Cronbach's alpha > .70) of the measure (Pelletier et al., 2013). In addition, results of the Systematic Review (Chapter 2) suggest this is the most commonly utilised measure of motivation in the burnout literature.

3.6.3 Motivational Climate in Sport

The Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2; Newton et al., 2000) was used to examine how players view their training and playing environment. If players were members of multiple teams, they were asked to answer in relation to the team they trained with most often. Responses are measured on a 5-point Likert scale. The 33-item measure consists of two higher-order motivational climate scales and three lower-order subscales within each. The *performance/ego-orientated (EO) motivational climate* scale consists of combination of the lower-order subscales; *intra-team member rivalry, unequal recognition* and *punishment for mistakes*. The *task-orientated (TO) climate* subscale is assessed using a combination of the *cooperative learning, effort/improvement* and *important role* subscales (Newton et al., 2000). Higher scores on each subscale suggest that the characteristic in question more closely describes the athletes' training environment. The factor structure, validity, reliability and consistency (Cronbach's alpha > .70) of the PMCSQ-2 is supported (Newton et al., 2000). In addition, results of the Systematic Review (Chapter 2) suggest this is the most commonly utilised measure of motivational climate in the burnout literature.

3.6.4 Sport Commitment

The Sport Commitment Questionnaire-2 (SCQ-2; Scanlan et al., 2016) is used to examine the factors influencing players' commitment to their sport. The 58-item measure includes two higher-order factors, *enthusiastic commitment* and *constrained commitment*, and ten underlying factors; *sport enjoyment, valuable opportunities, personal investments (loss* and *quantity of investment subscales), social support (emotional and informational support subscales)* and *desire to excel (mastery and social achievement subscales*; Scanlan et al., 2016). Responses are measured on a 5-point Likert scale. Higher scores on each subscale indicate the commitment antecedent or commitment subtype is particularly relevant for the athlete. Each of the 12 SCQ-2 subscales have shown good reliability and internal consistency (Cronbach's alpha > .70) in existing research, while the factor structure was also supported (Scanlan et al., 2016).

3.6.5 Perceived Stress

The Perceived Stress Scale (PSS-10; Cohen et al., 1994) is a 10-item measure that was used to assess perceived daily-life stress. In addition, it can more specifically be viewed as a measure of the secondary evaluation of stress, namely the perceptions of coping and control (Cerclé et al., 2008), and thus is in line with the Smith's (1986) conceptualisation of stress in the context of athlete burnout as a perceived inability to cope with demands. Questions are answered on a 5-point Likert scale. Responses between 0-13 are indicative of low stress, scores ranging from 14-26 indicate moderate stress, and scores from 37-40 suggest high levels of perceived stress (Cohen et al., 1994). Existing research has found the PSS-10 to be a valid, reliable and consistent measure (Cronbach's alpha > .70) (Barbosa-Leiker et al., 2013), and the Systematic Review (Chapter 2) indicated it is commonly used to assess stress in athletes.

3.6.6 Characteristics and Demands of Sport Participation

Characteristics. Participants were asked to outline their *sport type* (Gaelic football/hurling/ladies football/camogie), *starting status* ("do you start in 75% or more of your games?"; Cresswell & Eklund, 2006) and number of training days missed in previous 3 months due to injury (*injury*). Data on *playing level* (intercounty v. non-intercounty) was also gathered.

Sport demands/stressors. Participants were to specify the average number of hours they spend training for Gaelic games each week (*training hours)* and the average number of hours each week they dedicate to Gaelic games outside of physical training (*other hours)*. Average weekly training hours have previously been employed as a measure of temporal demands in the athlete burnout literature (e.g. Cresswell & Eklund, 2006b), while Kelly et al. (2018) also explored average additional temporal demands in this manner. Participants were also asked to indicate the Gaelic games team(s) they were currently a member of, from a list including club minor, club U20/U21, club adult, college, county minor, county U20/U21, county adult and 'other'. Participants could select as many team as required across both hurling/camogie or football. This question was used to calculate the number of teams each participant represented, (*number of teams represented*), and their *playing level* (intercounty v. non-intercounty).

3.6.7 Demographic Questions

Additional questions relating to *gender* and *age* were also included, to allow for accurate description of our sample. When asked to specify their gender, participations could select from the options "male", "female" and "other". They were asked to enter their age in years.

3.6.8 Questions Relating to the Impact of the COVID-19 Pandemic

As noted in Chapter 1, additional analyses were conducted specifically to assess how athletes viewed the pandemic-induced suspension of sport, and the impact of this period on feelings of burnout and stress. Furthermore, additional closed- and open-ended questions were added to the questionnaire at T5 with a view to achieving these aims (Brace, 2013). As these additions relate specifically to T5 and one analysis only, relevant details are provided in Chapter 8, rather than in this more general methods chapter.

3.7 Ethical Considerations

Ethical approval for this study was obtained from Dublin City University Research Ethics Committee (See Appendix F). The population of Gaelic games players is not considered inherently vulnerable (Gordon, 2020), and the topic of burnout is one discussed often in Gaelic Games (e.g. Duffy, 2015; Moran, 2018). All participants were provided with a copy of the PLS at T1 and reminder information at T2-T6 and informed consent was obtained from participants at each timepoint. In order to mitigate potential social risks or pressure in the case of face-to-face recruitment, athletes were given the questionnaire to take home. In the event that any participant did experience any upset or distress, contact details for relevant support services were provided.

Substantial steps were taken to ensure that identifying information (e.g. names and email addresses) collected to facilitate data tracking and continued contact was anonymous to all other individuals involved in the research and to ensure the confidentiality of participants' data. This included the separation of both online and hard-copy consent forms from questionnaire data, with identifying information replaced by a unique ID code. Datagathered was private and confidential, and was dealt with in a GDPR-complaint manner at all times. Furthermore, participants were made aware of anonymity, confidentiality and data storage issues in the PLS.

3.8 Data Analysis Plan

The following subsections will provide a broad overview of the data analysis techniques employed in each phase of the analyses. Specific details of each analysis are provided in the relevant chapter, as noted below.

3.8.1. Data Screening and Preparation

Screening and preliminary analyses of data gathered at all timepoints was conducted using SPSS 27.0. The first step of this process involved reverse-coding variables where appropriate, coding missing data, and combining individual items to create relevant subscales, as per the materials section. A specific overview of missing data analysis is provided below, while additional preparatory work specific to each analysis is outlined in detail in the relevant chapter.

3.8.1.1 Screening for Missing Data. Screening for missing data is an important part of preliminary analysis. Missing data can be defined as unobserved values that would be meaningful for the analysis in question (Little & Rubin, 2002). Missing data is a particularly relevant challenge in longitudinal studies (Graham, 2009), where participants commonly fail to provide responses at certain data collection windows, or drop out of the study before all data collection windows are complete. Missingness can be described both in terms of a *pattern* and a *mechanism*; the *pattern* of missingness describes which values are missing and observed, while the *mechanism* refers to the relationship between the data that is missing and the underlying values of the variables in the dataset (Little, 2020). Participant attrition in a longitudinal study is an example of a pattern of missingness (Little, 2020). Focusing on mechanisms of missingness, data can be Missing Completely at Random (MCAR), Missing at Random (MAR) and Missing Not at Random (MNAR) (Little & Rubin, 2002). Data MCAR are not dependent on any observed or missing values, while data MAR is allowed to be related to other observed variables, but not the values on the variables that are missing (Little & Rubin, 2002). Where missing data is related to observed data, it is referred to as MNAR (Little & Rubin, 2002). While identifying the exact mechanism of missingness can require meeting untenable assumptions, it is essential to ensure that the missing data technique employed is in line with the relevant assumptions of the most likely mechanism of missingness (Graham, 2009; Newman, 2014).

The mechanism and pattern of missingness for data gathered was assessed, and methods for handling missing data are discussed in details across relevant analysis chapters.

3.8.2 Assessing Burnout Prevalence and Demographic Predictors of Burnout at T1.

Descriptive statistics, frequency analyses and tests of assumptions were calculated for the ABQ subscales and demographic and sport-specific characteristics at T1. Multiple regression analyses were used to identify demographic and sport-specific predictors of burnout; separate analyses were conducted for PEE, RSA and SD, with gender, age, *playing level, injury* and *starting status* at T1 specified as predictors in each case. Specific details of the analysis are outlined in Chapter 4.

3.8.3 Cross-sectional Analysis of the Utility of Existing Perspectives of Burnout

Structural equation modelling (SEM) was employed to assess the fit and predictive utility of distinct models based on the stress, motivation and commitment perspectives of burnout. Details of model specification are provided in Chapter 5. SEM is a powerful and flexible analysis tool that allowed us to account for measurement error of observed variables (Wang & Wang, 2012). This is particularly important when assessing psychological constructs that cannot be directly observed, and thus can only be examined using indicator items (Wang & Wang, 2012), as is the case with the variables of interest in this study. In line with the recommended two-step approach for SEM, confirmatory factor analysis (CFA) was conducted at Step 1 to confirm the factor structures of measures employed (Anderson & Gerbing, 1988; Wang & Wang, 2012). At Step 2, the structural models were assessed, whereby the measures of stress, commitment, motivation were incorporated as predictors of the dimensions of athlete burnout. Further details of this analysis are provided in Chapter 5.

3.8.4 Identifying Trajectories of Burnout Symptoms

Latent Growth Modelling (LGM) refers to a specific application of structural equation modelling (SEM) that enables the examination of both intra- and inter-individual change over time (Preacher et al., 2008). LGM techniques allow researchers to explore a range of features of the data, including the mean trajectory of scores over time, whether this trajectory is predicted by initial levels and to explore whether there is substantial variability in the initial levels and trajectories of change identified across participants (Preacher et al., 2008). LGM's are extremely flexible and, where data is gathered over three or more timepoints, allow for the modelling of both linear and nonlinear change over time (Preacher et al., 2008). The trajectory that best explains changes in data over time can be identified by comparing different models of change (Preacjer et al., 2008). In addition, inter-individual differences in initial burnout and rate of change can also be assessed. As such, with a view to identifying the average trajectory of change in PEE, RSA and SD over time, and inter-individual variability, a series of LGM models were fitted to each data set, and compared for fit. The specific details of this analysis are outlined in Chapter 6.

3.8.5 Identifying Risk and Protective Factors for the Development of Burnout

With the aim of identifying the factors that predicted individual differences in the trajectory of PEE, RSA and SD over time, conditional LGM was employed, which involves incorporating predictors into a growth model (Preacher et al., 2008). Candidate predictor variables for this analysis were identified through the results of the SEM and MR analyses outlined above. All predictors were regressed on the intercept and the slope, and the intercept and slope were allowed to co-vary (Preacher et al., 2008).

Backwards elimination is a formal variable selection method wherein all candidate variables are included in the model at the first step, and variables are deleted at each subsequent step until only those considered to be contributing to the model remain (Chowdhury & Turin, 2020). As such, this variable selection method was employed to facilitate the identification of the set of variables that contribute to the best fitting parsimonious conditional LGM for PEE, RSA and SD (Chowdhury & Turin, 2020). Specific details of this analysis are provided in Chapter 7.

3.8.6 Examining the Impact of the Suspension of Sport due to COVID-19

This analysis focused on two of the six data points; T2 (June – August 2019), and T5 (July – August 2020). T2 was a regular "in-season" period for Gaelic games athletes. In contrast, at T5 Gaelic games athletes were returning to a restricted training and games schedule following a 3-month suspension of all organised activity after the onset of the COVID-19 outbreak. Means scores on the ABQ, PSS-10, *training hours* and *other hours* at T2 and T5 were compared, and a multiple regression (MR) was used to identify predictors of burnout T5. In addition, inductive coding was employed to analyse open-ended responses (Bengtsson, 2016). Specific details of this analysis are provided in Chapter 8.

Chapter 4. Investigating the Prevalence of Burnout Symptoms and Demographic and Sport-Specific Characteristics as Predictors of Burnout at Time One

4.1 Introduction

This chapter details the series of cross-sectional analyses with data gathered at T1, that were conducted to assess the prevalence of burnout in Gaelic games, and identify demographic and sport-specific predictors of PEE, RSA and SD. This chapter begins with an overview of the rationale, aims and hypotheses for this analysis, followed by details of the methods and results, and finally a discussion of the implications of the findings both in the context of the thesis and more broadly.

4.1.1 Overview of Rationale

As outlined in Chapter 1, it has been argued that the characteristics of Gaelic games may place these athletes at increased risk of burnout (e.g. Hughes & Hassan, 2017). These substantive concerns have received some support in the existing quantitative research; Hughes' (2008) found that elite male Gaelic footballers reported higher levels of PEE and RSA compared to data from other team (Cresswell & Eklund, 2005a) or individual (Raedeke, 1997) sports, but comparatively low levels of SD. Similarly, Turner and Moore (2016) found that male GAA players reported relatively moderate levels of PEE and RSA on average, with lower levels of SD (M = 1.33). A previous exploration of burnout in adult male and female Gaelic games players across levels by the researcher (Woods et al., 2020) found that 10% of athletes reported experiencing all three burnout symptoms at least "*sometimes*", which exceeds estimates ranging from 1 – 9% across other team and individual sports (Dubuc-Charbonneau et al., 2014; Gustafsson et al., 2007). However, further research on athletes across genders and non-elite athletes is needed to assess the risk of burnout in Gaelic games.

In addition to specific stress-, motivation- and commitment-related variables, both the systematic review (Chapter 2) and substantive concerns in the literature (e.g. Bicalho & Costa, 2018) suggest that certain characteristics of sport participation may increase the risk of burnout in team-sport athletes, including absence from sport due to injury, starting status and playing level. Specifically, experiencing serious injury has been associated with increased distress in Gaelic games athletes (Gouttebarge et al., 2016), while Cresswell and Eklund (2006) found that amateur rugby players who experienced more absences due to injuries during the season reported higher levels of PEE, RSA and SD. Similarly, rugby players who were regularly substitutes on their team showed higher levels of RSA (Cresswell & Eklund, 2006a). Supporting qualitative research suggests that this increased risk can be explained by frustration and pressure experienced by injured athletes, while athletes also reported similar pressure and insecurity in relation to their starting status (Cresswell & Eklund, 2006b). In addition, research exploring the experience of substitute players more broadly has also highlighted the substantial negative emotions experienced by substitute players (Hills et al., 2018). Notably, over 60% of male intercounty Gaelic games players state that playing regularly, as opposed to being a substitute who may not play, is one of the most important aspects of their sporting experience (Kelly et al., 2018). To the researcher's knowledge, effects of injury and starting status on the burnout experience of Gaelic games athletes have yet to be explored.

Furthermore, and as evidenced in the systematic review (see Table 2.2), much of the concern around burnout in team sport has focused on elite athletes (e.g. Bicalho & Costa, 2018). It has been argued that characteristics of elite sport, including increased training demands, commitment, social constraints and pressure to perform may place this population at greater risk of burnout (Bicalho & Costa, 2018; Casper & Andrew, 2008; Gustafsson et al., 2011). However, elite athletes have also been shown to outperform amateur athletes on measures of positive psychological attributes, such as stress control and self-determined motivation (Olmedilla et al., 2018). Furthermore, a recent meta-analysis of the prevalence of burnout symptoms in studies from 1997 – 2019 revealed found no significant differences in symptom frequency across playing levels (Madigan et al., 2022). As noted in Chapter 1, Gaelic games athletes can play at elite intercounty level or non-elite levels, but as with all sports, non-elite participants make up the majority of the playing population. As such, exploring the impact of playing level on burnout can provide further insight into whether this is an issue of concern across playing levels.

Finally, the importance of gathering data on participants' age and gender was also identified when planning this programme of research. Notably, previous research on gender differences in athlete burnout has produced varied results, for example some studies have found that female athletes report significantly higher levels of burnout than their male counterparts, on some or all burnout dimensions (Cremades et al., 2011; Cremades & Wiggins, 2008; Dubuc-Charbonneau et al., 2014; Isoard-Gautheur et al., 2015), while previous work by the researcher on burnout in the Gaelic games population (Woods et al., 2020) found that females reported significantly higher levels of PEE. In contrast, others have identified an increased risk of burnout in male athletes (Lai & Wiggins, 2003). No significant gender differences were identified in the recent meta-analysis of the frequency of athlete burnout symptoms (Madigan et al., 2022). Research on the impact of age on burnout has also been mixed; for example, in their cross-sectional analysis of basketball players, Toros et al. identified no impact of age on burnout (Toros et al., 2017), while Isoard-Gautheur et al. (2015) found that the trajectory of change in burnout different across different ages of adolescence. As noted previously, administrators in the GAA have raised particular concerns about burnout in younger athletes (e.g. Duffy, 2016). As such, participants' age was also assessed with a view to assessing the impact of age on burnout.

Importantly, these demographic and sport-specific characteristics are of particular interest because understanding their impact on feelings of PEE, RSA and SD can provide insight into potentially high-risk groups for the development of burnout symptoms in Gaelic games, in line with the overarching aim of this thesis, and may also help to inform targeted intervention approaches moving forward.

4.1.2 Aims and Objectives

In line with the rationale outlined above, the aims of this series of cross-sectional analyses were to assess the prevalence of burnout symptoms reported by Gaelic games athletes, and to explore the impact of demographic and sport characteristics on burnout levels. The specific objectives were as follows;

1. To examine the prevalence of feelings of PEE, RSA and SD reported by Gaelic games players at T1.
2. To assess whether frequency of PEE, RSA and SD symptoms at T1 were significantly predicted by demographic characteristics, including age and gender, and characteristics of sport participation, including starting status, the amount of training missed due to injury in the preceding 3 months, and playing level.

4.1.3. Hypotheses

A number of exploratory and specific hypotheses were specified for the each of the cross-sectional analysis objectives, based on the rationale outlined above. The following hypotheses were specified;

Hypothesis 1. Gaelic games athletes would report a moderate frequency of burnout symptoms on average.

Hypothesis 2. Playing at the elite level would significantly positively predict frequency of PEE, RSA and SD symptoms.

Hypothesis 3. Time-missed due to injury would significantly positively predict frequency of PEE, RSA and SD.

Hypothesis 4. Regularly holding a substitute role would significantly positively predict frequency of RSA symptoms. No specific hypotheses were specified for the impact of starting status on PEE or SD, due to limited existing evidence. As such, this variable was included in models of PEE and SD on an exploratory basis.

Hypothesis 5. Due to conflicting or limited evidence in the existing literature (Isoard-Gautheur et al., 2015; Lai & Wiggins, 2003; Woods et al., 2020), no specific hypotheses were put forward in relation the impact of age or gender. As such, the inclusion of these variables was exploratory.

4.2 Methods

A detailed description of all aspects of study design is provided in Chapter 3 (Section 3.3.). This section provides an overview of participants and materials, and a detailed description of the methods of analysis.

4.2.1 Overview of Participant Eligibility

This analysis relates specifically to data gathered at T1 of the study. As such, in line with eligibility criteria outlined in Chapter 3, any individual aged 18 or over and a member of Gaelic games team playing Ladies football, Camogie, Gaelic football or Hurling at the time of initial recruitment (March 2019) was eligible for participation.

4.2.2 Overview of Materials Relevant for this Analysis

The ABQ was used to assess the frequency of athlete burnout symptoms experienced by Gaelic games athletes (Raedeke & Smith, 2001). Participants were also asked to outline their *sport type* (Gaelic football/hurling/ladies football/camogie), *starting status* (do you start in 75% or more of your games?; Cresswell & Eklund, 2006), number of training days missed in previous 3 months due to injury (*injury*), and to indicate the Gaelic games team(s) they were currently a member of, from a selection of elite and non-elite teams across sports. This question was used to calculate their *playing level* (intercounty/elite v. non-intercounty). Where athletes represented multiple teams, they were asked to respond to the question on *starting status* in relation to the team they trained with most often. Participants were also asked to indicate their *gender* (male/female/other) and *age* (in years).

4.2.3 Analysis

4.2.3.1 Preliminary Analyses. Frequency and descriptive statistics were calculated, along with tests of assumptions and analysis of the percentage of missing data for each variable. The percentage of participants who report experiencing symptoms of all three burnout dimensions at least "sometimes" (i.e. mean scores ≥3 on all ABQ dimensions), those who experience two of these symptoms at least "sometimes" (i.e. mean score ≥3 on two burnout dimensions) and those who "rarely" or "almost never" experience any symptoms of burnout (i.e. mean score scores ≤ 2 on all three burnout dimensions) was also calculated. While no clinical cut-off scores for burnout have been established, it has been suggested that these groupings can give an indication of those experiencing high, moderate and low levels of burnout respectively (Dubuc-Charbonneau et al., 2014). Such categorisation allows for comparison with data from other studies. Correlational analysis for continuous variables and mean comparisons of burnout symptom frequency across categorical variables were also conducted.

4.2.3.2 Multiple Regression Analysis. Multiple regression analyses were used to assess demographic and sport-specific characteristics as predictors of frequency of feelings of PEE, RSA and SD; *gender* (coded as male = 0; female = 1; no participants selected the option for "other"), *age, playing level* (coded as elite = 1, non-elite = 0), *starting status* (coded as regular starter = 1, substitute = 0), and training sessions/games missed due to *injury* were included simultaneously in the multiple regression, and separate analyses were conducted for PEE, RSA and SD. Preliminary analyses were also conducted to assess relevant assumptions, including normality, linearity, homogeneity of variance, multicollinearity, and homoscedasticity.

4.3 Results

4.3.1 Descriptive Statistics

370 Gaelic games athletes completed the questionnaire at T1. Missing data was evident on the *starting status* (n = 3, 0.8%) variable. Participants with missing data were excluded. As such, sample size for the for the multiple regression analyses was n = 367. Participants ranged in age from 18 – 55 years (M = 24.34, SD = 5.96). Descriptive statistics and bivariate correlations for all continuous variables are outlined in Table 4.1.

4.3.1.1 Prevalence of Burnout Symptoms in Gaelic games. The mean frequency of PEE, RSA and SD symptoms is provided in Table 4.1. Mean scores for distinct groups and mean comparisons across grouping variables are provided in Table 4.2. In addition, frequency analyses indicated that 6.2% (n = 23) of players reported scores ≥3 on all burnout dimensions, while 14.1% (n = 52) of players reported scores ≥3 on two dimensions of burnout. Focusing on each dimension in isolation, 21.9% (n =

81) scored ≥3 on PEE, 16.5% (n = 61) scored ≥3 on RSA, and 11.6% (n =43) scored ≥3 on SD. 13.8% (n = 51) of participants scores ≤2 on all three burnout dimensions.

Table 4.1

Means, standard deviation and bivariate correlations for continuous variables

	PEE	*RSA*	*SD*	Age	Injury	M	SD
PEE	1.00					2.32	0.73
RSA	$.39^{**}$	1.00				2.63	0.76
SD	$.40_s^{**}$	$.58_s^{**}$	1.00			2.09	0.87
Age	$-.14_s^{**}$	$-.06_s^{*}$	$-.06_s$	1.00		24.31	5.95
Injury	$-.06_s$	$-.01_s$	$-.06_s$	.01	1.00	5.03	10.23

Note: Injury = number of training sessions and missed in the preceding 3 months due to injury; r_s = Spearman's rho correlation; subscript "s" denotes r_s values; correlation = Pearson's r; M = mean score, SD = Standard Deviation; * = $p < 0.05$; ** = $p < 0.01$.

Table 4.2

Means, standard deviation and mean comparisons of ABQ Dimension across Categorical Variable Groups

Variable	Group	*n*	PEE		RSA		SD	
			M (SD)	*U/ t(df)*	*M (SD)*	*U/ t(df)*	*M (SD)*	*U/ t(df)*
Gender	Male	175	2.31 (.69)	t(365)= -.39	2.65 (.69)	t(365)= -.24	2.12 (.82)	U = 15776.0
	Female	192	2.34 (.77)		2.62 (.81)		2.07 (.91)	
Playing Level	Elite	104	2.50 (.79)	U =11239.5*	2.50 (.76)	U =11955.0	1.76 (.71)	U = 9354.5*
	Non-Elite	263	2.25 (.69)		2.68 (.75)		2.23 (.90)	
Starting status	Starter	316	2.31 (.72)	U = 7739.0	2.58 (.75)	U = 6177.0*	2.12 (.90)	U = 7241.0
	Non-starter	51	2.40 (.85)		2.88 (.75)		1.93 (.71)	

Note. Elite = intercounty; *Non-elite* = non-intercounty; *Starter* = starts more than 75% of games; *non-starter* = does not start more than 75% of games; U = Non-parametric Mann-Whitney U test, employed where data was non-normally-distributed/group sizes differed substantially; $t(df)$ = t-test (degrees of freedom), employed where data was normally distributed and group sizes were similar; * = $p < 0.0167$ (Bonferonni adjustment; p = 0.05/3)

4.3.2 Demographic and Sport-Specific Characteristics as Predictors of Burnout

4.3.2.1 Test of Assumptions of Multiple Regression. Although significant results ($p < 0.05$) were evident for the Kolmogorov-Smirnov and Shapiro-Wilk tests for PEE, RSA, SD, age and *injury* suggesting the data violated the assumption of normality, these tests are highly sensitive (Oppong & Agbedra, 2016) and examination of the histograms revealed that the PEE and RSA histograms closely approximated the normal curve. Positive skews were evident for the age and *injury* data and for the SD data, but this did not improve with transformations (square root and logarithm). Spearman's rho correlation is reported in Table 4.1 where data showed a non-normal distribution. However, normality of residuals is the key concern in multiple regression, and the normal Q-Q plots for all subscales supported this assumption. The additional multiple regression-specific assumptions of absence of multicollinearity (VIF < 5, tolerance > 0.2; Hair et al., 2021), independence of residuals (Durbin-Watson = 1.91 – 2.05), homoscedasticity (scatterplot distribution) and linearity (scatterplots) were supported for models of PEE, RSA and SD. For each analysis, the maximum Mahalanobis distance was above the critical chi-square for eight independent variables (26.13), indicating the presence of multivariate outliers. However, simulation studies indicate that Mahalanobis distance is a relatively liberal measure of outlying observations, and is more likely to treat nonoutlying observations as outliers, also known as swamping (Tong & Zhang, 2017). In contrast, Cook's distance performs more conservatively, with lower levels of sensitivity in identifying outlying observations, but great specificity (Tong & Zhang, 2017). Notably, the Cook's distance value in each case was well below the critical value of 1 (0.05 – 0.1) suggesting there were no influential cases impacting the models (Pallant, 2013). As such, the data was retained.

4.3.2.2 Examining Predictors of Burnout. Following preliminary analyses, all multiple regression analyses were conducted as planned. The models assessed significantly predicted frequency of symptoms of PEE [$F(5, 361) = 4.705$, $p < 0.001$, $R^2 = 0.061$ (6.1%)], RSA [$F(5, 361) = 4.852$, $p < 0.001$, $R^2 = 0.063$ (6.1%)] and SD [$F(5, 361) = 5.629$, $p < 0.001$, $R^2 = 0.072$ (7.2%)]. The contribution of each variable to the models is outlined in Table 4.3.

Table 4.3 Results of the Multiple Regression Analyses

Variable	PEE			RSA			SD		
	B [95% CI]	**SEB**	**β**	**B [95% CI]**	**SEB**	**β**	**B [95% CI]**	**SEB**	**β**
(Constant)	2.82 [2.45, 3.18]	.19		3.44 [3.07, 3.82]	.19		2.44[2.00, 2.88]	.22	
Age	-.02 [-.04, -.01]	.01	-.19**	-.02 [-.03, -.01]	.01	-.15**	-.01 [-.03, .00]	.01	-.07
Gender	-.03 [-.18, .12]	.08	-.02	.02 [-.13, .18]	.08	.02	.03 [-.15, .21]	.09	.02
Injury	-.00 [-.01, .00]	.00	-.06	-.00 [-.01, .01]	.00	-.01	-.01 [-.68, -.26]	.00	-.09
StartStat	.04 [-.18, .26]	.11	.02	-.34 [-.57, -.11]	.12	-.16**	.08 [-.18, .35]	.13	.03
Level	.24 [.07, .41]	.09	.15**	-.27 [-.45, -.09]	.09	-.16**	-.47 [-.68, -.26]	.11	-.24**

Note. B = unstandardized beta coefficient, SEB = standard error of the unstandardized coefficient, β = standardized beta coefficient, Gender: male = 0, female = 1, Injury = number of training sessions missed due to injury in preceding 3 months, StartStat = starting status (1 = regular starter, 0 = regular substitute), Level = playing level (elite = 1, non-elite = 0).

$^{*} = p < 0.05$, $^{**} = p < 0.01$

4.4. Discussion

In line with the aims and objectives outlined, this analysis provides insight into the prevalence of burnout symptoms in Gaelic games athletes, and the demographic and sport-specific characteristics that predict frequency of burnout symptoms. The average prevalence of burnout symptoms reported by athletes in this sample can be compared to findings from a recent meta-analyses of the burnout literature, which included data from over 20,000 athletes across sports (Madigan et al., 2022). Results suggest that the frequency of PEE symptoms experience by this sample (*M* = 2.32; see Table 4.1) is slightly lower than the mean of 2.45 identified in Madigan et al.'s (2022) meta-analysis, while the frequency of RSA (*M* = 2.63) and SD (*M* = 2.09) symptoms are slightly above the respective meta-analysis means of 2.46 and 2.03. As such, these findings indicate that the risk of burnout in Gaelic games athletes is similar to that experienced by athletes from other team and individual sports. Notably, the lower frequency of SD symptoms compared to either RSA or PEE has been identified in previous research on Gaelic games athletes (Hughes, 2008; Turner & Moore, 2016), and may provide some support for qualitative research that has highlighted the value placed on Gaelic games in Irish society (e.g. Geary et al., 2021). However, this trend is also evident in athletes across sports (Madigan et al., 2022).

While no clinical cut-offs for the ABQ have been identified (Gerber et al., 2018), Dubuc-Charbonneau et al. (2014) suggest that athletes who experience all three burnout symptoms at least “sometimes” (i.e. mean score ≥3) can be described as a “high burnout” group, while those reporting this frequency of two burnout symptoms can be described as experiencing “moderate burnout”. 14.1% of players in this sample reported experiencing two dimensions of burnout at least “sometimes” (i.e. mean score ≥3), and the percentage of athletes reporting all three symptoms at this rate was 6.2%. In contrast, almost 14% of respondents were categorized as experiencing “low burnout”, experiencing PEE, RSA or SD symptoms “rarely” or “almost never” (scores ≤ 2; Dubuc-Charbonneau et al., 2014). These findings are somewhat in contrast to previous work conducted by the researcher with this population of athletes (Woods et al., 2020), wherein almost 10% of respondents were categorized in the “high burnout” group. This may be explained by the timing of data collection period, which was slightly later in the season for this study compared to the previous work. Previous (e.g. Cresswell & Eklund, 2006) has suggested some symptoms of burnout may be higher earlier in the season. However, the percentage of athletes in a potential high burnout category in the current sample remains at the upper end of the 1-9% range commonly reported in other sports (Dubuc-Charbonneau et al., 2014; Gustafsson et al., 2007).

This analysis also identified key demographic and sport-specific characteristics that predict feelings of PEE, RSA and SD in Gaelic games athletes. Findings suggest that younger athletes are at greater risk of experiencing feelings of PEE and RSA. Increased RSA was also predicted by being a substitute player, while playing at the elite level emerged as a protective factor against RSA and SD, but predicted increased frequency of PEE symptoms. Neither gender nor *injury* significantly predicted frequency of symptoms across any burnout dimensions.

Notably, while the positive relationship between elite participation and PEE provides some support for the prevailing perception in the literature that elite athletes are at increased risk of burnout (Bicalho & Costa, 2018), the emergence of elite participation as a protective factor against RSA and SD was contrary to the hypothesized positive relationship. Research examining the role of Gaelic games in athletes' lives may provide some substantive explanation for this result; in addition to the substantial time and energy dedicated by intercounty levels to their sport, they identify strongly with their sporting role and are glad to play at the elite level (Kelly et al., 2018; Geary et al., 2021), all of which suggest they value their sport participation highly. Furthermore, it has been argued that Gaelic games athletes have been socialised to hold participation in their sport in high regard, with participation at the intercounty level holding particular gravitas, and athletes view the sports as part of their national identity (Geary et al., 2021; Hughes & Hassan, 2017). As such, the sense of accomplishment from competing at this level may be greater for these athletes. Importantly, these results suggest that the issue of burnout is not specific to elite athletes, and thus appropriate awareness of burnout and relevant support for athletes is required across participation levels in Gaelic games.

Results supported our hypothesis around non-starters being a potentially high-risk group for burnout (section 4.1.3), with increased levels of RSA predicted by frequent non-starting, or substitute, status. This finding, is in line with previous research on burnout in rugby players (Cresswell & Eklund, 2006b) and suggests that greater care should be taken to promote feelings of accomplishment among this group. Exploration of the impact on additional burnout variables indicated that non-starters were not at greater risk of PEE or SD. These findings may again reflect the value placed on Gaelic games participation in Irish society (Geary et al., 2021; Hughes & Hassan, 2017), and provide support for the idea that this extends beyond valuing individual sporting success to reflect the importance and value placed on representing one's family, home town and national culture (Keeler & Wright, 2013).

Contrary to our hypothesis, there was no significant impact of time out of training due to injury, suggesting that, in contrast to data from rugby (Cresswell & Eklund, 2006), injured Gaelic game athletes are not more prone to burnout. This may be explained by the relatively limited absences due to injury experienced in the current sample, with participants reporting just over five missed training sessions due to injury on average over the preceding three months. In contrast, Cresswell and Eklund (2006b) note that injuries in rugby tend to be more serious, and almost 65% of their sample experienced absences of more than 28 days (Cresswell & Eklund, 2006b).

Exploration of demographic factors also provided insight into risk factors for burnout; the absence of gender differences for frequency of PEE, RSA and SD symptoms is in line with a recent meta-analysis of the prevalence of burnout across sports (Madigan et al., 2022), and suggests that burnout is an issue of equal importance for male and female Gaelic games players. However, as noted in Chapter 2, research on burnout in female team-sport athletes remains limited, and further exploration of athlete experiences across genders is warranted. Furthermore, to the best of the researcher's knowledge, and in contrast to the discussion papers put forward by the men's GAA (Duffy, 2015), the women's associations (i.e. LGFA and CA) have yet to officially address the potential issue of burnout in their games. These findings suggest that awareness of, and efforts to prevent, burnout are relevant for male and female Gaelic games.

Finally, while no directional hypothesis was specified for age as a predictor of burnout, results suggest that being a younger Gaelic games athlete increases the risk of experiencing PEE and RSA, and thus provides some support for concerns raised within Gaelic games (GAA, 2016) and across sports (Isoard-Gautheur et al., 2015) around the risk of burnout in younger athletes. Specifically, findings support arguments made in a discussion on burnout in the 2016 GAA Annual Report, where it is suggested that the combination of the age-grading system, player eligibility and competition structures, means athletes aged 17 – 21 are a particularly at-risk group (Duffy, 2016). Notably, these results differ somewhat from those of a recent meta-analysis, wherein age significantly predicted differences in SD only (Madigan et al., 2022), and suggest that, in line with the discussion of the role of Gaelic games in athletes' lives, value placed on Gaelic games participation does not diminish as an athlete ages.

4.4.1 Conclusions and Implications for Thesis

Taken together, this series of analyses indicates that burnout is an issue affecting Gaelic games athletes across genders and playing levels. Furthermore, results highlight a number of demographic and sport-specific characteristics that can increase the risk of burnout for these athletes, including being younger and being a substitute player. In contrast, playing at the elite level had a mixed effect on burnout, and was associated with an increased risk of PEE but a reduced risk of RSA and SD. These findings may help to inform targeted intervention and prevention methods, for example highlighting the importance of ensuring that substitute players and younger athletes have opportunities to achieve their goals and potential (RSA). In the context of the broader thesis, this analysis makes an important contribution to our overall aim of identifying the key risk and protective factors for burnout in Gaelic games, and highlights variables that warrant further exploration in longitudinal analyses. Specifically, the variables that emerged as significant predictors of burnout in this cross-sectional analysis were subsequently examined as predictors of change in burnout over time (Chapter 7).

Chapter 5 Cross-sectional Analysis of the Utility of Existing Perspectives of Burnout

5.1 Introduction

This chapter details the series of cross-sectional analyses that were conducted to assess the relative utility of the stress-, commitment-, and motivation-based perspectives of athlete burnout. The chapter begins with a short overview of the rationale for the analyses, followed by a detailed overview of the methods and results, and a discussion of the implications of this work for our understanding of burnout more broadly and specific implications in the context of the thesis.

5.1.1 Analysis Rationale

As discussed in Chapter 1, a lack of consensus remains as to how burnout develops (Gustafsson et al., 2017), with no singular, well-accepted theory identified (Gustafsson et al., 2017). As such, researchers have attempted to understand burnout through a variety of existing theoretical lenses, with stress-, commitment-, and motivation-based perspectives to the fore (Gustafsson et al., 2017; Madigan, 2021; Madigan et al., 2021). While detailed overviews of these perspectives are provided in Chapter 1, this section outlines the rationale for the specific stress-, motivation and commitment-related variables explored, informed by the findings of the systematic review (Chapter 2) and consideration of the Gaelic games context, and the analysis approach undertaken

The stress perspective of burnout suggests that burnout occurs as a result of a perceived inability to cope with stressful demands (Smith, 1986), while Silva's (1990) training stress syndrome perspective focuses specifically on the negative implications of intense training demands. Notably, while the results of the systematic review in Chapter 2 highlight a range of potential psychological stressors experienced by athletes, such as money hassles, college life, and sport-specific stress, as well as more general measures of perceived stress and distress (see Table 2.5), these variables consistently show a positive association with symptoms of burnout. This is in line with a recent systematic review focusing specifically on the relationship between stress and burnout (Lin et al., 2021), and provides support for a strong positive relationship between psychological stress and athlete burnout in team sports.

While stress is consistently associated with burnout, support for the specific impact of training demands on burnout is mixed (e.g. Appleby et al., 2018; Smith et al., 2010; Chapter 2). However, as noted in Chapter 1, the conceptualisation of burnout in Gaelic games appears to centre largely around this "training stress syndrome" (Silva, 1990) perspective of burnout, with a focus on the demands associated with sport participation (e.g. Duffy, 2015). Furthermore, temporal demands outside physical training (e.g. travel time and team meetings; Kelly et al., 2018) and multi-team representation (e.g. Geary et al., 2021; Hughes & Hassan, 2017), have been identified as potentially key sources of stress for Gaelic games players. Notably, previous research did not identify a link between multi-team representation and burnout in youth males playing elite-level Gaelic games (Hughes, 2008). However, to the researcher's knowledge, the role of additional sport-related stressors, such as temporal demands, and the impact of psychological stress more broadly, have yet to be explored as predictors of burnout in Gaelic games athletes. In addition, research on multi-team representation has yet to be extended to adult athletes from across genders and playing levels. As such, exploring the extent to which these stress-related variables account for symptoms of burnout in the current sample can provide insight into the utility of the existing training-stress approach to burnout in Gaelic games, as well as the potential benefits of considering psychological stress, and may help to inform future intervention and prevent efforts.

As discussed in Chapter 1, the commitment perspective suggests that burnout occurs when athletes feel trapped in their sport, or experience a sense of obligation to play (Raedeke, 1997). Raedeke's (1997) early work and recent research by De Francisco et al. (2022) provide support for the utility the commitment perspective. However, this work was based on a conceptualisation of commitment (Scanlan et al., 1993) that has since been updated and extended (Scanlan et al., 2016). To the researcher's knowledge, her previous work (Woods et al., 2020) signalled the first effort to explore the utility of the most recent conceptualisation of the Sport Commitment Model (SCM; Scanlan et al., 2016; see Table 1.1). Notably, findings suggest that key components of the model can account for significant variation in frequency of PEE, RSA and SD symptoms experienced by Gaelic games (Woods et al., 2020). In addition, results of the systematic review (Chapter 2) indicate that, beyond this, there has been limited explicit exploration of the role of commitment on burnout in team sports. However, findings of WMA (Chapter 2) did highlight that *social support*, which is a component of SCM (Scanlan et al., 2016), showed a significant negative association with PEE, RSA and SD across studies. Furthermore, despite the relatively limited empirical exploration of the commitment perspective, there is substantial conceptual and theoretical support for the role of commitment in burnout (Gustafsson et al, 2011). In addition, as discussed in Chapter 1, the commitment perspective may be particularly useful in understanding burnout in the amateur sports of Gaelic games (Hughes & Hassan, 2017). As such, exploring the utility of the full range of commitment-related factors in accounting for frequency of PEE, RSA and SD is an important step towards achieving the overarching aim of identifying the key factors associated with burnout in this population of athletes.

The motivation perspective of burnout draws on the SDT (Deci & Ryan, 2008; Ryan & Deci, 2000), and suggests that burnout occurs when athletes are motivated by external factors, or experience an absence of motivation, while self-determined motivation can protect against burnout (Lonsdale et al., 2009). Notably, results of the systematic review (Chapter 2) suggest that burnout in team sports is most commonly explored from the motivation perspective. Furthermore, in line with existing reviews incorporating athletes from across sports (Bicalho & Costa, 2018; Li et al., 2013), the WMA (Chapter 2) identified consistent support in the existing team-sport literature for the positive impact of *amotivated regulation* on all dimensions of athlete burnout, and a strong negative association between *intrinsic regulation* and feelings of RSA and SD (Chapter 2). However, support for the association between burnout and additional controlled regulations within the SDT, namely *external regulation, identified regulation* and *introjected regulation* (Ryan & Deci, 2000, 2017), is less consistent, as evidenced by findings from existing reviews (Bicalho & Costa, 2018; Goodger et al., 2007; Li et al., 2013), and results of the systematic review of burnout in team sport (Chapter 2).

In addition, the motivation perspective also considers the role of climate in line with the AGT (Ames, 1995), and suggests that an EO climate can increase the risk of burnout, while a TO climate can protect against burnout. Notably, the results of the WMA (chapter 2, see Table 2.4) provide further support for a positive association between ego-orientated climate and TB. Furthermore, although the impact of task-orientated climate emerged as non-significant in the WMA, the review identified just three studies that have examined motivational climate in relation to team sports, and these focused on TB rather than the distinct dimensions of PEE, RSA and SD. As such, findings suggest that further exploration of the role of motivational climate in burnout for team-sport athletes is warranted. In addition, motivational climate may be particularly impactful in the context of Gaelic games, where athletes are relatively restricted in their opportunities to move team (GAA, 2021).

Importantly, existing research (Ntoumanis, 2001; Standage et al., 2003) suggests the SDT and AGT theories are complementary, with a TO climate found to promote more self-determined regulations, while a EO climate promotes more controlled regulation. In the burnout context, existing research suggests that integrating the variables from these theories can contribute to a more comprehensive understanding of the relationship between motivation and burnout (e.g. Russell et al., 2021). Sheehan et al. (2018) found that a EO climate was positively associated with depression and anxiety in Gaelic games athletes specifically, while intrinsic motivation, extrinsic motivation and TO climate were associated with reduced anxiety. However, to the best of the researcher's knowledge, motivation-related factors have yet to be explored explicitly as predictors of burnout in Gaelic games.

In addition to the SDT and AGT perspectives outlined above, it is important to acknowledge that researchers employing the motivational perspective of burnout have also focused on the impact of the satisfaction of basic psychological needs, and results from Chapter 2 and earlier reviews (Bicalho & Costa, 2018) support the protective effect of need satisfaction on burnout. Furthermore, the motivation literature suggests that satisfaction of basic psychological needs may mediate the relationship between motivational climate and regulations (Ntoumanis, 2001; Standage et al., 2003). However, inter-relations between motivational climate, motivational regulation and basic needs have been described as complex, with inconsistent associations between basic psychology needs and motivational regulations (Baena-Extremera et al., 2015;

Chen et al., 2020; Kipp & Amorose, 2008; Sarrazin et al., 2002), and limited evidence of a relationship between TO climate and the basic psychological needs (e.g. Sheehan et al., 2018). Importantly, existing research also supports a direct relationship between motivational climate and regulations (e.g. Baena-Extremera et al., 2013; Kipp & Amorose, 2008). Furthermore, considering the range of variables associated with burnout, as evidenced in Chapter 2, key decisions had to be made with respect to narrowing the research focus. To this end, and with a view to examining the impact of individual- and environmental-level motivational factors on athlete burnout rather than explicitly assessing a hierarchical model of motivation, the decision was taken to focus on a more parsimonious motivation model, incorporating motivational climate and regulations only. This approach is line with the overarching aim of identifying the key factors associated with athlete burnout in Gaelic games.

Taken together, the rationale outlined herein provides support for the potential utility of the stress-, motivation and commitment perspectives in accounting for feelings of burnout in Gaelic games. As such, in order to achieve the overarching aim of identifying the key predictors of athlete burnout in this population, it was deemed necessary to explore variables from across each of these perspectives. However, to the researcher's knowledge, existing work has yet to examine the impact of each of these perspectives on burnout in the same sample of athletes. Notably, while there have been calls for comparison and integration of these elements (e.g. Madigan et al., 2020; Gustafsson et al., 2011), with a view to providing a more comprehensive insight into the range of variables associated with burnout, efforts at integration, or exploring these different perspectives in a single model, remains challenging due to model complexity and the range of variables involved (De Francisco et al., 2022; Madigan et al., 2021; Rust et al., 1995). For example, more than 20 different variables would need to be integrated to account for the core components of the theoretical perspectives outlined above. As such, it could be argued that a key step in overcoming this barrier to integration is identifying the most impactful variables from across these perspectives, thereby narrowing the research focus in an approach that can be viewed as systematic, and is in line with existing calls for a "winnowing process" (Madigan, 2021, p.668) of the burnout literature. To this end, while not a direct statistical comparison, analysing the fit of competing models in the same sample allows us to view these models alongside each other with a critical lens for the first time (Madigan, 2021; Madigan et al., 2021), and identify the significant predictors of burnout that emerge across the existing models. Furthermore, the results of the systematic review (Chapter 2) and existing research (e.g. Bicalho & Costa, 2018; Lin et al., 2021) also highlight inconsistencies in the strength of relationships between key variables from across the stress, motivation, and commitment perspectives and the dimensions of burnout, suggesting that variables from different perspectives may be more influential in predicting symptoms of PEE, RSA and SD. As such, assessing distinct predictors of PEE, RSA and SD in line with the multidimensional conceptualisation of burnout (Raedeke, 1997) can provide important nuanced insight into the key factors impacting each of these dimensions specifically. A better understanding of the relative utility of existing theories in explaining symptoms of burnout may help to direct the focus of future intervention studies and prevention methods. In addition, considering the integrated approach mentioned above, such insight also ensures that efforts to combine variables from across perspectives can be individualised to each dimension, thus further focusing integration efforts.

5.1.2 Aims and Objectives

As such, in line with the rationale outlined above, the aims of this analysis was to assess the utility of existing theoretical perspectives in accounting for symptoms of burnout. Specifically, the objectives of the current analysis were two-fold;

1. Assess whether models based on the stress, motivation and commitment perspectives of burnout provide an adequate fit for the PEE, RSA and SD data from this sample.
2. Identify significant direct and indirect predictors of PEE, RSA and SD based on existing stress, motivation and commitment perspectives.

5.1.3 Hypotheses

Based on the existing literature outlined in Chapter 1 and the detailed rationale in Section 3.2.1.1, we identified a number of specific hypotheses in relation to the first aim stated above, which relate to each model individually as follows;

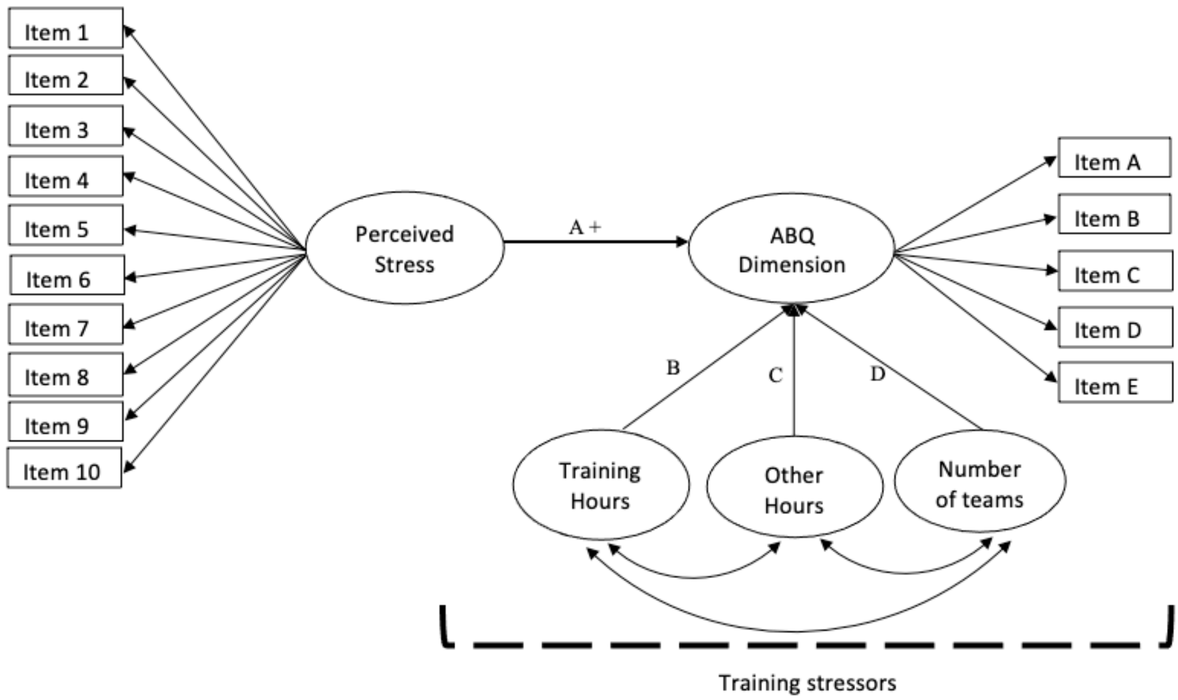
5.1.3.1 Stress-based Model. The stress model was specified as per Figure 5.1 below, and incorporates measures of training-specific stress (Silva, 1990), and a general perceived inability to meet demands (Smith, 1986). Existing research and theory outlined above and in Chapter 1 informed the following hypotheses;

Hypothesis 1a. In line with existing research and theory (Lin et al., 2021; Smith, 1986), perceived stress, as measured by the PSS-10, would be a significant positive predictor of all burnout dimensions, as indicated by path A (see Figure 5.1).

Hypothesis 1b. In recognition of conflicting existing research on the impact of training demands (e.g. Appleby et al., 2018; Smith et al., 2010) and the relatively novel exploration of *additional hours* and *number of teams,* no specific hypotheses were specified for the impact of these variables on burnout. Instead, the aim was to explore whether average weekly *training demands*, average *additional hours* committed to sport, and the *number of teams* an athlete was a member of significantly predicted feelings of PEE, RSA or SD. As such, no direction is specified for paths B – D (see Figure 5.1).

Figure 5.1.

Hypothesised Stress-Based Model of Burnout

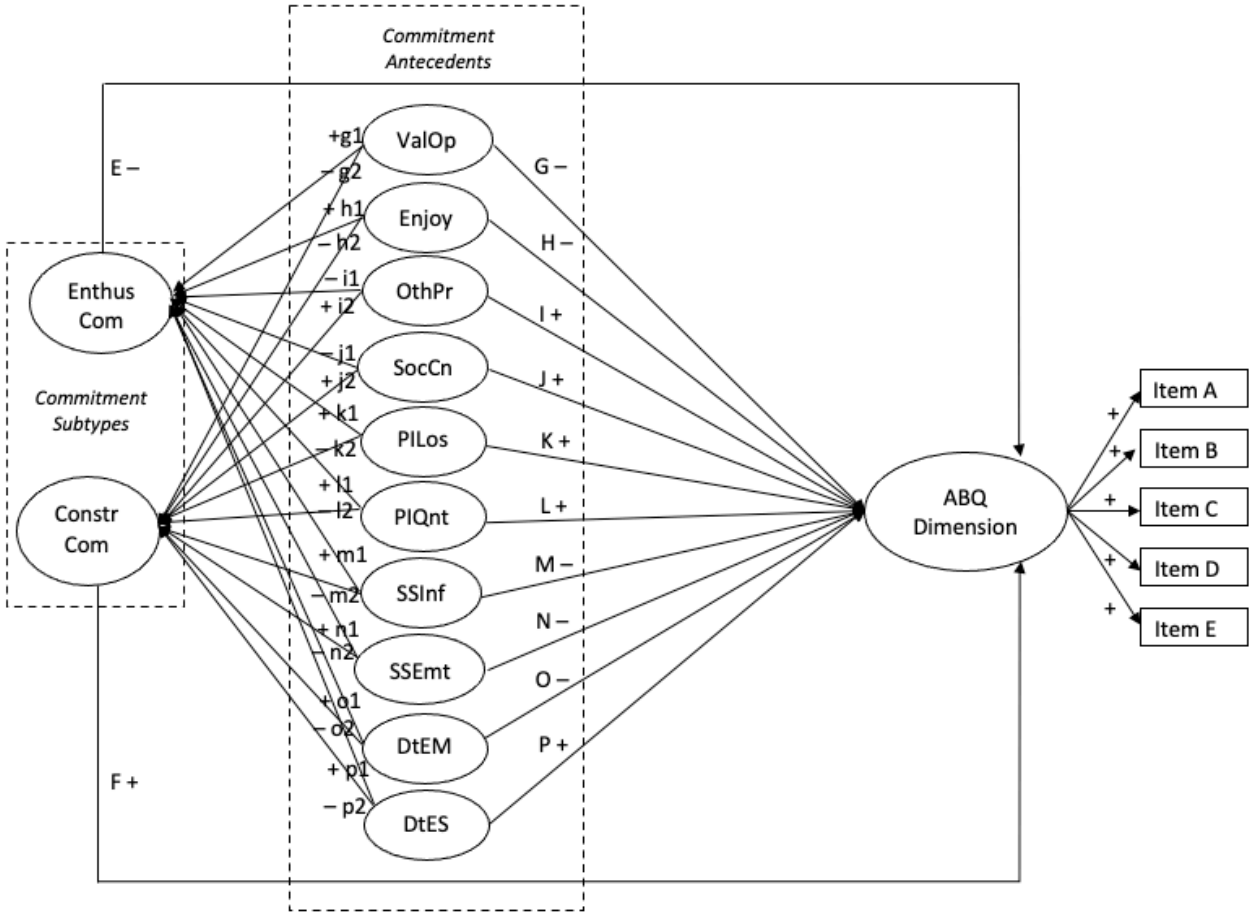


Note: Items 1 – 10 refer to the items from the PSS-10 (Cohen et al., 1994); Item A – E represent the relevant five indicator items for each dimensions of burnout as measured by the ABQ (Raedeke & Smith, 2001; i.e. PEE = items 2, 4, 8, 10, 12; RSA = items 1, 5, 7, 13, 14; SD = items 3, 6, 9, 11, 15); A – D represent the hypothesised paths to burnout; + indicates the hypothesised direction of the path. Double-headed errors indicate variables were allowed to covary. Although not specified for ease of viewing, each of the training stressors were also allowed to covary with perceived stress.

5.1.3.2 Commitment-based Model. The hypothesised commitment-based model is outlined in Figure 5.2. As discussed above and outlined in Chapter 3, sport commitment was assessed as per the updated SCM (Scanlan et al., 2016). Hypothesised relationships were based on a combination of existing research and theory (De Francisco et al., 2022; Raedeke, 1997; Woods et al., 2020), and were not distinguished for the different dimensions of burnout.

Figure 5.2

Hypothesised Commitment-Based Model of Burnout



Note: Item A – E represent the relevant five indicator items for each dimensions of burnout (i.e. PEE = items 2, 4, 8, 10, 12; RSA = items 1, 5, 7, 13, 14; SD = items 3, 6, 9, 11, 15); Enthus Com = enthusiastic commitment, Constr Com = constrained commitment; ValOp = valuable opportunities, Enjoy = enjoyment, OthPr = other priorities, SocCn = social constraints, PILos = personal investment (loss), PIQnt = personal investment (quantity), SSInf = social support (informational), SSEmt = social support (emotional), DtEM = desire to excel (mastery achievement), DtES = desire to excel (social achievement); B – M represent hypothesised direct pathways to burnout; d1 – m2 represent direct relationships from commitment antecedents to commitment subtypes; +/ - indicates the hypothesised direction of the path.

Hypothesis 2a. Scores on each burnout dimension (PEE, RSA and SD) would be significantly negatively predicted by *enthusiastic commitment* (path E), *valuable opportunities* (path G)*, enjoyment* (path H)*, social support (informational;* path M)*, social support (emotional;* path N) and *desire to excel (mastery achievement;* path O)

Hypothesis 2b. Scores on PEE, RSA and SD would be positively predicted by *constrained commitment* (path F), *other priorities* (path I), *social constraints* (path J), *personal investments (loss;* path K), *personal investments (quantity;* path L) and *desire to excel (social achievement;* path P)

Hypothesis 2c. The antecedent commitment factors would indirectly predict burnout through *enthusiastic* and *constrained commitment* (i.e. paths g1/g2→E/F, h1/h2→E/F, i1/i2→E/F, j1/j2→E/F, k1/k2→E/F l1/l2→E/F, m1/m2→E/F, n1/n2→E/F, o1/o2→B/C, p1/p2→E/F).

5.1.3.3 Motivation-based Model. The hypothesised motivation-based model is outlined in Figure 5.3. As per the rationale outlined in Chapter 1 and above, the motivation model employed herein consisted of a combination of the SDT (Deci & Ryan, 2008) and AGT (Ames, 1995) frameworks, with a specific focus on motivational regulation and motivational climate. Hypotheses were specified based on existing research (Lemyre et al., 2008; Reinboth & Duda, 2004; Vitali et al., 2015) and systematic reviews (Bicahlo & Costa, 2018; Li et al., 2013, Chapter 2).

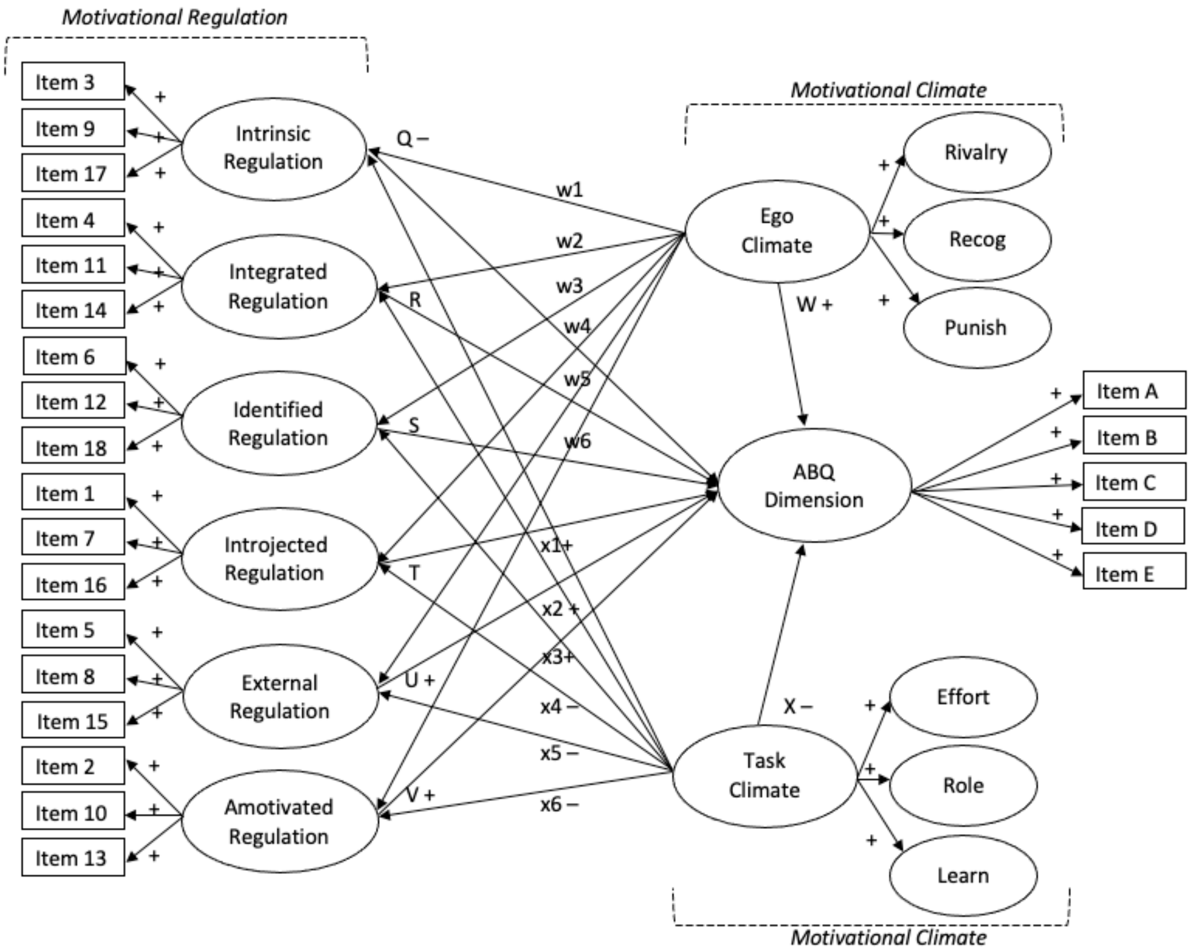
Hypothesis 3a. *Amotivation* (path V) and *external regulation* (path U) would significantly positively predict scores on all burnout dimensions. *Intrinsic regulation* (path Q) would significantly negatively predict scores on all burnout dimensions.

Hypothesis 3b. *Ego-orientated climate* would positively predict scores on all burnout dimensions (path W), and *task-orientated climate* would negatively predict scores on all burnout dimensions (path X).

Hypothesis 3c. The impact of *motivational climate* on burnout would be mediated by *motivational regulations*. Specifically, there would be significant indirect paths from *ego* and *task-orientated climates* to burnout through the motivational regulations, as specified by the following paths; w1→Q, w2→R, w3→S, w4→T, w5→U, w6→V, x1→ Q, x2→R, x3→S, x4→T, x5→U, x6→V.

Figure 5.3

Hypothesised Motivated-Based Model of Burnout



Note: Item A – E represent the relevant five indicator items for each dimensions of burnout (i.e. PEE = items 2, 4, 8, 10, 12; RSA = items 1, 5, 7, 13, 14; SD = items 3, 6, 9, 11, 15); Rivalry = intra-team member rivalry, Recog = unequal recognition, Punish = punishment for mistakes, Effort = effort/improvement, Role = important role, Learn = cooperative learning; N – U represent hypothesised direct pathways to burnout; t1 – u6 represent direct relationships from motivational climates to motivational regulations; +/ - indicates the hypothesised direction of the path.

Hypothesis 3d. Direct pathways from *integrated, identified* and *introjected regulation* to burnout (paths R S, T) were exploratory, as there is a lack of consensus on the impact of these regulations on PEE, RSA and SD in the existing literature (e.g. Li et al., 2013).

For all models, the aim of assessing the relative utility of these existing theories was exploratory in nature, and centred around reviewing and comparing the predictive power and significant pathways identified across the competing models.

5.2 Methods

This section provides a detailed overview of the analysis process, which included preliminary analyses, and a two-step SEM approach; Step 1 involved conducting CFA to assess the factor structure of the measures assessed, and Step 2 involved testing the structural models, whereby models of stress, commitment and motivation were assessed as predictors of PEE, RSA and SD.

5.2.1 Overview of Participant Eligibility

This analysis relates specifically to data gathered at T1 of the study. As such, in line with eligibility criteria outlined in Chapter 3, any individual aged 18 or over and a member of a Gaelic games team playing Ladies football, Camogie, Gaelic football or Hurling at the time of initial recruitment (March 2019) was eligible for participation. Individuals who were not competent in the English language were ineligible for participation.

5.2.2 Overview of Materials Relevant for this Analysis

This analysis incorporates data from the following measures; ABQ (Raedeke & Smith, 2001), SMS-II (Pelletier et al., 2013), the PMCSQ-2 (Newton et al., 2000), SCQ-2 (Scanlan et al., 2016), the PSS-10 (Cohen et al., 1994), and individual items assessing *average weekly training demands, average weekly additional demands,* and the *number of teams* an athlete is currently a member of. Additional details on these materials is provided in Section 3.5.1.

5.2.3 Data Analysis

5.2.3.1 Preliminary Analyses Preliminary analyses, including tests of normality, linearity, multicollinearity, and homoscedasticity were conducted on the T1 data from the PSS-10, SCQ-2, SMS-II and the PMCSQ-2 using SPSS.

5.3.2.2 Confirmatory Factor Analysis (CFA). The data was transferred to *Mplus* version 8.4 (Muthén & Muthén, 1998 – 2017). CFA was conducted at Step 1 to confirm the factor structures of measures employed (Anderson & Gerbing, 1988; Wang & Wang, 2012), namely the ABQ, PSS-10, SMS-II, PMCSQ-2 and SCQ-2, in the current data set. In line with recommendations for the use of multiple fit indices (Hu & Bentler, 1999; Wang & Wang, 2012), goodness-of-fit for the models was assessed using the chi-square (χ^2) statistic, the comparative fit index (*CFI*), the root mean square error of approximation (*RMSEA*) and the standardized root mean square residual (*SRMR*) (Schreiber et al., 2006). The following cut-off points for each of these measures are indicative of acceptable fit; $\chi^2/df < 3$, $CFI > 0.9$, $RMSEA$ <0.06 to 0.08 $SRMR < 0.1$ (Hu & Bentler, 1999; Marsh et al., 2004; Wang & Wang, 2012). Where a model showed poor fit, items with a factor loading < 0.4 on their intended latent variable were removed (Leung et al., 2012), and CFA was re-run without these variables. If fit improved, these items were also excluded from the subsequent SEM.

5.2.3.3 Tests of Structural Models. At Step 2, the structural models were assessed, whereby the measures of stress (PSS-10), commitment (SCQ-2), motivation (SMS-II and PMCSQ-2) were incorporated as predictors of the dimensions of athlete burnout. The hypothesised pathways across models are outlined in Figure 5.1 – 5.3. The following cut-off points for each of these measures are indicative of acceptable fit; $\chi^2/df < 3$, $CFI > 0.9$, $RMSEA$ <0.06 to 0.08 $SRMR < 0.1$ (Marsh et al., 2004; Schreiber et al., 2006; Wang & Wang, 2012). The predictive utility of each model was assessed using the R^2 statistic, which indicates the percentage variance in burnout dimension score explained by each model. Standardized path coefficients were assessed to identify the direction, significance and magnitude of predictive pathways within each model (Bollen, 1989).

5.3 Results

5.3.1 Descriptive Statistics

Data from 370 athletes who completed the questionnaire at T1 was included in this analysis. Descriptive statistics provide an overview of sample characteristics; male $n = 178$ (48.1%), female $n = 192$ (51.9%), age 18 – 55 ($M = 24.32$, $SD = 5.95$), elite $n = 104$ (28.1%), non-elite $n = 266$ (71.9%). Mean scores and standard deviations across subscales, as well as correlations with the dimensions of burnout are included for all subscales in Table 5.1. 6.2% of players reported scores ≥ 3 on all burnout dimensions, while 14.1% of players reported scores ≥ 3 on two dimensions of burnout. 13.8% of participants scores ≤ 2 on all three burnout dimensions.

5.3.2 Preliminary Analyses

5.2.3.1 Tests of Normality. Preliminary analysis indicated that the data did not violate the assumptions of linearity, multicollinearity, homoscedasticity or independence of residuals, for any of the SEM analyses. Significant results ($p < 0.05$) for the Kolmogorov-Smirnov and Shapiro-Wilk tests for all subscales other than *EO climate* indicated that the data violated the assumption of normality. However, histograms indicated that subscales of PEE RSA, *training hours, perceived stress, other* *priorities, social support-informational, intra-team member rivalry, unequal recognition, punishment for mistakes, introjected regulation* and *external regulation* approximated the normal curve. Data on the remaining subscales was somewhat skewed. Where data was skewed, Spearman's non-parametric rho correlation was calculated in place of Pearson's correlation coefficient (see Table 5.1). In addition, while non-normal distribution of data has been identified as a common issue in the psychology literature (Cain et al., 2017; Micceri, 1989), non-normality can impact standard errors of parameter estimates and fit indices including the chi-square statistics in SEM (Finney & DiStefano, 2013). As such, the MLR estimator, which computes robust standard errors using a mean-adjusted chi-square test statistic (Asparouhov & Muthén, 2005), and has been shown to be robust to non-normality (Shi et al., 2021) was employed in all subsequent analyses.

5.3.2.2 Presence of Outliers. For each analysis, the Mahalanobis distance was above the critical chi-square value, indicating the presence of multivariate outliers. However, the data was retained as the maximum Cook's distance values < 1 suggested outliers were not influencing the models to a great extent, and the number of outliers was small in the large sample (Pallant, 2013).

5.3.2.3 Missing Data Analysis. Frequency analysis of responses to items on all subscales revealed sixteen missing data points (0.035% missingness); there were instances of missingness on the *training hours* (n = 1, 0.3%), *other hours* (n = 2, 0.5%), SCQ-2 item 12 (n = 1, 0.3%) and the PSS-10 (items 1 – 4, 6, 7 and 10 missing $n = 1;$ items 5, 8 and 9 missing $n = 2;$ 0.35%) measures. Missing values analysis (Little's MCAR) (Little & Rubin, 2002; Yang & Shoptaw, 2005) indicated that the data was missing completely at random (χ^2(914) 982.80, $p > 0.05$). In line with guidelines for handling missing data (Newman, 2014), full information maximum likelihood (FIML) estimation was employed in place of listwise deletion. FIML directly analyses incomplete data and has been shown to yield accurate standard errors and unbiased parameters, and is robust to non-normality when used alongside the MLR (Enders & Bandalos, 2001).

Table 5.1. *Mean, standard deviation, correlation with burnout and reliability analyses of included variables*

Variable	**Correlation with ABQ dimensions (r/r_s)**			***M***	***SD***	**α**
ABQ	***PEE***	***RSA***	***SD (s)***			
PEE	1.00			2.32	0.73	0.86
RSA	0.39**	1.00		2.63	0.76	0.83
SD	0.40_s^{**}	0.61**	1.00	2.10	0.88	0.85
Stress						
Perceived stress	0.43**	0.32**	0.27_s^{**}	18.59	6.71	0.88
Weekly training hours	0.19**	0.11*	-0.17_s^{**}	6.35	3.21	-
Weekly additional hours	0.21_s^{**}	-0.07_s	-0.04_s	3.63	3.53	-
Number of teams represented	0.20_s^{**}	-0.07_s	-0.19_s^{**}	2.05	1.25	-
Sport Commitment						
Enthusiastic Commitment	-0.22_s^{**}	-0.39_s^{**}	-0.62_s^{**}	4.34	0.68	0.88
Constrained Commitment	0.41_s^{**}	0.49_s^{**}	0.65_s^{**}	2.35	1.01	0.85
Enjoyment	-0.33_s^{**}	-0.46_s^{**}	-0.60_s^{**}	4.60	0.57	0.87
Valuable Opportunities	-0.12_s^{*}	-0.36_s^{**}	-0.44_s^{**}	4.12	0.62	0.60
Other Priorities	0.28^{**}	0.33^{**}	0.47_s^{**}	3.01	0.97	0.86
Personal Investment – Loss	0.20_s^{**}	0.01_s	0.07_s	3.79	0.84	0.81
Personal Investment – Quantity	0.15_s^{**}	-0.23_s^{**}	-0.28_s^{**}	4.61	0.51	0.71
Social Constraints	0.19_s^{**}	0.04_s	0.16_s^{**}	3.71	0.92	0.77
Social Support – Emotional	0.00_s	-0.24_s^{**}	-0.20_s^{**}	4.04	0.84	0.81
Social Support – Informational	-0.11_s^{*}	-0.35_s^{**}	-0.36_s^{**}	3.61	0.82	0.81
Desire to Excel – Mastery Achievement	-0.16_s^{**}	-0.42_s^{**}	-0.57_s^{**}	4.31	0.65	0.89
Desire to Excel – Social Achievement	-0.02_s	-0.33_s^{**}	-0.39_s^{**}	4.19	0.67	0.82
Sport Motivation						
Intrinsic Regulation	-0.21_s^{**}	-0.33_s^{**}	-0.50_s^{**}	5.01	1.40	0.82
Integrated Regulation	-0.12_s^{*}	-0.22_s^{**}	-0.35_s^{**}	5.32	1.14	0.70
Identified Regulation	-0.19_s^{**}	-0.29_s^{**}	-0.37_s^{**}	5.23	1.29	0.81
Introjected Regulation	0.09	0.04	0.05_s	4.71	1.17	0.54
External Regulation	0.26^{**}	0.16^{*}	0.31_s^{**}	3.27	1.45	0.73
Amotivated Regulation	0.37_s^{**}	0.60_s^{**}	0.74_s^{**}	3.31	1.34	0.79
Motivational Climate						
Performance/ego-orientated (EO)	0.34^{**}	0.35^{**}	0.34_s^{**}	8.67	2.51	0.88
Mastery/Task-orientated (TO)	-0.26_s^{**}	-0.43_s^{**}	-0.48_s^{**}	12.33	1.99	0.87
Intra-team rivalry (EO)	0.27^{**}	0.23^{**}	0.24_s^{**}	3.05	0.87	0.55
Unequal Recognition (EO)	0.32^{**}	0.37^{**}	0.35_s^{**}	2.93	1.00	0.89
Punish. For mistakes (EO)	0.31^{**}	0.29^{**}	0.32_s^{**}	2.69	0.92	0.85
Cooperative learning (TO)	-0.21_s^{**}	-0.38_s^{**}	-0.45_s^{**}	4.21	0.72	0.81
Effort/Improvement (TO)	-0.19_s^{**}	-0.39_s^{**}	-0.43_s^{**}	4.17	0.69	0.88
Important Role (TO)	-0.28_s^{**}	-0.39_s^{**}	-0.42_s^{**}	3.96	0.83	0.85

Note: r = Pearson's correlation; r_s = Spearman's rho correlation; subscript "s" denotes r_s values. *M* = mean score, *SD* = Standard Deviation; α = Cronbach's alpha; * = $p \leq 0.05$; ** = $p \leq 0.01$

However, in *Mplus* FIML cannot be applied to missingness on observed predictors (i.e. *training hours* and *other hours*). As such, with a view to ensuring that the same sample of athletes was included in each analysis (i.e. n = 370) and avoiding listwise deletion, regression-based imputation was used to address the very small amount of missingness on the *training hours* (n = 1) and *other hours* (n = 2) variable. In contrast to mean imputation, regression imputation utilises additional available data from the respondent to predict the missing values (Fox-Wasylyshyn & El-Masri, 2005). Correlation analysis indicated that *training demands* and *other demands* showed the strongest relationship to each other (r_s = 0.40) and no athlete had missing data on both of these variables. As such, the linear regression equations for *training hours* as a predictor of *other hours,* and vice versa, were generated in SPSS, and the respective missing values for each participant were calculated by inputting the non-missing value into the regression equation (Fox-Wasylyshyn & El-Masri, 2005).

5.3.3 Confirmatory Factor Analyses

5.3.3.1 Athlete Burnout (ABQ). Review of the fit indices indicated that the measurement model for the dimensions of burnout, as assessed by the ABQ (Raedeke & Smith, 2001), was a good fit for this data; $\chi^2/df < 3$, $CFI > 0.9$, $SRMR < 0.1$, $RMSEA < 0.08$. All items showed standardised loadings that were > 0.4, significant, and in the expected direction on their respective burnout dimension and, the subscales showed acceptable reliability in the sample (Cronbach's alpha > 0.7; see Table 5.1). As such, all items were retained for the subsequent analyses.

5.3.3.2 Stress Model (PSS-10). The fit indices suggest that the one-factor model for the PSS-10, with all ten items loading onto the *perceived stress* variable (Cohen et al., 1994), had an adequate fit in the current dataset; $\chi^2/df < 3$, $CFI > 0.9$, $SRMR < 0.08$, $RMSEA < 0.08$, and all items showed significant standardised loadings >

0.4, in the expected direction and the scale showed acceptable reliability in the sample (Cronbach's alpha > 0.7; see Table 5.1). As such, all items were retained for the subsequent SEM analyses.

As per Figure 5.1, the sport-specific stressors of *training demands, other hours* and *number of teams* were also added to the model, and were allowed to covary with each other and with *perceived stress*. The model continued to show acceptable fit; $\chi^2/df < 3$, $CFI > 0.9$, $SRMR < 0.08$, $RMSEA < 0.08$. There were significant correlations between the training specific stressors (r_s = .399 – .229; $p < .001$), but these variables were not significantly correlated with general *perceived stress* (r = .003 – .101 $p > .05$). All variables were retained the model to allow for exploration of their impact on burnout.

5.3.3.3 Sport Commitment (SCQ-2). Scanlan et al.'s (2016) CFA of the SCQ-2 supported the 58-item, 12-factor model; each of the ten commitment antecedents and the two commitment subtypes can be viewed as latent variables, and are assessed by a number of indicator variables, and commitment antecedents were also included as predictors of both commitment subtypes (Scanlan et al., 2016). As such, all hypothesised higher-order paths were specified in the current analysis in order to test their utility in the current sample (Scanlan et al., 2016).

CFA was used to assess the fit of the 12-factor SCM. However, our preliminary analysis revealed this model was not an adequate fit for the data (χ^2 (1529) = 2848.04, CFI = .87, $SRMR$ = .06, $RMSEA$ = .048). Research has shown that where there are a large number of indicator items associated with a measure, as is the case with the SCQ-2, the correlation between items within subscales can negatively impact the model, resulting in a poor fit (Wang & Wang, 2012). Item parcelling using the single factor method (Landis et al., 2000) was employed to address this issue (Hau & Marsh, 1994).

Further details relating to this method and the parcels generated is provided in Appendix G. Item 2 (*personal investment – quantity* subscale) was removed as the factor loading was < 4.

Furthermore, examination of the correlation matrix for the latent variables revealed potential issues of multicollinearity, suggesting that some subscales may be redundant. Specifically, although preliminary tests of mean scores indicated an absence of multicollinearity using relatively stringent cut-offs (VIF < 5 and tolerance > 0.2 - 0.1) (Hair et al., 2021), examination of the latent variable correlations in *Mplus* indicated that high correlation (close to 0.8; Neys, 2018) between *desire to excel (mastery)* and *desire to excel (social achievement; r* =.82) and between *enjoyment* and *valuable opportunities* (*r* =.77) may be problematic (Neys, 2017). All other latent independent variables in the model were regressed on these latent variables in *Mplus* to assess multicollinearity; R^2 approaching 1.0 can be viewed as a strong indication of the presence of multicollinearity (Neys, 2017), and this value can also be used to calculated tolerance and VIF values for latent variables. Results suggested multicollinearity was an issue (VIF > 5, tolerance < 0.2, Hair et al., 2021) for the latent variables *desire to excel (social achievement;* R^2 = 0.80, VIF = 0.2, tolerance = 5.00) *desire to excel (mastery achievement;* R^2 = 0.83, VIF = 0.17, tolerance = 5.88) *valuable opportunities* (R^2 = 0.822, VIF = 0.178, tolerance = 5.62), *enjoyment* (R^2 = 0.80, VIF = 0.2, tolerance = 5.00).

Multicollinearity has been identified as a substantial issue in SEM when it exists between predictors (Maruyama, 1998), as would be the case for these variables in Step 2 of the analysis. As such, in the interest of parsimony and in line with recommendations, the decision was taken to remove subscales based on consideration of VIF values and theoretical knowledge (Zuur et al., 2010). Notably, while VIF values were quite similar, the *desire to excel (mastery)* and *enjoyment* subscales have previously been identified as particularly important predictors of commitment (Scanlan et al., 2016) and burnout (Woods et al., 2020), while the *desire to excel (social achievement)* and *valuable opportunities* have previously shown inconsistent relationships with commitment, and did not emerge as significant predictors of burnout in previous work (Woods et al., 2020). In addition, *valuable opportunities* was the only subscale that showed relatively poor reliability in the sample (Cronbach's alpha < 0.7; see Table 5.1). As such, the *desire to excel (mastery)* and *enjoyment* subscales were retained, and the *desire to excel (social achievement)* and *valuable opportunities* subscales were removed. Recalculation of R^2, VIF and tolerance suggested that removing these variables addressed the issue of multicollinearity (i.e. VIF < 5, tolerance > 0.2, Hair et al., 2021) in the retained subscales. As such, the model was respecified, with the following paths removed; *valuable opportunities* Paths G, g1, g2, and *desire to excel mastery* Paths P, p1, p2 (see Figure 5.2). The resulting measurement model with 10 latent variables and incorporating the parcelled items was a good fit for the data (χ^2 /*df* < 3, *CFI* > 0.9, *RMSEA* < 0.06, *SRMR* < 0.06).

Notably, the amendments made to the model at this stage to ensure adequate fit suggest that the SCM (Scanlan et al., 2016) is not fully supported in the current sample. However, the aim of this analysis was not specifically to assess the model of commitment, but rather to explore the impact of commitment-related variables on burnout. As the retained variables still provide comprehensive insight into the multi-faceted nature of sport commitment as it is conceptualised (Scanlan et al., 2013), this model of commitment was retained for the subsequent SEM analyses (see Figure 5.2).

5.3.3.4 Integrated Motivation Model. A measurement model incorporating the measure of the SMS-II and PMCSQ-2 was assessed. The first model tested included all

18 items of the SMS-II (Pelletier et al., 2013), with three indicator items loading onto each of the six regulation types (i.e. six latent variables), and the 33 PMCSQ-2 items, loading onto six lower-order subscales and two higher-order climate types (Newton et al., 2000). However, preliminary CFA of this model found a poor model fit, with (χ^2 (488) = 1138.33, *CFA* = .882, *RMSEA* = .06, *SRMR* = .068), and the decision was taken to employ item-parcelling methods once more, with respect to the PMCSQ-2 (see Appendix G; Hau & Marsh, 1994). Notably, item 12 showed a loading < 0.4 (Leung et al., 2012) on the *intra-team member rivalry*, and the *intra-team member rivalry* subscale also showed relatively poor reliability in the sample (Cronbach's alpha > 0.7; see Table 5.1). However, this item was retained as the *intra-team member rivalry* subscale also serves as second-order factor for the higher order *EO climate* and, as such, a two-item factor may have resulted in identification issues (Blunch, 2008). Importantly, the higher-order subscale showed acceptable reliability (Cronbach's alpha > 0.7)

Examination of standardised factor loadings also indicated that SMS-II item 16 had a factor loading <0.4 (Leung et al., 2012) on the *introjected regulation* subscale. In addition, *introjected regulation* was the only subscale SMS-II that showed relatively poor reliability in the sample (Cronbach's alpha < 0.7; see Table 5.1). Furthermore, examination of the latent variable correlation matrix revealed a relatively high correlation (Cohen, 1988) between the *introjected regulation* and *external regulation* subscales (r = 0.72), suggesting that, in addition to poor reliability, the *introjected regulation* subscale may also have issues with multicollinearity. Very high correlations (Neys, 2017) were also evident between the latent variables of *identified regulation* and *integrated regulation* (r = 0.908) subscales, and between the *intrinsic regulation* subscale and both the *identified regulation* (r = 0.87) and *integrated regulation* (r =

0.78) subscales. Calculation of *R^2,* VIF and tolerance values for these latent variables also suggested multicollinearity may be an issue, with R^2 values approaching 1.0 (Neys, 2017), VIF > 5 and tolerance < 0.2 (Hair et al., 2021) for *integrated regulation* (R^2 = 0.86, tolerance = 0.14, VIF = 7.14) and *identified regulation (*R^2 = 0.89, tolerance = 0.89, VIF = 9.09).

Notably, the *external* and *introjected regulation* subscales examine more external forms of motivation, while the *intrinsic, identified* and *integrated regulation* subscales all measure more autonomous forms of motivation. Furthermore, high level of correlation between three autonomous motivation subscales on the SMS-II has been identified as an issue that could negatively impact statistical analyses (Lonsdale et al., 2014), while issues around a lack of discrimination between *external* and *introjected* regulation have also been noted (Pelletier et al., 2013). As such, in the interest of parsimony and considering the *intrinsic regulation* and *external regulation* represent the most self-determined and most controlled forms of regulation respectively, these subscales were retained, and the decision was made to remove the *introjected regulation* subscale, which showed weak factor loadings and was relatively highly correlated with *external regulation,* and the *identified regulation* and *integrated regulation* subscales, which were both highly correlated with each other and with the retained *intrinsic regulation* subscale.

The updated CFA incorporating three SMS-II subscales (*intrinsic regulation, external regulation* and *amotivated regulation)* showed an adequate fit for the data, $\chi^2/df < 3$, $CFA > 0.9$, $SRMR < 0.08$, $RMSEA < 0.6$. The measurement model was also re-assessed with SMS-II item 16 and with the PMCSQ-2 parcelled items. No identification issues emerged and the measurement model achieved an adequate fit.

Importantly, while this analysis fails to provide support for the six-factor structure of the SMS-II, the retained subscales continue to allow for the exploration of the impact of motivation on burnout in line with the broad tenants of the SDT; that is, whether more self-determined motivation (*intrinsic regulation)* protects against burnout, and more externally driven motivation (*external regulation)*, or an absence of motivation (*amotivated regulation)*, are risk factors for the development of burnout.

In line with the amendments outlined above, the following variables and associated path were removed from the model (See Figure 5.3); *integrated model* paths R, w2, x2, *identified regulation* paths S, w3, x3, and *introjected regulation* paths T, w4 and x4.

5.3.4 SEM Analyses

The ABQ dimensions were then incorporated into the models and predictive pathways were specified using the measurement models outlined above, to assess measures of stress, commitment, motivation regulation and motivational climate as predictors of the each of ABQ dimensions, as per Figures 5.1-5.3.

Table 5.2

Fit Indices Structural Models

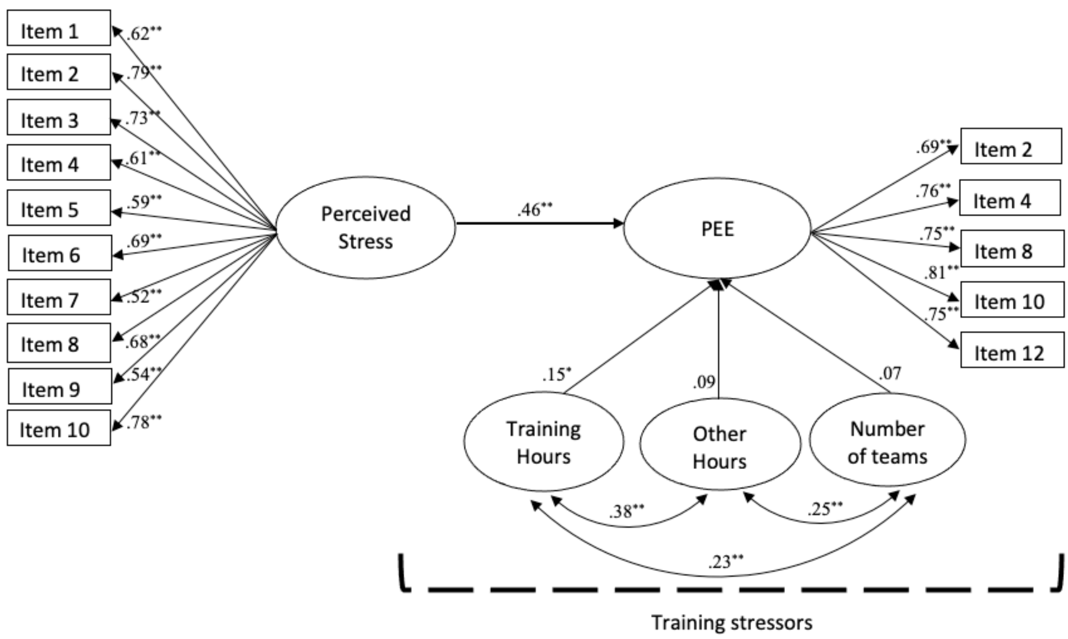
Model	χ^2 *(df)*	χ^2 */(df)*	CFI	RMSEA [*90%CI*]	SRMR	R^2%
PEE						
Stress	246.85(128)**	1.93	0.94	.050 [*.041,.059*]	.041	28.3
Commitment	1050.0 (575)**	1.83	0.93	.044 [*.043,.052*]	.057	31.9
Motivation	985.61 (509)**	1.94	0.92	.050 [*.045, .051*]	.060	22.7
RSA						
Stress	247.33(128)**	1.93	0.94	.050 [*.041,.060*]	.046	16.0
Commitment	1076.19 (575)**	1.86	0.93	.049 [*.44,.053*]	.057	48.9
Motivation	983.53 (509)**	1.93	0.92	.050 [*.045,.055*]	.065	62.7
SD						
Stress	235.95(128)**	1.84	0.95	.048 [*.038,.057*]	.042	13.0
Commitment	1106.13(575)**	1.92	0.93	.050 [*.046,.054*]	.059	76.6
Motivation	998.26 (509)**	1.96	0.92	.051 [*.046,.051*]	.066	78.6

Note. χ^2 = chi-square; ***df*** = degrees of freedom; ***p*** = significance;

* = $p < 0.05$; ** = $p < 0.01$

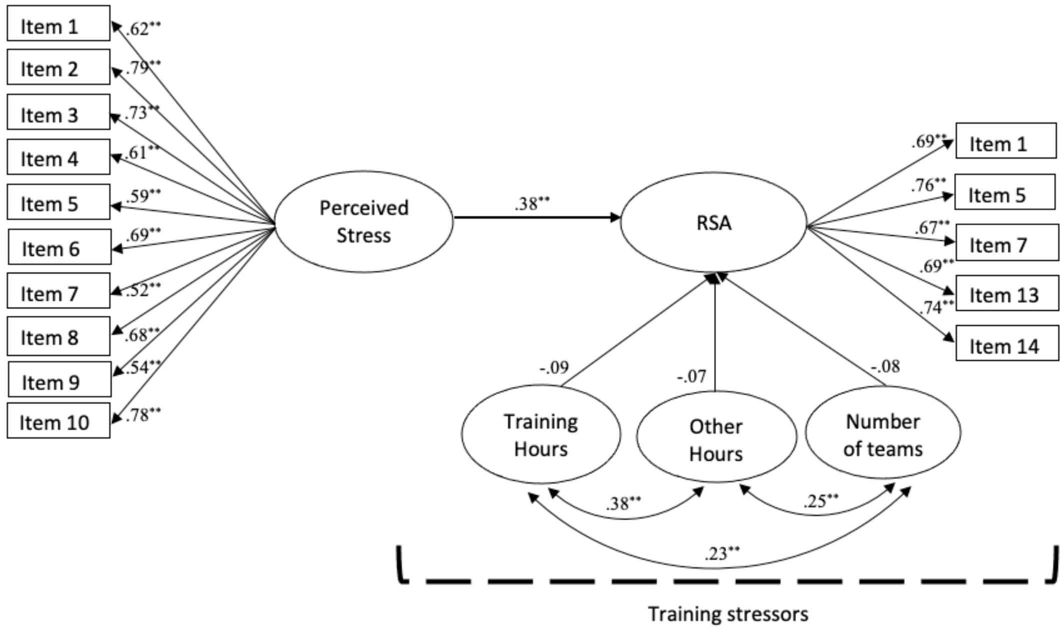
5.3.4.1 The Stress Model of Burnout. As outlined in Table 5.2, the stress model showed acceptable fit for PEE, RSA and SD; $\chi^2/df < 3$, CFI > 0.9, RMSEA (90% CI) < 0.06, SRMR < 0.08. The standardised (STDYX) regression coefficients for each of the paths assessed for the PEE, RSA and SD models are outlined in Figures 5.4 – 5.6 respectively. Information relating to confidence intervals and standard errors for direct paths to burnout are provided in Table 5.3

Figure 5.4 S*tandardised Path Coefficients for the Stress Model of PEE*



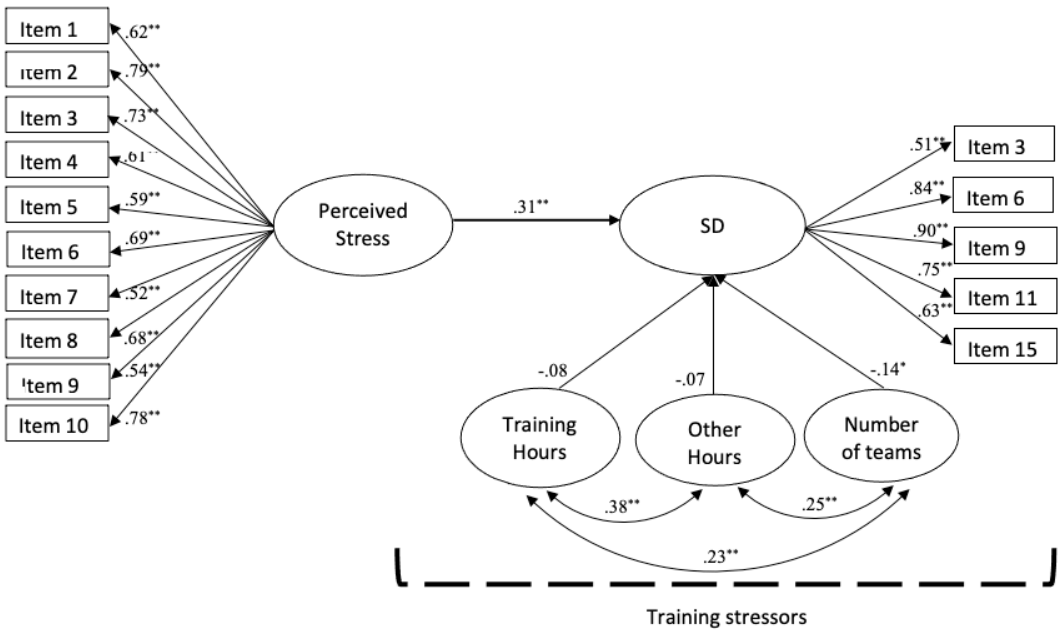
Note. ** = p < .001, * = p < .05

Figure 5.5 S*tandardised Path Coefficients for the Stress Model of RSA*



Note. ** = p < .001, * = p < .05

Figure 5.6 S*tandardised Path Coefficients for the Stress Model of SD*



Note. ** = p < .001, * = p < .05

Table 5.3.

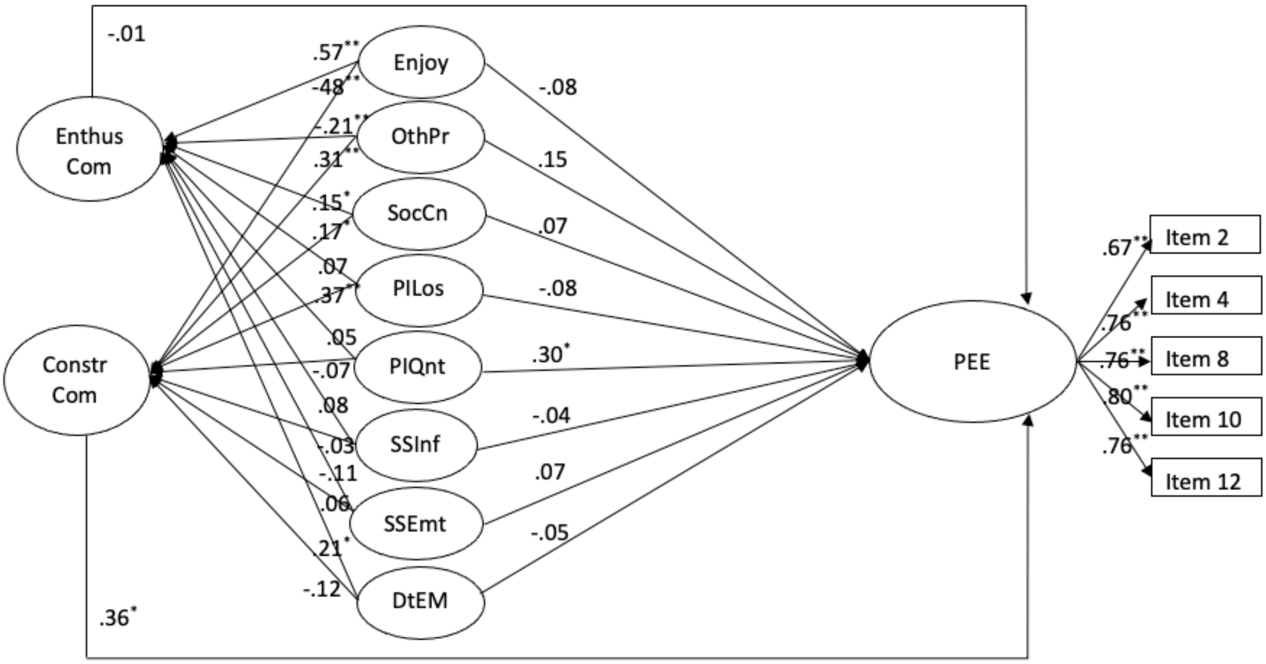
Standardised coefficients, standard errors and 95% confidence intervals for direct paths to burnout estimated in Figures 5.4 – 5.12

Model	PEE β (95% CI)	S.E	RSA β (95% CI)	S.E	SD β(95% CI)	S.E
Motivation						
Intrinsic Regulation	-.093 [-.245, .058]	.077	-.097 [-.217, .022]	.061	-.274** [-.392, -.156]	.060
External Regulation	.202* [.062, .343]	.072	-.074 [-.188, .039]	.058	.144* [.048, .241]	.049
Amotivated Reg.	.223* [.031, .414]	.098	.738** [.595, .880]	.073	.751* [.600, .901]	.077
TO Climate	.102 [-.111, .315]	.109	-.107 [-.288, .074]	.092	-.097 [-.247, .053]	.076
EO Climate	.240* [.064, .416]	.090	-.086 [-.231, .060]	.074	-.179* [-.309, -.049]	.066
Stress						
Perceived Stress	.464** [.371, .558]	.048	.376** [.262, .489]	.058	.311** [.199, .422]	.057
Number of teams	.072* [-.032, .176]	.053	-.092 [-.194, .010]	.052	-.144* [-.248, -.040]	.053
Training hours	.153 [.043, .262]	.056	-.069 [-.177, .039]	.055	-.076 [-.190, .038]	.058
Other hours	.080 [-.020, .180]	.050	-.082 [-.178, .013]	.049	-.072 [-.163, .020]	.047
Commitment						
Enthusiastic Commit.	-.008 [-.256, .240]	.127	.236* [.024, .449]	.108	-.284* [-.448, -.120]	.084
Constrained Commit.	.364* [.056, .672]	.157	.473* [.193, .754]	.143	.480* [.271, .690]	.107
Enjoyment	-.081 [-.412, .250]	.169	-.274* [-.529, -.018]	.13	-.021 [-.235, .193]	.109
Other Priorities	.150 [-.019, .319]	.086	.115 [-.026, .257]	.072	.103 [-.007, .214]	.056
Personal Invest. (loss)	-.083 [-.272, .106]	.096	-.127 [-.311, .057]	.094	-.065 [-.180, .051]	.059
Personal Invest (qnt.)	.300* [.122, .478]	.091	-.074 [-.261, .112]	.095	.026 [-.100, .152]	.064
Social Constraints	.070 [-.088, .227]	.080	-.145 [-.296, .007]	.077	-.006 [-.106, .093]	.051
Social Supp. (emotion)	.071 [-.102, .244]	.088	.037 [-.147, .220]	.094	.056 [-.071, .183]	.065
Social Supp. (inform.)	-.038 [-.254, .178]	.11	-.197 [-.401, .007]	.104	-.07 [-.217, .076]	.075
Desire Excel (mastery)	-.051 [-.262, .160]	.108	-.052 [-.250, .145]	.101	-.183* [-.316, -.049]	.068

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

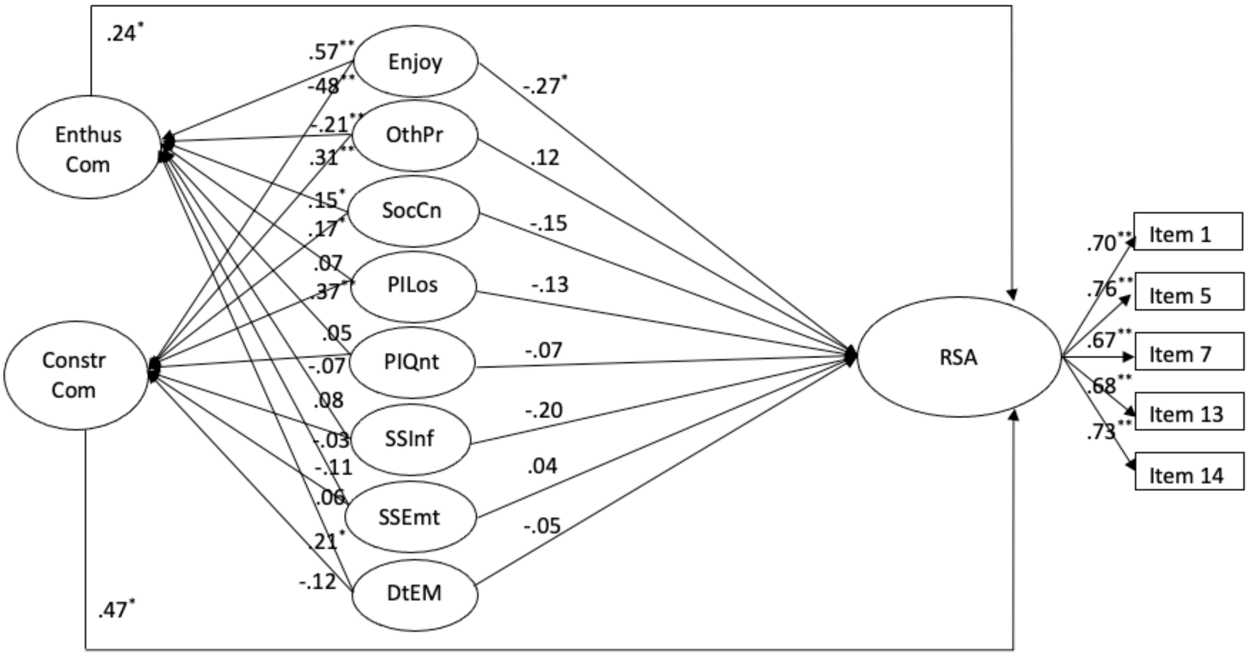
5.3.4.2. The Sport Commitment Model of Burnout. As outlined in Table 5.2, the commitment model of burnout showed an adequate fit for the PEE, RSA and SD data ($\chi^2/df < 3$, CFI > 0.9, RMSEA (90% CI) < 0.6, SRMR < 0.08). The standardised regression coefficients and *p*-values for direct paths assessed are outlined in Figure 5.7 – 5.9. To improve readability, information relating to confidence intervals and standard errors for direct paths to burnout are provided in Table 5.3, and indirect relationships are listed in the notes section below the figure. Item loadings for SCQ-2 are outlined in Appendix G.

Figure 5.7 S*tandardised Path Coefficients for the Commitment Model of PEE*



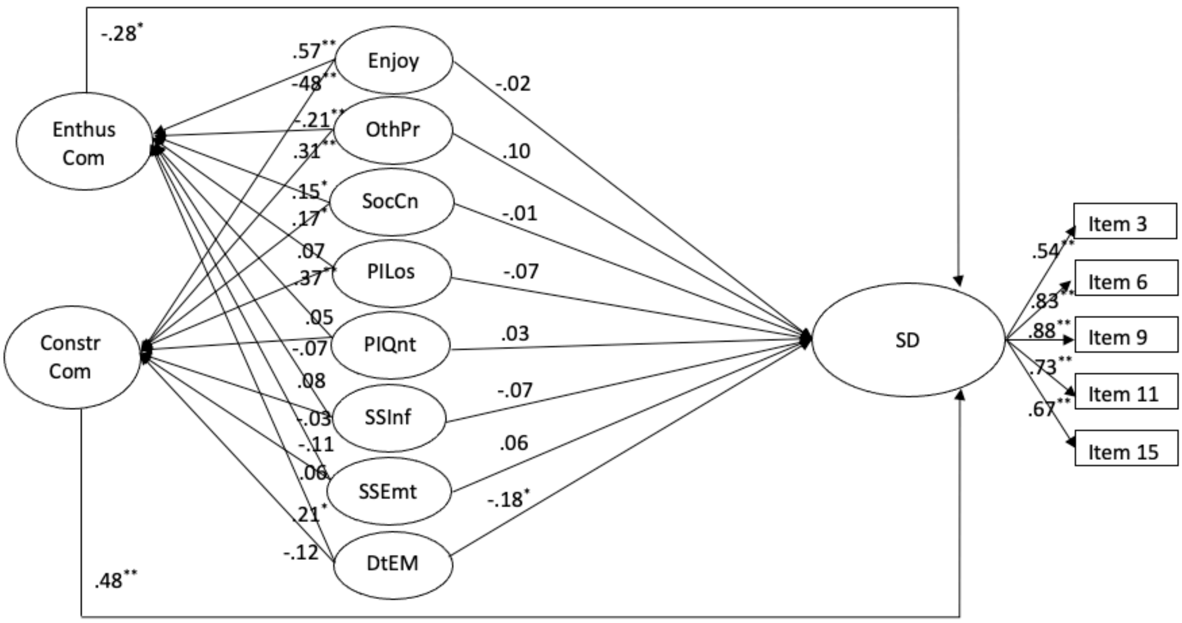
Note. Enthus Com = enthusiastic commitment, Constr Com = constrained commitment; Enjoy = enjoyment, OthPr = other priorities, SocCn = social constraints, PILos = personal investment (loss), PIQnt = personal investment (quantity), SSInf = social support (informational), SSEmt = social support (emotional), DtEM = desire to excel (mastery achievement); *Significant indirect paths (β) [95% CI]:* Enjoy through Constr Com (-.17)* [-.33, -.02], OthPr through Constr Com (.11)* [.01, .21], PILos through Constr Com (.13)* [.01, .25]; ** = $p < .001$, * = $p < .05$

Figure 5.8 S*tandardised Path Coefficients for the Commitment Model of RSA*



Note. See Fig 5.7 for abbreviations. *Significant indirect paths (β) [95% CI]:* Enjoy through Constr Com (-.23)*[-.38, .26], Enjoy through Enthus Com (0.14)*[.01, .26], OthPr through Enthus Com (-.05)*[-.10, -.00], OthPr through Constr Com (.14)*[.05, .24], SocCn through Constr Com (.08)*[.012, .13], PIlos through ConstrCom (.17)*[.06, .28]; ** = $p < .001$, * = $p < .05$

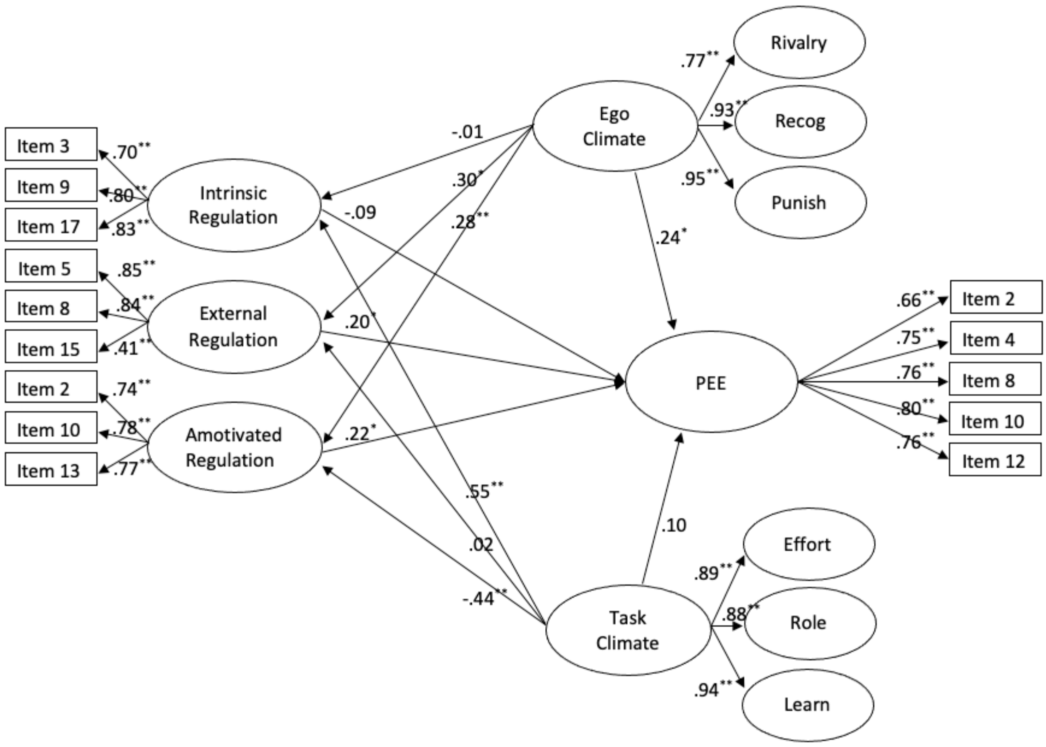
Figure 5.9 S*tandardised Path Coefficients for the Commitment Model of SD*



Note. See Fig 5.7 for abbreviations. *Significant indirect paths (β) [95% CI]:* Enjoy through Enthus Com (-.16)*[-.27, -.05], Enjoy through Constr Com (-.23)**[-.32, -.11], OthPr through Enthus Com (.06)*[.02, .10], OthPr through Constr Com (.15)**[.07, .23], SocCn → ConstrCom (.08)*[.02, .13], PILos through Constr Com (.18)**[.08, .27], PIQnt through Enthus Com (-.02)*[-.06, .03];** = $p < .001$, * = $p < .05$

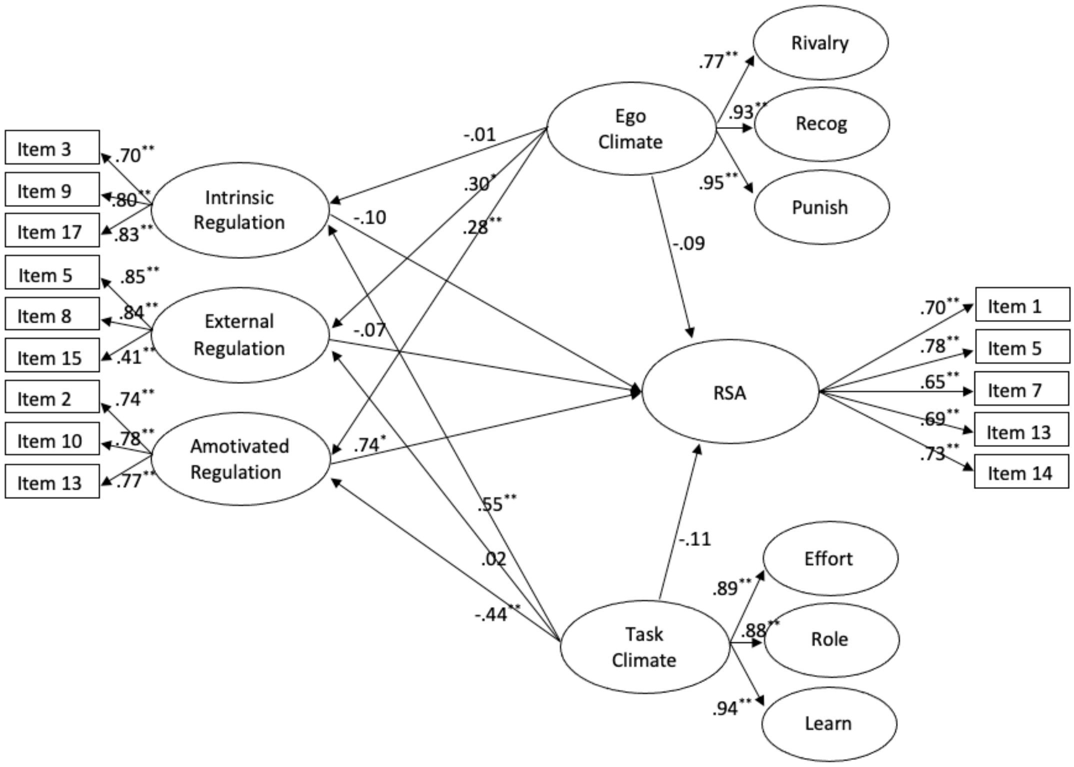
5.3.4.2 The Motivation Model of Burnout. As outlined in Table 5.2, the motivation model achieved acceptable fit for each burnout dimension ($\chi^2/df < 3$, CFI > 0.9, RMSEA (90% CI) < 0.06, SRMR < 0.08). The standardised regression coefficients for the pathways assessed are outlined in Figure 5.10 – 5.12. For ease of interpretation, information relating to confidence intervals and standard errors for direct paths to burnout are provided in Table 5.3, and significant indirect paths are outlined in the notes section below the figure. Relevant factor loadings for the PMCSQ-2 are outlined in Appendix G.

Figure 5.10 S*tandardised Path Coefficients for the Motivation Model of PEE*



Note. Rivalry = intra-team member rivalry, Recog = unequal recognition, Punish = punishment for mistakes, Effort = effort/improvement, Role = important role, Learn = cooperative learning; *Significant indirect paths (β) [95% CI]:* Ego Climate through External Regulation (.06)*[.01, .113], Ego Climate through Amotivated Regulation (.06)*[.001, .124], Task Climate through Amotivated Regulation (-.10)*[-.192, -.001]; ** = $p < .001$, * = $p < .05$

Figure 5.11 S*tandardised Path Coefficients for the Motivation Model of RSA*

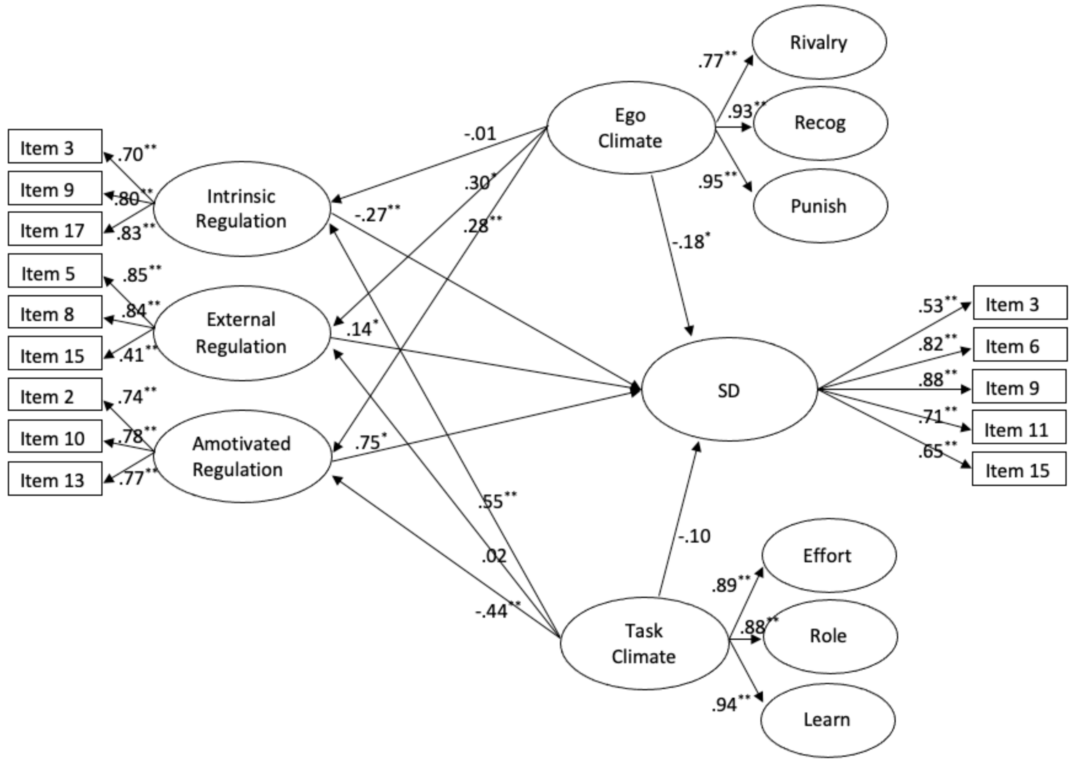


Note. See Fig 5.10 for abbreviations; *Significant indirect paths (β)[95% CI]:* Ego Climate through Amotivated Reg. (.21)**[.09, .32], Task Climate through Amotivated Reg. (-.31)**[-.46, -.16]; ** = $p < .001$, * = $p < .05$

5.4 Discussion

To the best of the researcher's knowledge, this is the first time multiple perspectives of burnout have been assessed alongside each other, using data from one sample of athletes. Each of the models tested was an adequate fit for the observed burnout data, indicating support for the stress-, motivation- and commitment-based perspectives. However, a closer look at the regression pathways identified reveals that the significant predictors of PEE, RSA and SD differ; only *perceived stress, amotivated regulation* and *constrained commitment* were significant direct predictors of all three burnout dimensions. In addition, *other hours* and a number of the variables in the *sport commitment* model did not have a significant impact on any of the dimensions of burnout, suggesting that these variables may not contribute significantly to feelings of burnout.

Figure 5.12 S*tandardised Path Coefficients for the Motivation Model of SD*



Note. See Fig 5.10 for abbreviations; *Significant indirect paths (β)[95% CI]:* Ego Climate through External Regulation (.04)*[.00, .08], Ego Climate to Amotivated Regulation (.21)*[.08, .32], Task Climate through Intrinsic Regulation (-.15)**[-.23, -.07], Task Climate through Amotivated Regulation (-.33)*[-.48, -.18]; ** = p < .001, * = p < .05

Focusing on the specific hypotheses outlined, results show support for the stress-based hypothesis (hypothesis 1) and are in line with existing literature (Lin et al., 2021), with higher levels of *perceived stress* identified as a significant predictor of burnout across all of its dimensions. However, stress was stronger predictor of PEE than either RSA or SD. Although this is in contrast to the results of Lin and colleagues' review (2021) wherein the strongest association was evident between stress and RSA, it is in line with the fact that these stress-based theories (Silva, 1990; Smith, 1986) predated the specific multidimensional definition of athlete burnout (Raedeke, 1997), and instead utilised a definition with exhaustion at its core (Silva, 1990; Smith, 1986).

The conceptualisation of burnout by Gaelic games administrators to date has been inextricably linked with concerns about training-specific stressors, including overtraining and multi-team demands, in line with Silva's (1990) training stress syndrome theory; for example, the 2016 GAA Annual Report included a lengthy discussion on 'player overtraining and burnout, and our fixtures calendar' (Duffy, 2016, p.11), which argues that as a result of changes in the age-grading system, player eligibility and competition structures for male athletes aged 17 – 21 "the chances of young players experiencing overtraining, overuse injury and, ultimately, burnout would have been minimised" (Duffy, 2016, p. 12). In addition, the time demands outside physical training have also been identified as a substantial source of strain for these athlete (Kelly et al., 2018). However, results of this analysis indicated that, while the positive impact of *training hours* on PEE provided some support for the of role training load in burnout (Silva, 1990), this variable did not predict the other burnout dimensions of RSA and SD. Notably, Silva's (1990) work pre-dated the specific multi-dimensional conceptualisation of burnout (Raedeke, 1997), and described burnout specifically as an "exhaustive psychophysiological response" (Silva, 1990, p.11)

Furthermore, the negative relationship between *number of teams* and feelings of SD suggest that representing multiple teams in a season may actually have a protective effect against burnout. This finding may be explained by research suggesting that Gaelic games athletes have been socialised to hold participation in their sport in high regard, with athletes viewing the sports as part of their national identity (Geary et al., 2021; Hughes & Hassan, 2017). Consequently, it is reasonable to suggest that athletes who commit to multiple teams may value Gaelic participation even more highly. Finally, despite concerns around time dedicated to sport beyond physical training for these amateur athletes (Kelly et al., 2018), *other hours* did not predict PEE, RSA or SD.

As such, in line with findings from Gustafsson et al. (2007), results highlight the importance of exploring factors beyond training load and scheduling demands, and point to a potential failure within Gaelic games to consider burnout in line with its multidimensional conceptualisation. Hughes and Hassan (2015) also highlight the potential impact of more complex issues on burnout in Gaelic games, such as social relations and power-dynamics.

Partial support for commitment-based hypotheses was also evident, as *constrained commitment* emerged as a significant positive predictor of all three burnout dimensions, while *enthusiastic commitment* was a significant protective factor against feelings of SD only. However, contrary to the hypothesis specified, *enthusiastic commitment* positively predicted RSA, suggesting that higher levels of both enjoyment and entrapment based commitment are associated with an increased risk for RSA. Furthermore, increased *enjoyment* and reduced *other priorities* also indirectly predicted higher levels of RSA as a result of their respective positive and negative contributions to feelings of *enthusiastic commitment.*

The remaining significant direct and indirect effects of antecedent commitment factors were in the hypothesised direction, although relationships again varied across burnout dimensions; perceptions of increased *personal investments (quantity*) were directly associated with higher levels of PEE, while *enjoyment* and *desire to excel (mastery)* were direct protective factors against RSA and SD respectively. In addition, perceived *personal investments (loss)* and *other priorities* also indirectly predicted all burnout symptoms and *social constraints* indirectly predicted increased RSA and SD, by contributing to increased feelings of *constrained commitment*. In contrast, *enjoyment* was indirectly associated with lower levels of PEE, RSA and SD by limiting feelings of *constrained commitment,* and, in the case of SD, contributing to increased *enthusiastic* *commitment. Enthusiastic commitment* also moderated the detrimental impact of *other priorities* on SD (Baron & Kenny, 1986), as hypothesised. However, it was notable that *social support (emotional* or *informational)* showed no significant direct or indirect pathways to burnout and did not significantly predict feelings of *constrained* or *enthusiastic commitment*. These findings are somewhat in contrast to our hypotheses and previous research by the researcher (Woods et al., 2020), where *emotional social support* was identified as a protective factor against RSA. Notably, Scanlan et al. (2016) also found a lack of support for social support subscales as commitment antecedents, suggesting they may be redundant components of the SCM.

Broadly speaking, findings support the argument that the hierarchical commitment model can provide useful insight into the factors impacting burnout (Raedeke, 1997). Specifically, results indicate that working to counteract feelings of *constrained commitment* and promoting *enthusiastic commitment* may be beneficial in reducing symptoms of burnout. Furthermore, indirect pathways provide insight into how this can be facilitated, and suggest that fostering *enjoyment,* helping athletes to better balance *other priorities*, and working to reframe their perceptions of *personal investment* in sport away from concerns about the *quantity* and potential *loss* of time or energy expended may be especially beneficial. Reframing commitment in a positive light is somewhat in line with Gabana and colleagues' (2019) gratitude-based intervention, which was associated with a reduction in athlete burnout.

However, findings also suggest that athletes who are more committed to their sport, regardless of the nature of that commitment, are at increased risk of experiencing RSA. Although contrary to our hypothesis, it is possible that greater expectations around their sporting performance and accomplishments may place highly enthusiastic athletes at an increased risk of falling short of their goals. For example, Weiss (2020) found that athletes whose commitment was characterised by attraction to their sport had significantly higher expectations of success and viewed achieving success as more important than those who reported entrapment-based, average to low commitment (Weiss, 2020). This finding may also provide some support for concerns around the negative implications of increasing pressure and demands associated with sport involvement (e.g. Madigan et al., 2022).

Interestingly, focusing on the predictive utility of the models as a whole, results indicate that commitment predicts feelings of SD to a somewhat greater extent than RSA, and a substantially greater extent than PEE. As such, findings suggest that this commitment-based perspective may be most useful to employ when exploring predictors of SD, but may provide less insight into the development of PEE. Furthermore, issues of multicollinearity and non-significant pathways point to potential redundant variables within the model. As such, this model may not be described as parsimonious, when considered as a model of burnout.

Finally, the motivation model allowed us to assess the effects of motivational regulation and climate on burnout symptoms. In line with existing research (e.g. Li et al., 2013) and our hypotheses, direct effects of motivational regulation on burnout were identified; *amotivated regulation* directly predicted all burnout symptoms, while *external regulation* predicted PEE and SD and *intrinsic regulation* predicted SD only. As such, results provide a more nuanced insight into the impact of motivation, highlighting the differential impact of motivational regulations on symptoms of burnout. For example, findings suggest that autonomous regulation protects against feelings of SD only in this population, while motivation based on extrinsic factors does not increase the risk of experiencing RSA. While this inconsistent impact of *external regulation* is somewhat in line with existing literature (e.g. Bicalho & Costa, 2018), previous research has indicated consistent support for the protective effects of *intrinsic regulation.* Furthermore, while *amotivated regulation* was a significant positive predictor of all three burnout dimension, the regression weights indicate that it is a relatively weak predictor of the PEE dimension of burnout, and a much stronger predictor of feelings of RSA and SD.

Focusing on motivational climate, the hypothesized direct impact of *TO climate* on burnout was not supported, while *EO climate* positively predicted feelings of PEE, in line with our hypothesis, but emerged as a protective factor against SD. Although previous research has pointed to some variability in the strength of association between motivational climates and the different burnout dimensions (e.g. Russell, 2021), the negative relationship between *EO climate* and SD is in contrast to existing theoretical and empirical work (Russell, 2021; Vitali et al., 2015). However, this may be explained by the likelihood that, in addition to the emphasis on competition and performance in an *EO climate,* sport is highly valued in such settings. For example, in the Gaelic games context it is argued that the societal value placed on participation means that athletes are accepting of poor treatment and are described as "wearing their chains willingly" (Hughes & Hassan, 2017).

Notably, viewing the motivation model as a whole, results provide further support for the integration of the SDT and AGT theories (Ntoumanis, 2001) in the burnout context, with the motivational climate significantly impacting all burnout dimensions through the motivational regulations, in line with our hypotheses. Specifically, *EO climate* impacted all burnout dimensions indirectly by contributing to increased *amotivated regulation* and, in the case of PEE and SD, increased *extrinsic regulation*. In contrast, *TO climate* indirectly protected against all burnout symptoms by contributing to lower levels of *amotivated regulation*, and against SD specifically by promoting increased *intrinsic regulation* (Baron & Kenny, 1986). This *intrinsic regulation*-SD relationship highlights the importance of autonomous motivation in ensuring sport participation is valued by the athlete, while the indirect protective effect of *TO climate* appears to be stronger for RSA and SD than for PEE.

As such, taken together, findings suggest that Gaelic games athletes operating in an *EO climate* are more likely to experience burnout both as a direct result of their motivational climate, and as a consequence of the increased *extrinsic* and *amotivation regulation* this climate promotes. In contrast, a *TO climate* protects against feelings of burnout indirectly by promoting greater levels of *intrinsic regulation* and reducing feelings of *amotivated regulation*. Notably, *EO climate* also protected against SD. Results also highlight the differential impact of motivational climate and regulations on symptoms of burnout, with only *amotivated regulation,* which is increased in an *EO climate* and reduced in a *TO climate,* impacting all burnout dimensions. In addition, when we review the variance explained by the motivation models across burnout dimensions, results suggest motivation-related variables have a substantially greater impact on feelings of SD and RSA than PEE, and thus this model appears to have greater utility in explaining these dimensions of burnout.

In line with our second aim, these multiple analyses allowed us to assess the utility of the stress, commitment and motivation perspectives across the burnout dimensions, and in comparison to each other. When reviewed across models, and as outlined above, the results of this study highlight differences in predictive utility and significant pathways for existing burnout theories when applied to the dimensions of PEE, RSA and SD. Specifically, examination of variance explained across models suggests that the stress model predicts feelings of PEE most strongly, followed by RSA and SD, while both the commitment- and motivation-based models account for the most amount of variance in SD, followed by RSA, with a much lower variance explained for PEE in both cases.

These findings have potentially important implications for both research and practice; in the research context, results suggest that while the parsimonious stress perspective can be a useful lens to employ when examining the PEE dimension of burnout, it may provide comparatively limited insight into factors associated with RSA and SD. In contrast, the motivation- and commitment-based perspectives appear to have greater utility in accounting for SD and RSA, but their increased complexity relative to the stress model is not matched by a similar increase in predictive utility when accounting for feelings of PEE. Furthermore, both this complexity and the issue of potentially redundant variables identified across these models may limit their utility (De Francisco et al., 2022). Such insight may provide greater clarity to researchers who are unsure of the theoretical perspective from which they should approach their research question, and thus help to ameliorate the existing scattergun approach identified in Chapter 2.

Focusing on practical implications, findings suggest that targeted prevention and treatment measures specific to certain burnout dimension could be most appropriate. For example, the results of this analysis indicate that interventions aimed at the reduction of psychological stress may protect athletes against feelings of burnout (Dubuc & Durand-Bush, 2012), and may be especially useful in counteracting feelings of PEE. Furthermore, research suggests that many coaches view limiting physical stressors as a tool for burnout prevention (Kroshus & DeFreese, 2017), and the evidence here suggests this may be beneficial in addressing feelings of PEE and SD. Similarly, when considering motivation-based interventions, practitioners should be aware that working to protect against feelings of *amotivation* may be beneficial for athletes who are experiencing elevated frequency of PEE, SD and RSA, and fostering a *TO climate* may help to achieve this. Finally, looking through the commitment lens, the pathways identified indicate that working to counteract feelings of *constrained commitment* can reduce feelings of burnout, while highly committed athletes appear to be at greater risk of RSA, regardless of the nature of their commitment.

Overall, findings support assertions that the existing perspectives of burnout in isolation may not adequately account for the development of athlete burnout (e.g. Gustafsson et al., 2011; Madigan et al., 2021), and suggest that a more comprehensive model which incorporates key variables from existing theories may be more appropriate. As outlined Chapter 1 (Section 1.3.2.4), Gustafsson et al. (2011) put forward an integrated model which incorporated components that can be linked to the models discussed herein; specifically, they suggested such a model should include stressors (e.g. excessive training and work/school demands), entrapment-related variables (e.g. social constraints, high investment and low alternatives to sport), diminishing motivation and motivational climate (Gustafsson et al., 2011). However, this integrated model has largely failed to generate research in the area, and it has been suggested (De Francisco et al., 2022) that this lack of empirical investigation of can likely be attributed to the substantial complexity of the model. As such, and as noted by Madigan (2021, p.668), a "winnowing process" is needed to narrow the focus to potentially key variables of interest. This analysis can be viewed as a step in that process, insofar as results serve to identify the individual model components that emerged as strongest predictors of the dimensions of burnout from across exiting perspectives. In addition, findings underscore the importance of the multidimensional conceptualisation of burnout, and also suggest that there are potentially different key variables involved in the development of PEE, RSA and SD respectively.

5.4.1 Limitations

The limitations to this analysis must also be acknowledged. The small sample size, relative to the number of parameters included in some of the models (Deng et al., 2018) is one such limitation; only the *stress* model achieved a suggested minimum ratio of 5 participants per parameter, while the other models were outside this ratio. Although we did separate analyses for the different dimensions of burnout and employ MLR estimates in these instances with the aim of minimising the impact of the small sample (Deng et al., 2018; Yuan & Bentler, 2000), a small sample-to-parameter ratio can impact results, for example leading to a higher possibility that the likelihood ratio statistics will reject a correct model (Deng et al., 2018). This analysis is also limited by the cross-sectional design, which inhibits us from assessing causality, and a lack of direct statistical comparison of competing models. Specifically, the substantial heterogeneity in model complexity (e.g. the one factor *stress* model compared to the multi-factor higher-order *commitment* model) and the absence of shared variables across models prevent us from running statistical comparisons or seeking to identify the "best" model (Rust et al., 1995). In addition, while the potential utility of an integrated model is noted above, a model with the full range of variables explored across these analyses generated would be highly complex, which further compound issues of sample size. However, examining multiple key theoretical perspectives within the same study allows us to not only assess their individual utility in accounting for each dimension of burnout, but provides context to these results by placing them alongside each other. This serves both as an opportunity to further scrutinise existing theories and as a means of identifying key variables across competing models, in line with calls in the burnout literature (Madigan, 2021; Madigan et al., 2021). As such, in line with the key aims outlined, the current series of analyses can be viewed as an important step in identifying the relative predictive utility and the significant predictors of PEE, RSA and SD across models based on commonly employed stress-, commitment- and motivation-based perspectives of burnout.

5.5.2. Conclusions and Contribution to the Thesis

This is the first analysis exploring the relative fit and predictive utility of multiple competing theories of burnout across all three dimensions of burnout. Findings point to a number of key factors associated with athlete burnout across the models assessed and highlight the importance of taking a multi-dimensional approach in the athlete burnout research. In the context of this thesis, this analysis is viewed as an essential step in achieving the overarching study aim of identifying the risk and protective factors for athlete burnout in Gaelic games. Specifically, in order to narrow the focus of the research to potentially key predictors of burnout with a view to combining these variables in a longitudinal model (see Section 3.2.4), these analyses served to identify the significant predictors of PEE, RSA and SD to be included as predictors of change in burnout over time. The details of this analysis are outlined in Chapter 7.

Chapter 6: Identifying the Trajectories of Change in Burnout Frequency Over Time

6.1 Introduction

This chapter will focus specifically on the longitudinal analysis exploring the frequency of symptoms of PEE, RSA and SD reported by athletes across the early-, mid-, and late-stages of two consecutive Gaelic games seasons. Specifically, this analysis aims to identify the trajectory that best describes changes in symptom frequency over time. In addition to the aims and hypotheses associated with this phase, and in line with recommendations for reporting on latent growth models (Hesser, 2015; Jackson, 2010), this chapter begins with a discussion of the theoretical formulation of the research question relating to change in burnout over time, and how this informed the research design. The remainder of this chapter provides an overview of the methods employed, the results of the relevant analyses, and a discussion of the findings in the broader research context and the context of the thesis specifically.

6.1.1 Theoretical Formulation and Considerations

Athlete burnout is conceptualised as an enduring syndrome (Raedeke, 1997) and, as such, longitudinal research is essential in order to understand how burnout develops and the factors that impact this development, with a view to informing effective intervention and prevention and methods (Cresswell & Eklund, 2006a). Conceptualising a theory of change, or the anticipated timepoints, intervals, measure and trajectory most appropriate for capturing change over time, is identified as an important step when exploring data gathered longitudinally (Jackson, 2010). Furthermore, in the context of burnout, understanding symptom frequency across an athletic season can allow for the identification of potential 'high risk' periods (Cresswell & Eklund, 2006a). It has been argued that the year-round nature of competition and training in Gaelic games contributes to feelings of burnout (e.g. Hughes & Hassan, 2017), while GAA administrators have also raised concerns about an increased risk of burnout at points in the season where competitions are particularly condensed (Duffy, 2015).

Importantly, longitudinal exploration of burnout has received increased attention in recent years (e.g. Lundkvist et al., 2018; Madigan et al., 2020). However, reflecting on the existing literature in combination, it is evident that consensus has yet to be reached on the expected trajectory of burnout symptoms over time. Specifically, studies have pointed to conflicting trajectories, including consistent growth or decline in symptom frequency over time (i.e. linear trajectory), curvilinear change (e.g. quadratic trajectory) and an absence of significant changes in burnout symptoms over time (e.g. Cresswell & Eklund, 2006; Isoard-Gautheur et al., 2015; Lundkvist et al., 2018; Martinent et al., 2020). In addition, differences in study designs, including the number and spacing of data collection points and the methods of analysis employed, also make it difficult to compare trajectories identified in existing research. While the potential role of contrasting research designs and analyses in this lack of consensus was noted in Section 1.3.3, this section will provide a more detailed consideration of these issues with additional insight from the findings in Chapter 2, and a discussion of how they informed the methods employed herein.

As noted in Chapter 2, longitudinal research has continued to grow; 15 of the 22 longitudinal studies identified were published in the last decade (i.e. 2012 onwards; see Table 2.2), compared to seven published in the 15-year period immediately following the development of the ABQ (i.e. 1997 – 2011). The results of Chapter 2 also highlight variability in the spacing and number of data collection waves, with this interval ranging from weekly to a number of months, and the number of timepoints ranging from two to eight. While not all of these studies assessed changes in burnout over time (e.g. Grobbelaar et al., 2010), examination of results from across those that did and from studies of individual- or mixed-sport athletes have suggested that this variability in the number and spacing of data collection intervals may have implications for our ability to detect changes in burnout over time.

Focusing on the spacing of data collection points, it is useful to compare findings from studies with shorter and longer intervals between waves. A number of studies have tracked burnout at intervals of three weeks or less (Cresswell & Eklund, 2005b; Grobbelaar et al., 2011; Turner & Moore, 2016), and have identified very limited change in burnout symptom frequency across timepoints. These findings can be contrasted to results from studies that have assessed PEE, RSA and SD at longer intervals. For example, Cresswell and Eklund (2006) extended their previous work (Cresswell & Eklund, 2005b) to track burnout every 10 weeks in a 30-week season, and identified significant increases in frequency of feelings of RSA from the pre-competition period to the middle of the competitive rugby season, followed by a reduction towards to the end of the season, and a reduction followed by an increase in PEE from pre- to in- to end-of-competition (Cresswell & Eklund, 2006a). Tracking feelings of PEE at six timepoint over two years, Adie et al. (2012) identified a significant positive linear and negative quadratic term, suggesting that PEE increased over time, but also pointing to curvilinear change. Madigan et al. (2020) also identified significant linear growth in total burnout, when assessed at the beginning, middle and end of the athletic season, with each wave separated by a three-month interval (Madigan et al., 2020).

Recognising the potential implication of the length of the interval between data collection waves, Lundkvist et al. (2018) assessed burnout symptoms in two different samples of mixed-sport athletes using intervals of different lengths; one sample was assessed weekly over 8 weeks, and one was assessed every 6 months, over 18 months (Lundkvist et al., 2018). Results indicated no significant linear change over time in PEE, RSA or SD when assessed at the weekly intervals (Lundkvist et al., 2018). In contrast, small but significant positive growth was identified for the PEE and SD data when assessed at 6-month intervals, indicating significant linear increases over an 18-month period. Taken together, these series of analyses (Adie et al., 2012; Cresswell & Eklund, 2005, 2006; Lundkvist et al., 2018; Madigan et al., 2020) suggest that, in line with the conceptualisation of burnout as an enduring, chronic phenomenon, a relatively substantial spread in data collection waves may be most appropriate for capturing the development of symptoms over time (Lonsdale & Hodge, 2011). Furthermore, the findings also highlight the importance of the multidimensional conceptualisation of burnout, with variability in the trajectories identified for PEE, RSA and SD evident (e.g. Cresswell & Eklund, 2006; Lundkvist et al., 2018).

In addition, it is possible our understanding of the trajectory of burnout symptoms over time may be somewhat limited by the research designs employed in existing work. Specifically, the majority of research in the area has examined burnout at two (e.g. Lonsdale & Hodge, 2011) or three points in the season (e.g. Cresswell & Eklund, 2006; Lundkvist et al., 2018), and has involved comparison of mean scores across time (Alvarez Pires & Ugrinowitsch, 2021; Lonsdale & Hodge, 2011; Turner & Moore, 2016) or the charting of linear trajectories of change over time (i.e. latent growth modelling; Lundkvist et al., 2018; Madigan et al., 2020). Some emerging work in this area has also employed a person-centred approach, citing the potential existence of distinct classes of athletes with unique trajectories of change in burnout (DeFreese & Smith, 2021; Martinent et al., 2020). While mean comparisons allow for the identification periods of higher and lower burnout, this approach fails to provide insight into the rate of change in burnout over time, or the level of inter-individual variability in the development of burnout over time (Preacher et al., 2008). In contrast, while latent growth modelling (LGM), multi-level modelling, or person-centred techniques do provide such insight, the use of three timepoints only limits this insight to the exploration of linear growth/decline, and does not allow for the assessment of alternative, more complex trajectories of change (Preacher et al., 2008); three timepoints is the minimum number recommended for analysing a linear trajectory, while more than five timepoints are recommended when modelling non-linear change, such as quadratic or piecewise growth (Flora, 2008).

Notably, where study design has facilitated the exploration of more complex trajectories of change, such trajectories have been shown to accurately describe the development of burnout over time. For example, both Adie et al. (2012) and Isoard-Gautheur et al. (2015) tracked burnout across a two-year window, gathering data at six and five timepoints respectively. Examining burnout as a function of age, Isoard-Guatheur et al. (2015) found that frequency of SD through adolescents was described by a linear and quadratic effect, showing a greater rate of change as athletes got older (Isoard-Gautheur et al., 2015). In addition, a quadratic trajectory described feelings of PEE, which increased from ages 14-16, and then decreased for athletes ages 16 – 19, while feelings of RSA were best described by a significant negative linear change. Adie et al. (2012) tracked PEE only, but again identified linear and quadratic change over time. While, this data provides support for the idea that symptoms may not always be best described by a pattern of linear development (Cresswell & Eklund, 2006), these analyses focus solely on the development of burnout during adolescence, and provide little insight into the potential impact of changes that may occur across an athletic season for adult athletes (Adie et al., 2012; Isoard-Gautheur et al., 2015). In order to improve our understanding of potential trajectories of change over time in adult athletes, numerous waves of data collection are required, supported by appropriate theoretical rationale (Jackson et al., 2010; Preacher, 2008).

Considering the Gaelic game context specifically, GAA administrators have raised concerns that the risk of burnout may be further compounded at particularly congested points in the Gaelic games fixtures calendar (Duffy, 2015). For example, in a discussion paper on burnout and the fixtures calendar, the director general of the GAA argued that the period from January to April may be particularly demanding for young adult male athletes (Duffy, 2015). Qualitative research provides some support for these substantive concerns (Geary et al., 2021; Hughes & Hassan, 2017). However, to the researcher's knowledge, existing quantitative research (Turner & Moore, 2016) has tracked burnout in this population over only 8 weeks of a potentially 12-month long season, and thus our understanding of how burnout develops and potential high-risk periods remains limited.

Reflecting on the existing literature in combination, it is evident that consensus has yet to be reached on the expected trajectory of burnout symptoms over time. Furthermore, to the researchers' knowledge, no study has tracked burnout in a sample of adult athletes across a sufficient number of timepoint and data intervals to allow for the modelling of complex trajectories of change (Preacher et al., 2008). Such analysis can provide insight into how frequency of burnout symptoms may vary across an athletic season, and can allow for the identification of potential 'high risk' periods (Duffy, 2015). In addition, identifying individual variability in initial symptom frequency and trajectories of burnout is essential in order to understand whether there are individual-level factors impacting the development of burnout, beyond the role of time in the season.

As such, the aim of this analysis was to identify the trajectory that best describes the development of burnout over time in this sample of Gaelic games athletes, and to assess the level of variability in initial burnout symptom frequency and in trajectories of burnout across players. The LGM approach, which allows for exploration of both average growth for the sample across time and individual variability (Preacher, 2008), was employed herein. In line with guidelines for longitudinal research (Jackson et al., 2010), strong theoretical rationale should underpin the selection and spacing of data collection timepoints. Taking learnings from the existing work outlined above (e.g. DeFreese & Smith, 2021; Cresswell & Eklund, 2006), the tracking of athletes across a competitive season is arguably the most logical and informative design in that it allows us to explore patterns of burnout through the key phases of an athletes' sporting year, namely the early-, mid- and late-stage of an athletic season. Furthermore, by gathering data across consecutive seasons, we can explore how burnout progresses from one season to the next.

6.1.2 Aims and Objectives

The aim of this analysis was to identify the average trajectory of burnout in Gaelic games athletes over two years, and to assess the level of variability in initial burnout symptom frequency and in trajectories of burnout across athletes. More specifically, the research objectives are as follows;

1. To compare intercept-only, linear, quadratic and piecewise models of change to identify the latent growth trajectory that best describes frequency of PEE, RSA and SD symptoms reported by Gaelic games athletes at six timepoints across a 20-month period

2. To assess whether there is significant variability in initial burnout symptom frequency (intercept) and the rate of change (slope) over time across athletes.

Specific hypotheses for this analysis are outlined below.

6.1.3 Hypotheses

Considering the conflicting nature of trajectories of burnout symptoms identified to date (e.g. Lunkdvist et al., 2018), an exploratory approach to aim one was taken, and no specific hypothesis was specified. However, a hypotheses relating to inter-individual variability was specified based on existing research (e.g. Martinent et al., 2020). Specifically, it was hypothesised that *there would be significant inter-individual variability in frequency of PEE, RSA and SD symptoms across participants at T1, and the rate of change in PEE, RSA and SD across timepoints*.

6.2 Methods

6.2.1 Design

As outlined in Chapter (see Section 3.3.1), this study employed a longitudinal, quantitative design, with a view to tracking burnout over time. Data was gathered at 6 timepoints broadly representing the early-, mid-, and late-stages of two consecutive years Gaelic games season.

6.2.2 Participants

In line with the eligibility criteria outlined in Chapter 3, any individual aged 18 or over at the first time-point of data collection (March, 2019) and playing Gaelic was eligible for participation.

6.2.3 Materials Relevant to this Analysis

The ABQ (Raedeke & Smith, 2001) was used to measure athlete burnout. Athletes were asked to indicate their gender, age, sport(s) (men's Gaelic football, hurling, ladies' Gaelic football, camogie) and teams they represented (club, county, college, other) at each timepoint.

6.2.4 Procedure

Data was gathered at six data collection windows. Participants completed the questionnaire at T1 either via an online link or using a hard-copy version. At T2 – T6 participants received a link to the online questionnaire via the email address they provided. Participants were required to indicate at each timepoint whether they wished to be contacted again at the next timepoint. Participants who retracted consent at any stage were not contacted again. Furthermore, where a participant did not respond to two consecutive timepoints, it was assumed that they no longer wished to participate and they were not contacted again.

6.2.5 Analysis

6.2.5.1 Overview of the Latent Growth Modelling Approach. Latent Growth Modelling (LGM) refers to a specific application of structural equation modelling (SEM) that enables the examination of both intra- and inter-individual change over time (Preacher et al., 2008). LGM's are extremely flexible and, where data is gathered over three or more timepoints, allow for the modelling of both linear and nonlinear change over time (Preacher et al., 2008). Nonlinear change includes quadratic growth functions, which are characterised by increases to a point and a subsequent tapering-off of growth, and piecewise growth functions, which are characterised by two distinct slopes, before and after a specified theoretical point of interest (Flora, 2008).

In order to identify the trajectory that best describes burnout in Gaelic games players, and in line with recommendations (e.g. Preacher, 2008), data was gathered at 6 timepoints to allow for the assessment of increasingly complex trajectories (Whittaker & Khojasteh, 2017), including an intercept-only model, a linear growth model, a quadratic growth model and a piecewise growth model, as discussed in detail below. Models were compared to identify the trajectory that best accounted for the PEE, RSA and SD data across the six timepoints. In addition, the levels of inter-individual variability in frequency of burnout symptoms at T1 and growth rates was also explored.

6.2.5.2 Considerations and Preparations for Analysis.

Spacing of timepoints. Six timepoints were chosen to represent the beginning, middle and end of the season. While the time lag between data collections points does not need to remain the same, the lag must be consistent for all participants (Byrne & Crombie, 2003). As outlined in Chapter 3, the intervals between T1, T2 and T3 was circa 15 weeks for all participants. However, this was extended to an interval of circa 18 weeks for T4, T5 and T6, as a result of the shortened data collection window across these timepoints following the COVID-19 outbreak. This change in time-lag can be accounted for in LGM through the specification of time scores; time scores are the parameters used to specify the slope loadings over time (Preacher et al., 2008). In this analysis, we specified that T1 is the intercept point and a 15 week-lag receives a loading of one and an 18-week lag receives a loading of 1.2, such that the loadings for T1 – T6 were 0, 1, 2, 3.2, 4.4 and 5.6 respectively.

Sample Size and Power Considerations. The importance of an adequate sample size has been stressed consistently in the use of SEM methods, including LGM (e.g. Byrne & Crombie, 2003). However, specific guidelines around sample size for longitudinal research are lacking, and recommendations can also be impacted by characteristics such as model complexity (Curran et al., 2010). This lack of consensus is also evident in various "rules of thumb" relating to sample size, with examples including a minimum of ten cases per variable, a range of five to ten observations per parameters, or minimum sample size recommendations ranging from 100 to 200 cases

(Bollen, 1989; Shi et al., 2021). Furthermore, statistical power is also substantially influenced by sample size (Davey & Savla, 2009). Small samples and missing data can negatively impact power, while a greater number of data collection waves can contribute to increased power in longitudinal studies (Newman, 2014; Wänström, 2009). Based on a series of simulation studies, Davey and Salva (2009) suggest that, for a longitudinal study with 5 data collection points and expected missingness of 50%, a sample size of approximately 250 would be required to achieve the accepted power threshold of 0.8 (Cohen, 1988). We took a number of measures aimed at recruiting and retaining as many participants as possible across the timepoints, including multi-channel recruitment and a series of reminder emails. However, and as discussed in detail below, in reality difficulties with sample size and attrition are highly common in longitudinal studies and analyses are commonly conducted with fewer than 100 participants (McNeish & Harring, 2017).

Importantly, robust maximum likelihood estimators, including the MLR estimator in *Mplus* (Asparouhov & Muthén, 2005), can be highly effective in handling small sample sizes when fitting LGMs, and results reflect accurate standard error estimates and growth parameter coverage (Shi et al., 2021). As such, the MLR estimator was employed in subsequent LGM analyses.

6.2.5.3 Missing Data Analysis. Descriptive statistics were used to assess missingness of data across timepoints. Missing values analysis (Little's MCAR) was conducted to assess the mechanism of missing data (Yang & Shoptaw, 2005). In addition, mean comparisons were conducted to assess whether the frequency of burnout symptoms reported by athletes who failed to respond after T1 differed significantly from the athletes who responded to the survey at multiple timepoints.

6.2.5.4 Data Screening. Frequencies and descriptive statistics were calculated for the data across timepoints. Multivariate normality was assessed based on Mardia's skewness and kurtosis tests (Cain et al., 2017). Significant results on Mardia's tests indicate the data is significantly different from normal. However, simulation studies indicate that MLR estimator can handle non-normal data in latent growth models (Shi et al., 2021).

Robust squared Mahalanobis distances (Rousseeuw & van Zomeren, 1990) and Cook's distance are commonly used methods for identifying outlying observations (Tong & Zhang, 2017); $p < 0.001$ for Mahalanobis distance and Cook's distance > 1 are indicative of an outlying observation. Both of these values were calculated for all PEE, RSA and SD indicator items across T1-T6 using *Mplus*. In line with recommendations for the use of multiple methods to detect outliers (e.g. Tong & Zhang, 2017), data was deemed to be outlying where both the Mahalanobis and Cook's distance thresholds were violated. To the best of our knowledge, an estimator that is robust to outliers is not currently available in *Mplus*. As such, listwise deletion was employed where outlying observations were identified (Muthén & Muthén, 1998 – 2020)

6.2.5.5 Models to be Tested. Distinct models were tested for PEE, RSA and SD respectively. Model testing can be described across two broad steps; testing for measurement invariance, and testing trajectories of change over time.

Step 1. Testing Measurement Invariance. Measurement invariance refers to the assumption that a construct assessed psychometrically has an equivalent meaning across different measurement occasions, and thus differences identified across timepoints is not as a result of differences in interpretation of the construct or the measure used (Putnick & Bornstein, 2016). The 'second-order' (SO) LGM approach, wherein multiple observed indicators of latent variables are incorporated in the model rather than a single item, allows researchers to test for measurement invariance over time and for the separation of measurement error variance from occasion-specific variance (Sayer & Cumsille, 2001), and has greater statistical power for the detection of individual differences in change compared the single-item approach (von Oertzen et al., 2010). As such, the SO-LGM approach was employed herein, with the five indicator items for PEE, RSA and SD incorporated at each timepoint of this model. Measurement invariance can be tested under the SEM framework, through a number of key steps (Putnick & Bornstein, 2016; Widaman & Reise, 1997), including models specifying (1) *configural invariance*, (2) *metric invariance*, and (3*) scalar invariance*. Details of each of these models are outlined below.

For all of the analyses undertaken, Goodness-of-fit indices, namely the chi-square/degrees of freedom ratio (χ^2/df), the comparative fit index (*CFI*), the root mean square error of approximation (*RMSEA*) and the standardized root mean square residual (*SRMR)* (Schreiber et al., 2006), and associated rule-of-thumb cut-off values were used to assess whether a model showed acceptable fit. The following cut-off points for each of these measures are indicative of acceptable fit; $\chi^2/df < 3$, $CFI > 0.9$, $RMSEA < 0.06$ to 0.08 $SRMR < 0.1$ (Hu & Bentler, 1999; Marsh et al., 2004; Wang & Wang, 2012). Change in model fit from one step to the next was assessed using the CFI difference test (ΔCFI), the RMSEA difference test (ΔRMSEA), SRMR difference test (ΔSRMR) and the loglikelihood-based chi-square difference test ($\Delta\chi^2$) (Chen, 2007; Cheung & Rensvold, 2002; Rutkowski & Svetina, 2014). Difference testing using loglikelihood is recommended where analysis is conducted using the MLR estimator (Muthén & Muthén, 1998 - 2017). The following cut-offs indicate no significant difference in model fit; $\Delta\chi^2 > 0.05$, ΔCFI < -0.01, ΔRMSEA < 0.015 and ΔSRMR < 0.03 (Chen, 2007).

Model 1). Configural invariance, uncorrelated residual errors. The test of *configural invariance* is the least restrictive of the measurement invariance tests, and assesses whether the constructs of interest have the same pattern of loadings across timepoints (Putnick & Bornstein, 2016; Widaman et al., 2010; Wu et al., 2010). The specification of *uncorrelated residual errors* refers to the assumption that residual errors associated with indicator items are independent across time.

Model 1b). Configural invariance, correlated residual errors. Should goodness-of-fit indices suggest Model 1 was not an adequate fit for the data, the researcher planned to test configural invariance without the assumption of independence of residual errors. This assumption, while typical under classical theory, is often unrealistic and untenable when applied to longitudinal data (Byrne & Crombie, 2003), where residual errors related to each item are likely to be correlated across timepoints. As such, it is common practice in longitudinal analyses that residual errors are allowed to correlate for the same item across timepoints (Muthén & Muthén, 1998 - 2017). Where Model 1b. showed improved fit indices relative to Model 1, it was retained moving forward (Widaman et al., 2010).

Model 2). Full metric invariance. Where configural invariance was supported, these restrictions were retained and *metric invariance* (Widaman et al., 2010) was assessed. This is the assumption that each indicator item loads onto its latent construct to a similar degree across timepoints, and is tested by restricting the factor loadings of each indicator item to be equal across T1-T6. Where model fit does not significantly disimprove compared to Model 1/1b, metric invariance is supported (Putnick & Bornstein, 2016).

Model 3). Full scalar invariance. Scalar invariance (Widaman et al., 2010) refers to the equivalence of item intercepts, and assumes that mean differences in the latent constructs capture all mean differences in the shared variance of the indicator items (Putnick & Bornstein, 2016; Widaman & Reise, 1997). This assumption was tested by constraining all of the item intercepts to be equal across T1-T6. This assumption was accepted if model fit did not show significant dis-improvement compared to Model 2.

Model 3b). Partial scalar invariance. Where fit-indices indicated a lack of support for full scalar invariance, the decision was taken a priori to run tests of partial scalar invariance, in line with common practice (Putnick & Bornstein, 2016). This model re-specification was to be informed by MIs and theoretical considerations. Where sufficient substantive and statistical support was evident, the relevant intercept would be freed and the partial scalar model would be assessed. The partial scalar model would be preferred if it showed a significantly better fit than Model 3, and did not show a significantly worse fit than Model 2.

Where these three assumptions are satisfied, the data is said to meet the requirement of *strong invariance* (Putnick & Bornstein, 2016; Wu et al., 2010). The additional assumption of equivalence of residual variance (*strict invariance*) is generally viewed as unrealistic in cases of longitudinal data, and therefore was not assessed in this analysis (Putnick & Bornstein, 2016; Wu et al., 2010). All models were assessed using *Mplus* version 8 (Muthén & Muthén, 1998 - 2020)

Step 2. Assessing the Trajectories of Burnout Dimensions. In line with recommendations (e.g. Preacher, 2008), the researcher planned to assess a number of increasingly complex models to identify the best-fitting trajectory. As such, the following models were specified; *random intercept only (fixed slope)*, *linear growth*, *quadratic growth*, and *piecewise growth*. The details of each of these models and their specifications are described below. Goodness-of-fit indices were again employed to assess model fit, with the following cut-off criteria employed; $\chi^2 /df < 3$, $CFI > 0.9$, $RMSEA$ <0.06 to 0.08 $SRMR < 0.1$ (Marsh et al., 2004; Hu & Bentler, 1999; Wang & Wang, 2012). $\Delta\chi^2 < 0.05$ was indicative of significant improvement model in fit when comparing trajectories.

Model 4) Intercept only model. The *intercept* parameter was specified to describe participants' initial frequency of PEE, RSA or SD at T1, while the *slope* parameter represents rate of change in the outcome variable across timepoints (Byrne & Crombie, 2003). The mean *slope* factor and variance fixed to zero, restricting the model to specify no mean growth over time (Preacher et al., 2008). The *intercept* factor was allowed to vary freely, to test the hypothesis (hypothesis 2) that all athletes would not have the same frequency of burnout symptoms at T1.

Model 5) Linear LGM. The *slope* mean and residual variance were freed, specifying linear growth in burnout over time. T1 was specified as the intercept point. The time-score weightings for T1 – T3 were 0, 1 and 2 (15-week intervals), and time-score weightings for T4 – T6 were 3.2, 4.4 and 5.6 (18-week intervals).

Model 6) Quadratic LGM. The weightings assigned to each timepoint in the linear model were squared to specify the quadratic term. In addition, while the intercept factor continues to represent the initial scores at T1, the *slope* factor now represents the instantaneous growth rate at T1 (Whittaker & Khojasteh, 2017).

Model 7) Piecewise LGM. The suspension of the Gaelic games following the COVID-19 outbreak which occurred at T4 may represent a theoretically distinct point in time, whereby growth trajectories for burnout may be distinguished before and after the outbreak (van Zyl, 2021). As such, in this piecewise LGM T4 was specified as the "knot" point (Flora, 2008); Slope 1 describes participants' growth trajectories on PEE, RSA and SD from T1-T3, and Slope 2 describes growth trajectories across dimensions from T4-T6. To specify these two distinct slopes, time score weightings as follows; for Slope 1, T1@0, T2@1, T3@2, T4@2, T5@2, T6@2, and for Slope 2, T1@0, T2@0, T3@0, T4@1.2, T5@2.4, T6@3.6.

6.3 Results

6.3.1 Preliminary Analysis of the Total Sample

6.3.1.1 Descriptive Statistics. Table 6.1 below outlines the response rate at each timepoint, the breakdown by *gender, sport type* and *playing level*, and descriptive statistics for the ABQ subscales. The number of athletes who indicated they were not currently participating in Gaelic games is also outlined.

Table 6.1.

Sample characteristics of respondents, mean scores and standard deviations on ABQ subscales across timepoints

Variable	T1	T2	T3	T4	T5	T6
	n	*n*	*n*	*n*	*n*	*n*
Responses	370	192	161	131	116	98
Gender						
Males	178	86	71	55	48	44
Females	192	106	90	76	68	54
Sport						
Men’s Gaelic Foot.	134	63	44	33	27	27
Ladies Gaelic Foot.	162	88	70	59	50	40
Hurling	100	42	42	30	26	23
Camogie	66	36	31	25	18	15
Dual players	92	39	33	26	17	14
Not playing	N/A	1	7	10	12	7
Playing Level						
Intercounty	111	56	42	31	30	24
Non-Intercounty	259	136	112	90	74	67
Burnout	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
PEE	2.32 (.73)	2.26 (.79)	2.29 (.70)	2.14 (.74)	2.10 (.84)	2.09 (.70)
RSA	2.63 (.81)	2.64 (.81)	2.68 (.77)	2.63 (.81)	2.72 (.78)	2.81 (.83)
SD	2.10 (.88)	2.19 (.96)	2.28 (.93)	2.24 (1.0)	2.28 (.96)	2.24 (.87)

6.3.1.2 Response Rate. Of the 370 athletes who participated at T1, 50 athletes did not provide consent for contact at subsequent phases. Furthermore, athletes could opt out of future contact at any stage and were also removed from the contact list if they did not respond to two consecutive timepoints. As such, response rates across timepoints were calculated based on the ratio of athletes contacted to those who responded at each timepoint, as outlined in Table 6.2. A response was considered to be recorded where a participant had selected the final "submit" button.

Table 6.2

Overview of athletes contacted and the response rate at each timepoint

Timepoint	**Participants excluded from contact list and rationale for exclusion**		**Athletes Contacted (*n*)**	**Responses (*n*); response rate (%)**
	Opted out of future contact at previous timepoint (n)	*Failed to respond to two consecutive timepoint (n)*		
T1	N/A	N/A	Initial recruitment	370
T2	50	N/A	320	192 (60.00%)
T3	8	N/A	312	161 (51.60%)
T4	3	98	211	131 (62.09%)
T5	1	36	174	116 (66.67%)
T6	2	27	154	98 (63.63%)

6.3.2. Missing Data Analysis

To address convergence issues, the iterations for Little's test were increased (tolerance = 0.01, convergence = 0.001, iterations = 1500). Results indicated that data met the assumption of MCAR ($\chi^2(1245) = 1327.79$, $p > 0.05$). The MLR estimator employed has been identified as effective in handling data MCAR in LGM analyses (Shi et al., 2021).

The total percentage of missing data on the 15 ABQ items was estimated by calculating the ratio of responses across timepoints to the total number of responses that would have been recorded had each participant from T1 completed the questionnaire at all timepoints, as per the equation below;

$\sum (n_{T1 \ldots T6} * \textit{number of items}) / N_{T1} * (\textit{number of items} \times \textit{number of timepoints})$,

where *number of items* = 15 (as per the ABQ), N_{T1} = 370, number of timepoints = 6.

[(370*15) + (192*15) + (161*15) + (131*15) + (116*15) + (98*15)]/370*(15x6)

5550 + 2880 + 2415 + 1965 + 1740 + 1470/ 33300

16020/28800 = 48.11% completion, 51.89% missingness

Guidelines for handling missing data (Newman, 2014) suggest that listwise deletion should be avoided where possible due to the substantial negative impact on power (Newman, 2014), and instead advocate the use of maximum likelihood estimation treatments, such as FIML estimation, for data where partial respondents (i.e. participants that did not complete all timepoints) make up >10% of responses (Newman, 2014). In contrast to imputation, FIML directly analyses incomplete data and has been shown to yield accurate standard errors and unbiased parameters (Enders & Bandalos, 2001), and to outperform ad hoc deletion methods in latent growth modelling (Wothke, 2000). This also applies to non-normal data, when the MLR estimator is employed alongside FIML (Enders, 2001).

However, simulation studies suggest missingness approaching 50% can lead to increased error in parameter estimation for FIML (Newman, 2003). Examination of the response rates indicated that 148 athletes responded to T1 only, and thus had missing values at all other timepoints. With the exclusion of athletes who responded at T1 only (n = 148), such that the total sample is 222, the amount of missing data across timepoints is reduced substantially;

[(222*15) + (192*15) + (161*15) + (131*15) + (116*15) + (98*15)]/22*(15x6)

3330 + 2880 + 2415 + 1965 + 1740 + 1470/ 19980

13800/19980 = 69.07% completion, 30.93% missingness

Mann-Whitney U tests revealed no significant differences in burnout at T1 between athletes who participated at T1 only (*T1Only, n* = 148) and those who responded to multiple timepoints (*MultiT; n* = 222); PEE *T1Only* Md = 2.20, *MultiT Md* = 2.20, U = 16088.0, z = -0.34, $p > 0.05$; RSA *T1Only* Md = 2.60, *MultiT Md* = 2.60, U = 16060.0, z = -0.37, $p > 0.05$; SD *T1Only* Md = 2.00, *MultiT Md* = 2.00; U = 15642.0, z = -0.78, $p > 0.05$. As such, with the aim of improving the performance of FIML (Newman, 2003) and in line our aim of tracking burnout trajectories over time, athletes who responded to the questionnaire at T1 only ($n = 148$) were excluded from the remainder of the analysis.

6.3.3 Normality and Presence of Outliers

Mardia's tests indicated significant multivariate skewness and kurtosis in PEE, RSA and SD data across timepoints [PEE skewness $b = 6.60$, $z = 78.14$, $p < 0.05$, kurtosis skewness $b = 58.55$, $z = 4.54$, $p < 0.001$; RSA skewness $b = 9.67$, $z = 114.48$, $p < 0.001$, kurtosis skewness $b = 56.05$, $z = 3.46$, $p < 0.005$; SD skewness $b = 13.53$, $z = 160.11$, $p < 0.001$, kurtosis skewness $b = 63.57$, $z = 6.70$, $p < 0.001$]. The MLR estimator is robust against non-normality (Shi et al., 2021).

Mahalanobis distance and Cook's distance values were calculated for the indicator items for PEE, RSA and SD using *Mplus* software. There were twenty-one cases with a significant Mahalanobis distance value ($p < 0.001$). However, six of these cases did not have a Cook's distance value >1. In line with data analysis approach outlined, only those variables that emerged as outliers across both tests were excluded (Tong & Zhang, 2017). As such, 15 outlying cases were removed from the dataset at this point, such that $n = 207$.

6.3.4 Overview of Sample Included in Analysis

Descriptive statistics for the final sample ($n = 207$) at T1 provide an overview of key characteristics; age $M = 24.72$, $SD = 6.14$, female $n = 113$, male $n = 94$, elite $n = 63$, non-elite $n = 144$. Notably, this sample also included 11 athletes who indicated that they were no longer playing Gaelic games at one or more of the subsequent data collection points. Of these athletes, four athletes did not respond to any subsequent waves of data collection, four athletes responded to the subsequent wave and indicated that they had resumed participation again, and three of these athletes responded to the subsequent phase and indicated that they were still not participating in Gaelic games.

As dropout from sport is viewed as one of the potential consequences of athlete burnout (Isoard-Gautheur et al., 2016), the researcher felt it was important to retain data from these athletes in the analysis where possible, with a view to capturing the trajectory of burnout progression in its entirety and in line with its enduring nature. In addition, when responding to the ABQ, athletes were asked to reflect on their sport participation over the preceding three months and, as such, even if they had stopped playing at the point of data collection they could still reflect on any participation up to the stopping point. However, where athletes responded again to the subsequent data collection wave but had not returned to sport participation (i.e. they had stopped playing their sport for two consecutive waves) this data was not eligible for inclusion in the analysis as responses could not be based on sport participation over the preceding three months, and feelings about the end of the participation would have been captured at the preceding data collection point.

6.3.5 Models Tested

6.3.5.1 Measurement Invariance Models. Measures of goodness-of-fit indices and change in fit are outlined in Table 6.3. For PEE, RSA and SD, the models with uncorrelated residual errors across timepoints (Model 1) showed poor fit (CFI < 0.9 and RMSEA > 0.06). This suggests that the assumption of independence of measurement errors was not supported for PEE, RSA or SD; in each case, the model with correlated error variances (Model 1b) showed a substantial improvement in fit and was retained.

As outlined in Table 6.3, the fit indices for Model 1b were acceptable ($\chi^2/df <$ 3,CFI > 0.9, RMSEA < 0.06, SRMR < 0.1), indicating support for *configural invariance* in the PEE, RSA and SD with correlated errors. However, model fit was comparatively weaker for RSA (*CFI* = .908) and SD (*CFI* = .916). As measures of fit generally deteriorate further when models become more complex (Perry et al., 2015), this was recognised as an issue that may impact the analysis as it progressed (e.g. with the addition of predictors). Information from Modification indices (MIs) and theoretical considerations (Brown, 2015) informed amendments to these models; in the RSA model items ABQ13 and ABQ7 were allowed to correlate at T4 and items ABQ1 and ABQ14 were allowed to correlate at T3 (model 1c), while items ABQ3 and ABQ6 were allowed to correlate at T5 and items ABQ9 and ABQ15 were allowed to correlate at T3 in the SD model (model 1c) (Wang & Wang, 2012). A detailed overview of the rationale for this decision making is outlined in Appendix H.1.

The assumption of *metric invariance* (Model 2) was supported for PEE, RSA and SD when compared to Model 1b/1c ($\Delta\chi^2 > 0.05$ ΔCFI < 0.01, ΔRMSEA < 0.015 and ΔSRMR < 0.03). Full *scalar invariance* (Model 3) was supported for the PEE and SD data when compared to Model 2 ($\Delta\chi^2 > 0.05$, ΔCFI < 0.01, ΔRMSEA < 0.015 or ΔSRMR < 0.01). However, a significant worsening of fit ($\Delta\chi^2 < 0.05$ and ΔCFI > 0.01) was evident for the RSA full *scalar invariance* model compared to Model 2 (Table 6.3). In line with the approach specified a priori, examination of MIs and theoretical considerations informed the decision to specify *partial scalar invariance* by freeing ABQ1 item at T5. A detailed overview of this rationale is provided in Appendix H.2. RSA Model 3b was accepted.

Table 6.3

Fit Indices for the Measurement Invariance Models Assessed

Model	**χ^2 (df)**	**CFI**	**RMSEA** (90% CI)	**SR MR**	**Model Comp**	**ΔCFI**	**ΔRM SEA**	**ΔSR MR**	***Loglike-lihood***	***Cor-rect.***	***Free param***	**$\Delta\chi^2$ *(df)***	***Decision***
PEE 1	684.43** (390)	.876	.060 (.05-.07)	.076	--	--	--	--	--	--	--	--	Poor fit-Reject
PEE 1b	464.10** (315)	.937	.048 (.04-.06)	.067	--	--	--	--	-4099.46	1.13	180	--	Accept
PEE 2	482.98** (335)	.938	.046 (.04-.06)	.071	1b	+.001	-.002	+.004	-4108.53	1.14	160	18.05 (20)	Accept
PEE 3	510.02** (355)	.935	.046 (.04-.05)	.071	2	-.003	.00	.00	-4121.73	1.16	140	27.13 (20)	Accept
RSA 1	925.48** (390)	.763	.081 (.08-.09)	.092	--	--	--	--	--	--	--	--	Poor fit-Reject
RSA 1b	522.84** (315)	.908	.056 (.05-.07)	.072	--	--	--	--	--	--	--	--	Review MI
RSA 1c	467.31** (313)	.932	.049 (.04-.06)	.070	--	--	--	--	-4515.26	1.12	182	--	Accept
RSA 2	498.34** (333)	.927	.049 (.04-.06)	.081	1c	-.005	.00	+.011	-4531.80	1.12	162	29.97 (20)	Accept
RSA 3	545.98** (353)	.914	.051 (.04-.06)	.084	2	-.013	+.002	+.003	-4555.69	1.14	142	48.43**(20)	Reject
RSA 3b	523.42** (352)	.924	.049(.05-.06)	.082	3;	+.010;	-.002;	-.002;	-4544.07	1.14	143	--	
					2	-.003	.00	+.001				25.06 (19)	Accept
SD 1	854.59**(390)	.804	.076 (.07-.08)	.089	--	--	--	--	--	--	--	--	Poor fit-Reject
SD 1b	514.65** (315)	.916	.055 (.05-.06)	.067	--	--	--	--	--	--	--	--	Review MI
SD 1c	494.02** (313)	.924	.053 (.04-.06)	.067	--	--	--	--	-4729.73	1.23	182	--	Accept
SD 2	512.54** (333)	.924	.051 (.04-.06)	.074	1b	.00	-.002	+.007	-4739.05	1.26	162	18.22 (20)	Accept
SD 3	542.93** (353)	.920	.051 (.04-.06)	.074	2	-.004	.00	.00	-4754.63	1.29	142	30.38 (20)	Accept

Note. *1 = Configural invariance (uncorrelated errors), 1b = Configural invariance (correlated errors for same item across timepoints), 1c = Configural invariance (additional correlated errors based on modification indices and theoretical considerations), 2 = metric invariance, 3 = scalar invariance, 3b = partial scalar invariance;*

Model comp = model being compared; Correct. = scale correction factor; Review MI = Modification indices reviewed to identify opportunities for improvement

* = $p < 0.05$ **= $p < 0.001$

6.3.5.2 Latent Growth Models – Assessing Burnout Trajectories. Spaghetti plots generated in SPSS using data from a randomly generated 50% of the sample (see Figure 6.1 – 6.3), pointed to variability in the intercept values (T1 score) across participants, and it is somewhat difficult to identify any one trajectory that best explains the change over time. Results of the analysis of trajectories of change are outlined below. The level of measurement invariance supported in the first step of the analysis was retained for all latent growth models; full scalar invariance was specified for PEE and SD, and partial invariance was specified for RSA.

Physical and Emotional Exhaustion. Information relating to model fit is outlined in Table 6.4. Fit indices suggested that all models were an adequate for the data ($\chi^2/df < 3$, $CFI > 0.9$, $RMSEA < 0.6$, $SRMR < 0.1$; Marsh et al., 2004), and each converged on a solution with appropriate parameter estimates, anticipated signs and no warning messages relating to model parameters (Jackson, 2010). As outlined in Table 6.4, the *linear trajectory* (Model 5) was the model of best fit.

The standardised (STDYX) mean slope coefficient in the *linear trajectory* was significant and negative ($\beta = -0.502$, $SE = 0.16$, $p < 0.01$). Significant variance was evident for the slope (B = 0.01, $SE = 0.00$, $p < 0.01$) and intercept (B = 0.25, $SE = 0.04$, $p < 0.001$) factors. The intercept-slope covariance ($\beta = -0.306$, $SE = 0.11$, $p < 0.01$) was significant and negative.

Reduced Sense of Accomplishment. As outlined in Table 6.4, the fit indices suggested each model achieved an acceptable fit ($\chi^2/df < 3$, $CFI > 0.9$, $RMSEA < 0.6$, $SRMR < 0.1$; Marsh et al., 2004). However, while the *intercept* and *linear* models converged on solutions with appropriate parameter estimates, anticipated signs and no warning messages relating to model parameters, it was notable that a warning relating to negative variance for the slope factor for the *quadratic model,* and for the slope1 factor in the *piecewise model* emerged in *Mplus* (Jackson, 2010). Examination of the output indicated that the slope variance was small, negative and non-significant in both cases.

Loglikelihood comparisons revealed that the *linear trajectory* (Model 5) was the model of best fit (see Table 6.4). The STDYX mean slope coefficient was non-significant (β = 0.138, *SE* = 0.15, $p > 0.05$). The intercept (B = 0.346, *SE* = 0.051, $p < 0.001$) and slope variance (B = 0.004, *SE* = 0.002, $p < 0.05$) was significant. The intercept-slope covariance was non-significant (β = -0.197, *SE* = 0.16, $p > 0.05$).

Sport Devaluation. As outlined in Table 6.4, each of the models showed an adequate fit for the data ($\chi^2/df < 3$, $CFI > 0.9$, $RMSEA < 0.6$, $SRMR < 0.1$; Marsh et al., 2004) and all models converged on a solution with appropriate parameter estimates, anticipated signs and no warning messages relating to model parameters (Jackson, 2010). The comparative loglikelihood test indicated that the *linear trajectory* (Model 5) model was the model of best fit (see Table 6.4).

The STDYX mean slope coefficient in the *linear trajectory* was significant and positive (β = 0.387, *SE* = 0.136, $p < 0.01$). The intercept-slope covariance was significant and negative (β = -0.252, *SE* = 0.12, $p < 0.05$). Significant variance associated with the slope (B = 0.003, *SE* = 0.00, $p < 0.01$) and intercept (B = 0.183, *SE* = 0.03, $p < 0.001$) was also identified.

Figures 6.1-6.3. *Spaghetti plots of mean PEE, RSA and SD scores at T1-T6, from a random selection of participants.*

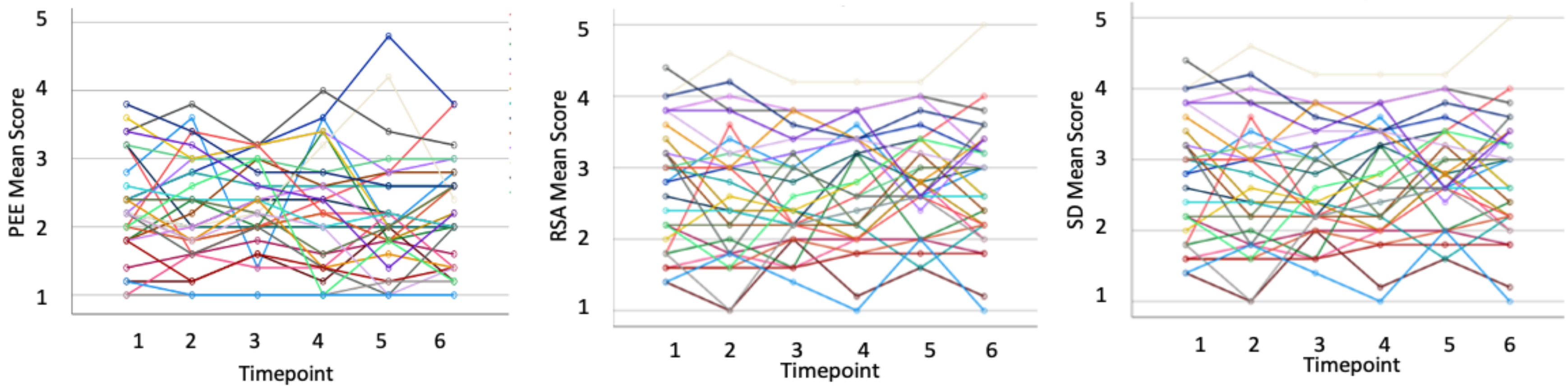


Table 6.4

Fit indices for the LGMs assessed

Dime-nsion	Model	χ^2 (*df*)	CFI	RMSEA [90% CI]	SRMR	*Loglike-lihood*	*Scale Correct.*	*Free param*	*Model compar.*	$\Delta\chi^2$ (*df*)
PEE	4. Intercept Only	562.78^{**} (374)	.920	.049 [.04-.06]	.093	-4150.56	1.17	121	--	--
	5. Linear	535.50^{**}(371)	.931	.046 [.04-.05]	.082	-4136.43	1.16	124	PEE 4	27.10^{**}(3)
	6. Quadratic	528.97^{**} (367)	.932	.046 [.04-.05]	.076	-4132.36	1.17	128	PEE 4	6.30 (4)
	7. Piecewise	527.75^{**} (367)	.932	.046 [.04-.05]	.078	-4131.67	1.17	128	PEE 4	7.37 (4)
RSA	4. Intercept only	548.08^{**} (371)	.922	.048 [.04-.06]	.087	-4557.53	1.15	124	--	--
	5. Linear	539.33^{**} (368)	.924	.047 [.04-.06]	.087	-4553.14	1.15	127	RSA 4	8.60^{*} (3)
	6. Quadratic (warning)	532.41^{**} (364)	.925	.047 [.04-.06]	.083	-4549.17	1.15	131	RSA 4	6.91 (4)
	7. Piecewise (warning)	533.07^{**} (364)	.925	.047 [.04-.06]	.084	-4549.38	1.15	131	RSA 4	6.20 (4)
SD	4. Intercept only	587.10^{**} (372)	.909	.053 [.04-.06]	.080	-4780.06	1.31	123	--	--
	5. Linear	558.72^{**} (369)	.920	.050 [.04-.06]	.079	-4766.22	1.29	126	SD 4	50.26^{**}(3)
	6. Quadratic	549.59^{**} (365)	.922	.049 [.04-.06]	.076	-4759.53	1.30	130	SD 5b	8.12 (4)
	7. Piecewise	550.96^{**} (365)	.921	.050 [.04-.06]	.076	-4759.89	1.31	130	SD 5b	6.99 (4)

***Note*.** Model Compar. = Model Comparison (i.e. model with which the difference test is conducted); * = $p < 0.05$ **= $p < 0.01$

6.4 Discussion

To the researcher's knowledge, this is the first study to track frequency of athlete burnout symptoms in adult athletes at six timepoints across two full athletic seasons. Findings indicate that, on average, frequency of PEE symptoms reduced across the two-year period, while SD increased over time and RSA remained stable. When considered alongside existing research, the increase in feelings of SD and stability in RSA are in line with the trajectories identified in multi-sport youth athletes across three six-month intervals (Lundkvist et al., 2018). Lundkvist et al. (2018) also identified a small linear increase in PEE over time, and while contrasting research on amateur rugby players suggested that exhaustion may in fact decrease and increase at certain stages of the season (Cresswell & Eklund, 2006a), the consistent linear decline in feelings of PEE experienced by this sample is it not in line with either of these trends. As such, results suggests that the risk of SD may increase as the season progresses, while the risk of PEE may be higher early in the season. Notably, the linear nature of the change identified suggested that growth trends continue from one season to the next, rather than being characterised by distinct trends for a season (i.e. a piecewise model). As such, the results largely fail to provide support for substantive concerns around potentially high risk (Duffy, 2015) periods of heightened activity for Gaelic games athletes; although higher PEE early in year 1 (T1) is somewhat in line with this theory, a similar increase was not evident at the corresponding wave in year 2 (T4). Similarly, SD was lower during this period in both seasons compared to the other timepoints.

Across a regular two year period, it is possible that the linear trajectories identified may be explained by the absence of a designated off-season in Gaelic games; as noted previously, Gaelic games activities run across the 12 months of the year and while the data collection waves are broadly categorised as the beginning, middle and end of the season, competitions begin and at different points, with some running from one calendar year to the next. For example, in March 2019 alone a Gaelic games athletes could have been preparing for national finals in the culmination of a collegiate season that began in October 2018, completing pre-season preparation with a club team, and competing in national league competitions at the elite inter-county level. As such, it would be reasonable to think that progressive changes in feeling of burnout would continue over these periods, with no distinct window between the ending of one season and the beginning of the next.

However, the findings of the current study must also be considered in the context of the pandemic and suspension of Gaelic games activity at T4; although the piecewise model did not show an improvement over the linear model, suggesting that change in burnout symptoms was not characterised by different trajectories before and after the onset of the pandemic, it is possible that the continuous decline and increase in PEE and SD respectively was impacted by the suspension period. Although our understanding of the psychological impact of the pandemic on athletes remains somewhat limited, the period can be conceptualised as a longitudinal, unanticipated change event, over which athletes had no control (Samuel et al., 2020). Existing research has highlighted potential negative implications of other unanticipated change events, such as injury (Samuel et al., 2015), while emerging work has indicated that athletes experienced increased negative mood and stress following the COVID-19 outbreak (Aghababa et al., 2021; Fronso et al., 2020). However, the pandemic period could also be viewed as an unprecedented break from the demands of organised sport, allowing for a period of detachment (Balk et al., 2017) which may have been beneficial for some athletes. As such, it is possible that the continued decline in PEE through T4 was a consequence of substantially reduced training demands, while SD may have increased during this period as athletes had an opportunity to re-evaluate their priorities (see Chapter 8). Notwithstanding the specific implications of this period, it cannot be denied that the 2020 season (i.e. T4 to T6) differed somewhat from a regular season for athletes in all sports. Notably, specific exploration of the potential impact of the suspension of sport due to COVID-19 on burnout is outlined in Chapter 8.

While this analysis provides important insight into average trajectories of change, findings also indicated significant inter-individual differences in the intercept and slope values for PEE, RSA and SD, which suggest that athletes varied substantially in both initial frequency of burnout and change in symptom frequency over time (Preacher et al., 2008). This is important insight that provides strong rationale for the exploration of additional predictors of initial burnout and the growth rate over time (Preacher et al., 2008), as will be discussed in Chapter 7. In addition, the variability in the trajectories evident for the different dimensions of burnout again highlights the importance of exploring the multidimensional conceptualisation of burnout, and suggests that, on average, they do not develop in tandem.

6.4.1 Limitations

This analysis is limited by the fact that athletes in this sample generally reported a relatively low frequency of PEE, RSA and SD symptoms across time points. This is a common issue in athlete burnout research, as athletes who are most burnt out may no longer be participating (Gustafsson et al., 2017). Notably, we did work to ensure that athletes who dropped out of Gaelic games were retained in the sample, with the hope of tracking athletes across the full trajectory of burnout. Findings from the second year of data collection (i.e. T4 onwards) should also be considered in the context of the pandemic, while the trajectories identified may not be generalizable beyond Gaelic games.

6.4.2 Conclusions and Implications for the Thesis

Overall, this analysis provides important insight into the development of burnout symptoms over time; results suggests that the risk of SD may increase as the season progresses, while the risk of PEE may be higher early in the season. RSA remained stable across time points, suggesting that this symptom of burnout is not impacted by time. Furthermore, the beginning of the new season (i.e. T4) did not see a reset in burnout symptom frequency, with average trajectories instead continuing linearly from one season to the next. Importantly, the finding that athletes differ significantly in terms of initial burnout and rate of change highlights the need for exploration of predictors of burnout beyond time in the season. As such, in the context of thesis more broadly, the identification of the average trajectory of change in burnout and the level of variability across individuals are essential steps in the overarching analysis exploring predictors of change, and form the basis of the more complex conditional growth modelling in Chapter 7.

Chap 7. Longitudinal Exploration of Factors Predicting Change in Burnout Symptom Frequency over Time

7.1 Introduction

This chapter focuses on the final stage of the longitudinal analysis, wherein predictors were incorporated into conditional latent growth models (LGMs) to assess their impact on changes in burnout symptoms over time. This chapter begins with an outline of analysis rationale, followed by an overview of the methods employed and the results of the analysis.

7.2 Analysis Rationale

As discussed in-depth throughout the preceding chapters, substantial debate has existed in relation to the key predictors of athlete burnout dimensions. Furthermore, the systematic review (Chapter 2) highlighted that existing research has explored associations between athlete burnout and a range of different factors, with a 'scattergun approach' evident (Goodger et al., 2007). Consequently, this programme of research has included a concerted effort to pinpoint potentially key predictors of burnout in Gaelic games players. These efforts have centred on exploring the utility of core constructs associated with existing theoretical perspectives of burnout (Chapter 5), and additional demographic or sport-specific characteristics that may impact the risk of burnout among Gaelic games athletes (Chapter 4). The full list of predictors of burnout identified in preceding chapters is provided in Table 7.1. Notably, findings from these analyses indicate that, in line with the existing theoretical perspectives discussed in Chapter 1, key variables associated with stress, commitment, and motivation significantly impacted burnout dimensions at T1, thus supporting the idea that each of these perspectives can contribute to our understanding of burnout in Gaelic games.

Importantly, while the preceding analyses (Chapter 4 and Chapter 5) highlight a range of key factors linked to symptoms of burnout, extending this work to an integrated analysis can provide further insight into whether these approaches are complementary. As discussed in Chapter 1, such an integrated approach was suggested by Gustafsson et al. (2011) with a view to improving the conceptual understanding of burnout, and is also in line with recommendations for the use of multiple theories in instances where one alone cannot adequately address the research question (Mayer & Sparrowe, 2013). However, a number of shortcomings of Gustafsson et al.'s (2011) integrated model were highlighted in Chapter 1. In particular, the model components were largely informed by Goodger et al.'s (2007) systematic review, which included predominantly cross-sectional studies, as well as a number of qualitative studies and studies utilising proxy measures of burnout (e.g. RESTQ-Sport; Kellman & Kallus, 2001). As such, there appears to be somewhat limited support for some of these model components, as well as for the delineation of variables into the distinct antecedent, early-signs and maintenance categories suggested (Gustafsson et al., 2011). In addition, the complexity of this integrated model has been suggested as a reason for its limited impact on the empirical research (De Francisco et al., 2022).

However, it is important to note that this integrated model was intended as a guide for future research, and the authors acknowledge that, while some features have strong empirical support, others were more tentatively included (Gustafsson et al., 2011). As such, focusing on components of the model can be useful in informing empirical research in practice, and the work provides a conceptual framework and rationale for the integration of multiple perspectives. A limited number of existing studies (Appleby et al., 2018; Russell, 2021; Schellenberg et al., 2013; Smith et al., 2010) have employed this integrated approach, examining the effects of a small number of variables from different theoretical perspectives. Notably, the inclusion of stressors (e.g. training demands), feelings of entrapment, motivation and motivational climate amongst other predictors, as key factors in the development of burnout (Gustafsson et al., 2011) is in line with the findings from Chapter 5.

However, Chapter 4 also highlighted the importance of considering demographic and sport-specific characteristics in the context of burnout, including characteristics such as age, starting status and playing level. The complex relationship between playing level and burnout is especially interesting; findings indicated that playing at the elite (intercounty) level significantly predicted higher levels of PEE, but reduced RSA and SD. The apparent protective effect of elite status is in contrast to the prevailing assumption that burnout is an issue of greater concern among elite athletes (Bicalho & Costa, 2018; Casper & Andrew, 2008; Gustafsson et al., 2011). This assumption is largely based on idea that characteristics of elite sport, which can include increased training demands, competition (Swann et al., 2015) and stress (Lin et al., 2021; Reeves et al., 2009) may place these athletes at a greater risk of burnout (Bicalho & Costa, 2018; Gustafsson et al., 2011). However, contrastingly, research also suggests that elite athletes tend to view adversity as part of their sporting journey (Tamminen et al., 2013), have better coping skills (Tamminen & Holt, 2010), and show greater levels of mental toughness characterised by increased self-belief, intrinsically driven motivation and commitment (Weissensteiner et al., 2012). To the best of the researcher's knowledge, the mechanisms impacting the risk and protective effects of elite-level sport compared to non-elite sport have not been empirically examined. As such, this mixed effect of playing level on burnout in the current sample warrants further exploration.

Importantly, while working to integrate the relationships identified across models can contribute substantially to our understanding of factors associated with burnout, it is also essential to extend cross-sectional work to consider risk and protective factors in line with the conceptualisation of burnout as an enduring syndrome. Longitudinal studies, and in-particular longitudinal growth modelling, allow for the identification of factors that predict and protect against the development, or growth, of burnout symptom frequency over time (Preacher et al., 2008). As evidenced in the systematic review (Chapter 2), longitudinal research exploring predictors of athlete burnout remains comparatively limited when reviewed alongside cross-sectional work. In addition, much of this work has assessed temporal relationships between predictors and burnout, for example, identifying stressors, social support and amotivated regulation at early stages in the season as significant predictors of burnout dimensions later on in the year (Cresswell, 2009; Fagundes et al., 2021), rather than exploring predictors of change in burnout. Examination of predictors of change provides better insight into the temporal nature of the relationship of interest (Preacher et al., 2009).

More recently, growth modelling and similar multi-levelling modelling approaches have been employed to great effect in the burnout literature. Assessing age and gender differences in the development of burnout, Isoard-Gautheur et al. (2015) found that girls showed a higher frequency of RSA and a steeper increase in SD as they aged (Isoard-Gautheur et al., 2015), with different rates of growth also identified for athletes in different developmental age cohorts (Isoard-Gautheur et al., 2015). In addition, beyond demographic factors, support for the integration of the stress and motivation-based perspectives was evident in work by DeFreese and Smith (2014), which showed that self-determined motivation and perceived stress were significant negative and positive predictors respectively of change in burnout (DeFreese & Smith, 2014), and Bentzen et al. (2016) who identified changes in demands and self-determined motivation as predictors of changes in burnout in coaches. In addition, Madigan et al. (2020) identified an avoidant coping style as a positive predictor of change in burnout. Commitment and stress-related factors have been identified as predictors of change in job and academic burnout (Lee et al., 2021; Lizano & Mor Barak, 2012; Parviainen et al., 2021).

Notably, beyond the work outlined above, existing longitudinal work exploring central components of the stress, motivation and commitment perspectives of change in burnout remains relatively limited, while, to the researcher's knowledge, an approach integrating core concepts from across all three perspectives and considering demographic and sport-specific characteristics has yet to be undertaken. In addition, excluding the work on the role of age and gender (Isoard-Gautheur et al., 2015), the longitudinal research assessing predictors of burnout have tracked burnout over relatively short periods (≈ 3 – 6 months; DeFreese & Smith, 2014; Madigan et al., 2020), and calls remain for exploration of key predictors of the development of athlete burnout over more substantial windows of time (Madigan et al., 2020). Importantly, in the context of this thesis, significant inter-individual variability in intercept and slope values identified in the growth models for PEE, RSA and SD (Chapter 6) provides strong justification for the addition of additional predictors to explain this variation (Byrne & Crombie, 2003).

In line with the rationale outlined above, the aim of this chapter was to explore how stress, motivation and commitment variables, in addition to demographic and sport-specific characteristics, predict and protect against changes in burnout over time. In addition, with a view to identifying the mechanisms that may underly the seemingly contrasting impact of elite-level participation on the risk of different burnout symptoms (Chapter 4), stress, motivation and commitment-related variables associated with burnout were compared across elite and non-elite athletes. Importantly, following the precedent set by Gustafsson et al. (2011), variables from across competing perspectives were incorporated into a single conceptual model. Finally, capturing the multi-dimensional conceptualisation of burnout (Raedeke, 1997), separate models were estimated for PEE, RSA and SD. These analyses may have important implications for development of intervention and prevention methods, for example by identifying the variables that could be targeted to produce the most substantial reduction in symptoms of PEE, RSA and SD, or identifying athletes that may be at increased risk of experiencing burnout symptoms.

7.2.1 Aims and Objectives.

The aim of this longitudinal analysis was to identify the determinants of initial frequency and change in PEE, RSA and SD symptoms reported by Gaelic games players over a 20-month period. Specifically, the analysis objective was as follows;

1. To assess the fit of conditional growth models incorporating predictors of burnout identified in the cross-sectional analyses as predictors of change in PEE, RSA and SD over time.
2. To use a backwards elimination approach to develop a parsimonious model of key predictors of change in PEE, RSA and SD.
3. To identify significant predictors of initial levels and rate of change in PEE, RSA and SD over a 20 month period.

Variables included across analyses and relevant hypotheses are outlined in Table 7.1

7.3 Methods

7.3.1 Analysis Overview

A conditional growth modelling approach was utilised to identify the factors that predict and protect against the development of PEE, RSA and SD over time (Preacher et al., 2008). Specifically, significant predictors of PEE, RSA and SD identified in the preceding analyses were incorporated into the growth models identified in Chapter 6 (Duncan & Duncan, 2004, 2009). This section will outline the selection of candidate variables considered for inclusion across the models, preliminary analyses of predictor variables, and details of model specification and variable selection methods employed.

7.3.2 Participant Eligibility

In line with the eligibility criteria for participation in this project, all participants were required to be aged 18 or over at the first time-point of data collection (March, 2019) and playing Gaelic games. In addition, and as specified for the unconditional LGM analyses in Chapter 6, participants who participated at T1 only were excluded from this analysis. Finally, participants who were excluded from the unconditional LGM analyses as outliers were also excluded from this phase of the analysis. As such, the sample for this analysis consisted of 207 athletes.

7.3.3 Materials relevant to this analysis

Burnout was assessed using the ABQ (Raedeke & Smith, 2001). In addition, this analysis incorporates data from the potential predictors of burnout assessed across timepoints, including perceived stress (PSS-10; Cohen et al., 1994), sport commitment (SCQ-2; Scanlan et al., 2016), sport motivation (SMS-II; Pelletier et al., 2013) and motivation climate (PMCSQ-2; Newton et al., 2000), in addition to questions on demographic and sport-specific characteristics, including age, gender, sport, playing level, weekly training hours, weekly additional hours committed to sport, training missed due to injury over the preceding three months, and whether the participant was a regular starter on their team or not. Additional details on these measures are included in Chapter 3.

7.3.4 Considerations and Preparation for Conditional LGM Analyses

7.3.4.1 Handling of Repeated-Measure Predictors. Tracking predictors over time can provide useful insight into athletes' experiences across the two athletic seasons. However, incorporating multiple repeated-measures predictors into a model is complex, and can be achieved using a range of different methods (e.g. use of all measurements, single "best" measurement, a summary mean, change scores, growth curve parameters), with different methods considered appropriate for different situations (Welten et al., 2018). To this end, key considerations for decision-making include *the hypothesized association between predictor and outcome*, the *available data*, and the *requirements of the prediction model for use in practice* (Welten et al., 2018). As such, these are the considerations that informed that treatment of repeated measure predictors in this analysis.

Focusing on the *hypothesized association between predictor and outcome*, the theoretical perspectives of burnout discussed previously (Chapter 1) suggest that burnout occurs as a consequence of chronic or sustained exposure to, or experience of, stress (Smith, 1986), feelings of constrained commitment (Raedeke, 1997a), externally driven or absent motivation (Deci & Ryan, 2008), and a EO climate (Ames, 1995).

Considering the *available data*, as noted in Chapter 6 and outlined in section 7.4.1 below, missing data was evident in this study in the form of participant non-response or dropout across the two-year data collection period, as is commonly the case in longitudinal studies (Graham, 2009). Notably, missing data precludes the use of some methods for handling repeated measures data, such as the use of all measurements or calculations of change scores, unless imputation is used (Welten et al., 2018). In addition, missingness is not allowed for predictors in *Mplus*, and can be modelled using imputation only if predictors are incorporated into the model and meet distributional assumptions, such as the assumption of normality (Muthén & Muthén, 1998). Furthermore, where the number of timepoints and predictors are substantial, the use of all measurements may create unfeasible computational costs (Welten et al., 2018), and can be problematic due to the likelihood of high correlations among repeated measures (Chen et al., 2015). Finally, where the aim is for a model to be *useful in practice* (Welten et al., 2018), parsimony and accessibility is preferable (Chowdhury & Turin, 2020).

Considering the issues of model complexity, computational cost and missing data discussed above alongside the preliminary results for this data (Section 7.4.1), the use of all measurements, change scores between measurements, or conditional measurements was not deemed to be appropriate in this study. Focusing on methods that involve a single score for each predictor, neither the growth curve parameter method nor the single "best" method were viewed as optimal, as the aim was not to model the impact of change in predictors on burnout, nor the impact of single flash point of, for example, stress or amotivation. In addition, the use of a single time-point measure does not allow for the incorporation of all data gathered (Welten et al., 2018). In contrast, the use of average scores provides insight into the sustained impact of predictors, in line with the theoretical conceptualisation outlined above, and ensures that all data gathered is incorporated into the model. Furthermore, although the use of mean scores results in the loss of information on temporal variation of the predictor, it can also be viewed as a useful step in summarizing the longitudinal information into one measure and is particularly appropriate when there is no particular trend in the predictor or the trends over time are similar for subjects (Chen et al., 2015).

Preliminary analyses were conducted to assess missing data and stability in predictor scores across timepoints, using descriptive statistics, repeated-measures ANOVAs and Friedman's non-parametric tests where appropriate. The results of these preliminary analyses, as discussed below, and the key considerations outlined above, informed the decision to incorporate average scores as predictors in the conditional LGMs for the subscales of the PSS-10, SMS-II, SCQ-2, PMCQS-2, *training hours* and *other hours*.

7.3.4.2. Candidate variable selection. The process of choosing among many variables and deciding which to include in a particular model can be one of the most difficult aspects of model building (Chowdhury & Turin, 2020). Where the number of candidate predictors for a model is likely too large to allow for meaningful interpretation or reliable prediction, background information is recognised as an important tool in helping to separate out truly predictive variables from non-predictive variables (Hafermann et al., 2021), and can be based on existing studies that identified predictors of the outcome under study in the same population (Walter & Tiemeier, 2009). For example, King et al. (2009) selected predictors for inclusion in their longitudinal model based on findings from a single time-point study of the same variables (King et al., 2009). In a series of simulation studies of variable selection based on existing knowledge, Hafermann et al. (2021) found that including variables based on results from one study performed the best with respect to the correct identification of true predictors, but also resulted in the highest selection of non-predictor variables when compared to selection based on results in two or three studies. However, a critical lens is recommended when reviewing existing work, with warnings against reliance on evidence which may be insufficient or based on results from few or weak preceding studies (Hafermann et al., 2021).

Considering the different subscales and demographic questions included across timepoints in this programme of research, twenty-four different variables were assessed as potential predictors of burnout (See Table 7.1). As such, with an aim of narrowing the focus of this analysis to potentially key predictors of each burnout dimension, but equally taking a more liberal approach to avoid removing potentially influential predictors, candidate variables for inclusion as predictors in the conditional LGM were identified based on existing knowledge that was generated through the cross-sectional analyses (Chapters 4 and 5), and the knowledge base that was explored through the systematic review (Chapter 2). Specifically, variables that were significant direct predictors of a dimension of burnout in the cross-sectional analyses and/or showed a strong relationship with burnout in the WMA (Chapter 2) were eligible for inclusion in the conditional LGM, while predictors that showed no significant direct relationship with burnout dimensions in the cross-sectional analyses or in the WMA of existing literature were excluded. Under these criteria, substantial weight was given to the results of the initial phases of this study as they represent existing relationships in this sample. In addition, consideration of the WMA results helped to ensure that any decisions were informed by sufficient evidence from good quality studies (Chapter 2) (Hafermann et al., 2021).

The decision was also taken to incorporate variables that emerged as direct predictors of burnout only, thus excluding indirect-only relationships identified in the SEM (Chapter 5). This was a necessary a priori decision with a view to achieving a parsimonious model and avoiding issues with model non-identification (Muthén & Muthén, 1998). However, where multiple predictors from a hierarchical model were eligible for inclusion, both direct and indirect relationships were specified in line with hypothesised theoretical models outlined in Chapter 5. For example, if both *EO climate* and *amotivated regulation* were included in a model, the indirect effect of *EO climate* on burnout through *amotivated regulation* would also be specified, as per Figure 5.3.

Table 7.1 below outlines the rationale for the inclusion and exclusion of candidate variables in conditional models of PEE, RSA and SD. The inclusion of *intrinsic regulation* in the RSA provides an example of the more liberal approach taken; although the variable was a non-significant predictor of RSA in the SEM (Chapter 5), it was included in the contingent LGM based on a significant relationship evident in the WMA. In addition, as *social support (informational)* and *social support (emotional)* were considered to be eligible for inclusion across models based on the impact of overarching *social support* variable identified in the WMA, a decision was taken to combine the subscales into a single *social support*[4] variable.

Finally, although it did not emerge as significant in multiple regression or the WMA, gender was included in all models, with a view to exploring whether gender differences identified in the development of athlete burnout in adolescent athletes (Isoard-Gautheur et al., 2015) are also evident in an adult sample.

Table 7.1 specifies the direction of the hypothesised relationship between each variable and the relevant dimension(s) of burnout.

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[4] Importantly, these subscales are conceptualised as subtypes of social support more broadly, and refer to different sources of support, rather than opposing or conflicting concepts of support (Scanlan et al., 2016). The fact that both variables show the same relationship with the dimensions of burnout and the other predictor variables in the current sample, in terms of direction and significance, provides further support for the integration of these subscales. In addition, the variables are relatively highly correlated (r_s = 0.54).

Table 7.1

Overview of rationale for selection of candidate variables and the hypothesised relationship with burnout

Variable	PEE Model		RSA Model		SD Model	
	Decision	*Rationale (hypothesis)*	*Decision*	*Rationale (hypothesis)*	*Decision*	*Rationale (hypothesis)*
Stress perspective						
Perceived Stress	**Included**	Sig. predictor in SEM (+)	**Included**	Sig predictor in SEM (+)	**Included**	Sig predictor in SEM (+)
Training Hours	**Included**	Sig. predictor in SEM (+)	Excluded	Non-sig in SEM; insuff for WMA	**Included**	Sig. predictor in SEM (-)
Additional Hours	Excluded	Non-sig. in SEM; insuff WMA	Excluded	Non-sig in SEM; insuff for WMA	Excluded	Non-sig in SEM; insuff for WMA
Number of teams	Excluded	Non-sig in SEM; insuff WMA	Excluded	Non-sig in SEM; insuff for WMA	**Included**	Sig. predictor in SEM (-)
Commitment perspective						
Enthusiastic Com.	Excluded	Non-sig. SEM; insuff. for WMA	**Included**	Sig predictor in SEM (+)	**Included**	Sig predictor in SEM (-)
Constrained Com.	**Included**	Sig. predictor in SEM (+)	**Included**	Sig predictor in SEM (+)	**Included**	Sig predictor in SEM (+)
Enjoyment	Excluded	Non-sig. SEM; insuff. for WMA	**Included**	Sig predictor in SEM (-)	Excluded	Non-sig. SEM; insuff. for WMA
Other Priorities	Excluded	Non-sig. SEM; insuff. for WMA	Excluded	Non-sig. SEM; insuff. for WMA	Excluded	Non-sig. SEM; insuff. for WMA
Social Constraints	Excluded	Non-sig. SEM; insuff. for WMA	Excluded	Non-sig. SEM; insuff. for WMA	Excluded	Non-sig. SEM; insuff. for WMA
Investment-Loss	Excluded	Non-sig. SEM; insuff. for WMA	Excluded	Non-sig. SEM; insuff. for WMA	Excluded	Non-sig. SEM; insuff. for WMA
Invest-Quantity	**Included**	Sig. predictor in SEM (+)	Excluded	Non-sig. SEM; insuff. for WMA	Excluded	Non-sig. SEM; insuff. for WMA
Social Supp-Inform	Excluded	Non-sig. SEM; SS[1] sig WMA(-)	Excluded	Non-sig. SEM; SS[1] sig WMA(-)	Excluded	Non-sig. SEM; SS[1] sig WMA(-)
Social Supp-Emot	Excluded	Non-sig. SEM; SS[1] sig WMA(-)	Excluded	Non-sig. SEM; SS[1] sig WMA(-)	Excluded	Non-sig. SEM; SS[1] sig WMA(-)
DtE-Mastery Achi.	Excluded	Non-sig. SEM; insuff. for WMA	Excluded	Non-sig. SEM; insuff. for WMA	**Included**	Sig. predictor in SEM (-)
Motivation perspective						
Ego Climate	**Included**	Sig. predictor in SEM (+); Sig. relation w/ TB in WMA (+)	**Included**	Non-sig. direct predictor in SEM; Sig. relation w/ TB in WMA (+)	**Included**	Sig. predictor in SEM (-); Sig. predictor of TB in WMA (+)
Task Climate	Excluded	Non-sig. SEM; Non-sig. w/TB in WMA	Excluded	Non-sig. SEM; Non-sig. w/TB in WMA	Excluded	Non-sig. SEM; Non-sig. w/TB in WMA
Intrinsic Regulation	Excluded	Non-sig. SEM; insuff. for WMA	**Included**	Non-sig. SEM; Sig. WMA (-)	**Included**	Sig. predictor in SEM (-)
External Regulation	**Included**	Sig. SEM (+); Non-sig. WMA	Excluded	Non-sig. SEM; insuff. for WMA	**Included**	Sig. SEM (+); Non-sig. WMA
Amotivated Regul.	**Included**	Sig. SEM (+); Sig. WMA (+)	**Included**	Sig. SEM (+); Sig. in WMA (+)	**Included**	Sig. SEM (+); Sig. WMA (+)
Demographic & Sport Charact.						
Gender	**Included**	Non-sig MR; insuff for WMA(0)	**Included**	Non-sig MR; insuff for WMA(0)	**Included**	Non-sig MR; insuff for WMA(0)
Age	**Included**	Sig. predictor in MR (-)	**Included**	Sig. predictor in MR (-)	**Excluded**	Non-sig in MR; insuff for WMA
Starting status	Excluded	Non-sig predictor in MR	**Included**	Sig. predictor in MR (-)	Excluded	Non-sig predictor in MR
Playing level	**Included**	Sig predictor in MR (+)	**Included**	Sig predictor in MR (-)	**Included**	Sig. predictor in MR (-)
Absence for injury	Excluded	Non-sig in MR; insuff for WMA	Excluded	Non-sig in MR; insuff for WMA	Excluded	Non-sig in MR; insuff for WMA

Note: *Sig./Non-sig predictor in SEM/MR* = variable emerged as a significant/non-significant direct predictor of this burnout dimension in the SEM or MR analyses (Chapter 4, 5); +/- indicates both the direction of the relationship identified in previous analysis, and the hypothesised direction of the variable in this analysis on the intercept and slope factor; 0 indicates exploratory analysis, with no specific hypothesis. *Sig/Non-sig WMA* = variable showed a significant/non-significant relationship with the burnout dimension in the WMA (Chapter 2); *Insuff for WMA* = variable was not included in the WMA due insufficient evidence; SS[1] = general social support identified in the WMA (not specific to inform/emot)

Indirect effects. Relevant indirect effects identified through the SEM analysis (Chapter 4) and included in the analysis are outlined in Table 7.2 below. The hypothesised impact of these indirect effects is also outlined in Table 7.2.

Table 7.2.

Overview of the interaction effects, relevant rationale and hypotheses.

Burnout Model	Indirect Effect to I and S	Rationale
PEE, SD	EO climate through External Regulation (+)	SEM analysis supported the following relationships; EO → PEE, SD (+) EO → External Regulation (+) External Regulation → PEE, SD (+) EO → External regulation → PEE, SD (+)
PEE, RSA, SD	EO climate through Amotivated Regulation (+)	SEM analysis supported the following relationships; EO → PEE, RSA, SD (+) EO → Amotivated Regulation (+) Amotivated Regulation → PEE, RSA, SD (+) EO → Amotivated regulation → PEE, RSA, SD (+)
RSA, SD	Enthusiastic Commitment through Enjoyment (-)	SEM analysis supported the following relationships; Enjoyment → PEE, RSA, SD (-) Enjoyment → Enthusiastic Commitment (+) Enthusiastic Commitment → RSA, SD (-) Enjoy. → Enthusiastic Com. → RSA, SD (-)
RSA	Constrained Commitment through Enjoyment (-)	SEM analysis supported the following relationships; Enjoyment → PEE, RSA, SD (+) Enjoyment → Constrained Commitment (-) Constrained Commitment → RSA, SD (+) Enjoy. → Constrained Com. → RSA, SD (-)
SD	Desire to Excel (mastery) through Enthusiastic Commitment (-)	SEM analysis supported the following relationships; Desire to Excel (mastery) → SD (-) Enthusiastic Commitment → SD (-)

Note. +/- specifies the direction of hypothesised relationship with I and S (column two), and direction of the relationship that emerged in the previous SEM analyses (column 3).

Playing Level. In addition, with a view to understanding the mechanisms through which *playing level* may impact burnout, preliminary tests were conducted to assess whether *playing level* was associated with differences on continuous predictors. Specific details of these analyses are outlined in the preliminary analyses section. It was hypothesised that elite athletes would report significantly higher *training hours* and *number of teams* due to the substantial demands associated with inter-county Gaelic games (Kelly et al., 2018) and the requirement for these athletes to represent their club team in addition to their county. Examination of differences across psychological constructs was exploratory, due to the dearth of research comparing elite and amateur athletes. Where significant group differences were identified, the categorical variable was specified as a predictor of the relevant continuous predictor, and the direct and indirect effect of the categorical predictor was assessed (Szczygiel, 2020). For example, where a significant difference in *training hours* was evident between elite and non-elite athletes, *playing level* at T1 was specified as a predictor of average *training hours*, and an indirect path from *playing level* to I and S through *training hours* was specified in addition to the direct paths.

7.3.5 Preliminary Screening of Longitudinal Data

Preliminary analyses were conducted to explore the data gathered across time-points, including descriptive statistics and analysis of correlations and the pattern of missingness (Yang & Shoptaw, 2005). Preliminary analyses were conducted to assess stability in responses for athletes who had completed all time-points, using repeated-measures ANOVAs and Friedman's non-parametric tests where appropriate.

7.3.6 Preparation and Preliminary Analyses of Candidate Predictor Variables

Average scores for candidate predictors were calculated using SPSS, such that each participant's average was specific to the number of responses provided. That is, where a participant provided answers at all six time-points, their score was an average of all six, compared to an average of five scores for those who completed five time-points, and so on.

Preliminary analyses were conducted to identify the mean, standard deviation and distribution of averaged scores. Missing data analysis was not necessary, as there was no missingness on averaged scores. Multicollinearity among candidate predictors was also assessed by examining the correlation matrix and assessing tolerance and VIF values, tolerance < 0.1 and VIF > 10 indicative of multicollinearity (Neys, 2017).

Multicollinearity can substantially impact parameter estimates, increases the likelihood of Type II errors, and can lead to and underestimation of R^2 (Neys, 2017).

The researcher planned to employ t-tests or appropriate non-parametric tests to assess whether average scores on stress (*perceived stress, training hours, number of teams)*, commitment *(enthusiastic commitment, constrained commitment, enjoyment, perceived investment-quantity, desire to excel – mastery, social support)* and motivation-related (*EO climate, intrinsic, external* and *amotivated regulation)* variables differed for elite compared to non-elite athletes.

7.3.7 Conditional LGM Analysis

7.3.7.1 Model Specification. The relevant candidate predictors for each burnout dimension (see Table 7.1) were included as time-invariant predictors of the latent slope and intercept factors, as per the unconditional models outlined in Chapter 6. The integrated models and the hypothesised pathways for the conditional PEE, RSA and SD models are outlined in Figures 7.1 – 7.3. Predictors were treated as time-invariant (Preacher et al., 2008) in this analysis, in line with the aim of assessing the impact of the average predictor score across time-points on the growth factor, and with a view to avoiding potential identification issues as discussed above.

To assess the utility of predictors in accounting for inter-individual differences in initial burnout and rate of change over time, all predictors were regressed on the intercept (I) and the slope (S), and I and S were allowed to co-vary (Preacher et al., 2008). While the main aim of this analysis was to explore these variables as predictors of inter-individual differences change over time (i.e. their impact on S), they are also associated with burnout at T1 (as identified in Chapter 5), and therefore their impact on I should also be accounted for. In addition, in contrast to the analyses reported in Chapter 5, these analyses involve the integration of core components from multiple perspectives of burnout, and thus allows for the exploration of their utility when considered in a single model.

As noted previously, where variables from a higher-order model were included, the relevant indirect effect was also specified. For example, *enjoyment* and *enthusiastic commitment* both directly predicted RSA at T1, and thus were eligible for inclusion in the model. However, *enjoyment* was also specified as a predictor of *enthusiastic commitment,* in line with the hierarchical SCM model (Scanlan et al., 2016; see Chapter 5; see Figure 7.2). With a view to accounting for potential shared variance among predictors (Bailey & Russell, 2010), continuous variables that showed significant correlations in preliminary analyses were allowed to covary in the PEE and RSA models, and those with correlation $r/r_s > .2$ (Akoglu, 2018; Schober et al., 2018) were allowed to covary in the SD model (see Table 7.4). This more restrictive approach was taken with the SD model with a view to avoiding potential identification issues (Muthén & Muthén, 1998), as more variables were eligible for inclusion in this model than either the PEE or RSA models (Table 7.1)

Finally, with a view to understanding the mechanisms through which playing level may impact burnout, where significant differences in stress, motivation and commitment-based variables were identified in elite versus non-elite athletes, T1 *playing level* was specified as a predictor of the relevant continuous predictor, and the direct and indirect effects of the categorical predictor were assessed (Szczygiel, 2020). For example, where a significant difference in *training hours* was evident between elite and non-elite athletes, *playing level* at T1 was specified as a predictor of average *training hours*, and an indirect path from *playing level* to I and S through *training hours* was specified in addition to the direct paths. As such, the specific structure of the models to be tested is outlined after the results of these initial analyses (see Figure 7.1 – 7.3 below).

All continuous variables were centred to facilitate interpretation (Schielzeth, 2010), and the following indices were considered to be indicative of acceptable fit; χ^2/df < 3, CFI > 0.9, RMSEA < 0.6, SRMR < 0.1 (Marsh et al., 2004).

7.3.7.2 Backwards Variable Elimination. Following the identification of candidate variables for inclusion in the initial model, variable selection methods were specified to facilitate the process of working towards a final, parsimonious conditional LGM for PEE, RSA and SD. The aim of variable selection is to determine the set of variables that contribute to the best-fitting model, thus facilitating accurate predictions (Chowdhury & Turin, 2020). Backwards elimination is a formal variable selection method wherein all candidate variables are included in the model at the first step, and variables are deleted at each subsequent step until only those considered to be contributing to the model remain (Chowdhury & Turin, 2020). Backwards elimination is more commonly favoured over forward selection as it specifies the unbiased global model, and, as such, this method was employed in the current analysis (Heinze et al., 2018).

In line with recommendations (Chowdhury & Turin, 2020), the decision to remove variables from the model was based on selection criteria and a stopping rule was specified a-priori; at each step, the variable with the highest *p*-value as a predictor of I or S was removed, and the point at which the removal of any of the remaining variables resulted in an increase in Akaike's Information Criterion (*AIC*) was specified as the stopping point (Heinze et al., 2018). *AIC* attempts to estimate information loss relative to other candidate models, and balances both under-fitting and over-fitting, and a lower value is indicative of a model that has a better balance of simplicity and adequacy, and has less information loss (Bozdogan, 1987). Specifying an increase in *AIC* as the stopping point effectively corresponds with a significance-based stopping point of $p \approx 0.157$ (Heinze et al., 2018). Although above more traditional cut-offs (e.g. 0.05), retaining variables at this higher *p*-value is in line with recommendations in the literature, and helps to ensure that variables of practical importance are not missed (Chowdhury & Turin, 2020). While variables above this cut-off were retained, significant contributions to the model were identified at the $p < .05$ level.

7.4 Results

7.4.1. Preliminary Analyses of Predictors across Timepoints

7.4.1.1 Missingness and Tests of Normality. Descriptive statistics relating to the data gathered across time-points are outlined in Table 7.3. Percentage missingness on subscales across time-point was as follows; T1 = 0%, T2 = 20.8%, T3 = 33.3%, T4 = 47.8%, T5 = 54.4%, T6 = 59.4%. Non-significant Kolmogorov-Smirnov and Shapiro-Wilk tests indicated that data from the PMCSQ-2 *performance orientated* subscale were normally distributed at all time-points, while the PSS data were normally distributed at T1, T3, T4, T5 and T6. Histograms indicated the *intrinsic regulation* and *social support (informational)* data also approximated the normal curve. The remaining subscales showed a non-normal distribution across timepoints. As outlined previously, unlike the use of all repeated measurements or calculations of change scores between measurements, the use of average scores can handle missing data (Welten et al., 2018). In addition, imputation must be used to handle missingness for predictors in *Mplus*, and in such cases, the data is assumed to meet the assumption of normality (Muthén & Muthén, 1998). As such, these results provide support for the use of average scores.

7.4.1.2 Correlations between Repeated Measures. To provide an overview of correlations between repeated measures of the specific candidate variables across time-points, the highest and lowest correlation between time-points (i.e. the range of correlations) is reported in Table 7.3. Where data showed non-normality, Spearman's rho correlation coefficients were examined in place of Pearson's correlation for these variables (Schober et al., 2018). A number of high correlations ($r > .80$) are evident, suggesting multicollinearity may be in an issue with repeated measures (Neys, 2017). As such, findings again provide support for the use of average scores.

7.4.1.3 Mean Comparisons of Scores Across Timepoints. Repeated-measures (RM) ANOVAs and Friedman's non-parametric tests were used to assess the stability of scores on candidate variables across timepoints for participants who responded on all occasions ($n = 60$). A RM ANOVA indicated no significant difference across time-points for scores on the PSS ($F(5, 330) = 1.374$, $p > .05$, $\eta^2 = .02$) and, while significant differences were identified for *EO climate* ($F(5, 295) = 2.683$, $p < .05$, $\eta^2 = .04$), the effect size was very small and no significant differences between time-points were identified in follow-up pairwise comparisons. Friedman's non-parametric tests indicated no significant differences on *constrained commitment* ($\chi^2(5) = 8.43$, $p > .05$), *enjoyment* ($\chi^2(5) = 2.50$, $p > .05$) or *intrinsic regulation* ($\chi^2(5) = 9.87$, $p > .05$) across time-points. Significant differences across time-points were identified for *training hours* ($\chi^2(5) = 100.96$, $p < .001$), *other hours* ($\chi^2(5) = 95.93$, $p < .001$), *enthusiastic commitment* ($\chi^2(5) = 49.04$, $p < .001$), *desire to excel – mastery achievement* ($\chi^2(5) = 18.67$, $p < .05$), *external regulation* ($\chi^2(5) = 13.11$, $p < .05$), and *amotivated regulation* ($\chi^2(5) = 11.96$, $p < .001$).

Table 7.3

Descriptive information and repeated measure correlation range for predictors across timepoints

Variables	T1			T2			T3			T4			T5			T6			Correlation range
	N	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	r/r_s
Weekly training hours	207	6.40	*3.38*	182	5.65	*3.15*	145	4.96	*3.81*	114	5.67	*3.37*	99	5.56	*3.12*	88	2.85	*4.83*	$.29_s^{**}$- $.61_s^{**}$
Number of teams	207	2.06	*1.26*	178	1.84	*1.13*	144	1.88	*1.29*	118	1.58	*0.91*	103	1.44	*1.09*	92	1.45	*1.13*	$.49_s^{**}$- $.73_s^{**}$
PSS	207	18.22	*6.85*	164	17.15	*7.44*	138	17.62	*7.10*	111	17.43	*7.04*	103	16.86	*7.28*	86	17.45	*6.89*	$.53^{**}$- $.74^{**}$
Enthusiastic Commit.	207	4.39	*.62*	164	4.36	*.63*	138	4.34	*.70*	108	4.38	*.67*	95	4.21	*.74*	84	4.17	*.68*	$.54_s^{**}$- $.82_s^{**}$
Constrained Commit.	207	2.24	*.94*	164	2.20	*.96*	138	2.26	*.95*	108	2.08	*.82*	95	2.19	*.93*	84	2.19	*.88*	$.56_s^{**}$- $.83_s^{**}$
Enjoyment	207	4.64	*.49*	164	4.58	*.57*	138	4.62	*.55*	108	4.62	*.58*	95	4.56	*.57*	84	4.57	*.45*	$.40_s^{**}$- $.77_s^{**}$
Investment- Quantity	207	4.58	*.52*	164	4.59	*.52*	138	4.61	*.49*	108	4.59	*.51*	95	4.53	*.57*	84	4.55	*.50*	$.52_s^{**}$- $.73_s^{**}$
Social Supp.-Emotional	207	4.04	*.83*	164	3.95	*.86*	138	3.98	*.87*	108	3.94	*.86*	95	3.91	*.86*	84	3.97	*.91*	$.59_s^{**}$- $.89_s^{**}$
Social Supp.-Information	207	3.62	*.78*	164	3.62	*.77*	138	3.53	*.87*	108	3.49	*.86*	95	3.44	*.77*	84	3.42	*.86*	$.57^{**}$- $.82^{**}$
DtE-Mastery achieve.	207	4.36	*.57*	164	4.30	*.63*	138	4.28	*.63*	108	4.26	*.60*	95	4.06	*.70*	84	4.08	*.62*	$.56_s^{**}$- $.84_s^{**}$
Ego-Orientated Climate	207	8.52	*2.53*	164	8.71	*2.57*	138	8.84	*2.52*	108	8.63	*2.11*	95	8.83	*2.44*	84	8.89	*2.46*	$.49^{**}$- $.80^{**}$
Intrinsic Regulation	207	5.12	*1.35*	164	5.26	*1.33*	138	5.33	*1.30*	108	5.36	*1.27*	95	5.02	*1.35*	84	5.29	*1.19*	$.62^{**}$- $.81^{**}$
External Regulation	207	3.17	*1.41*	164	3.02	*1.30*	138	3.22	*1.41*	108	3.27	*1.27*	95	3.07	*1.35*	84	2.93	*1.27*	$.51_s^{**}$- $.76_s^{**}$
Amotivated Regulation	207	2.20	*1.24*	164	2.04	*1.13*	138	2.26	*1.21*	108	2.03	*1.09*	95	2.12	*1.18*	84	2.25	*1.25*	$.48_s^{**}$- $.76_s^{**}$

Note. r = Pearson's correlation coefficient; r_s = Spearman's rho correlation coefficient; ** = $p < .01$

Follow-up Wilcoxon Signed Rank Tests were used for pairwise comparisons, with a Bonferonni adjustment applied to the alpha level (.05/15 = .003). No significant differences were identified in pairwise comparisons for *amotivated regulation* (z = -.45 to -2.02, p > .003), while *external regulation* differed at T3 compared to T6 only (z = -3.24, p < .003), with no significant differences identified between any other time-points (z = -.15 to -2.34, p > .003). *Desire to excel (mastery)* scores at T1 significantly different from scores at T5 (z = -4.09, p < .003) and T6 (z = -3.90, p < .003). No other significant differences across time-points were evident (z = -.18 to -2.93, p > .003). Similarly, *enthusiastic commitment* was significantly different at T6 compared to T1 (z = -3.22, p > .003), T2 (z = -3.30, p < .003) and T4 (z = -2.15, p > .003), but no significant differences were evident between any other time-points. While the most instability across time-points was evident for *training hours* and *other hours,* these significant differences were evident across stages of the season (e.g. T1 compared to T3; z = -4.889, p < .003) and, in contrast, demands were similar at the same point in the season across years (e.g. T1 and T4; z = -2.528, p > .003). As outlined previously, use of mean scores is considered to be particularly appropriate when there is no particular trend or change in the predictor, or the trends over time are similar for subjects (Chen et al., 2015), as was the case with training demands. As such, considering the limited variability evident in scores across time-points, outside of the seasonal trends in training demands, findings support the use of average scores.

7.4.2 Preliminary Analysis of Candidate Predictor Variables

7.4.2.1 Descriptive Statistics. Descriptive statistics are outlined in Table 7.4 for the average scores generated for the candidate predictors. Two-hundred-and-seven participants were included in the analysis (female n = 113, male n = 94, elite n = 63, non-elite n = 144, regular starter n = 178, substitute n = 28). One participant did not specify their starting status at T1. To ensure the full sample could be used across all analyses, single imputation based on the next observation was used to replace the missing data point (Jakobsen et al., 2017). Specifically, as the participant in question indicated that they were a regular starter on their team at T2, this value was imputed at T1.

Although some predictors were relatively highly correlated (e.g. *constrained commitment* and *amotivation,* $r_s = .72$; see Table 7.4), for all variables VIF < 5 and tolerance > 0.2 indicated an absence of multicollinearity (Hair et al., 2021). Significant ($p < .05$) Kolmogorov-Smirnov and Shapiro-Wilk tests indicated non-normal distribution of average scores all subscales except *EO climate* and *PSS*. However, examination of the corresponding histograms revealed that, in addition to the *EO climate* and *PSS* data, data on the *training hours, constrained commitment, social support, desire to excel (mastery), intrinsic regulation* and *external regulation* measures approximated the normal distribution. In contrast, histograms for *age, number of teams, enthusiastic commitment, enjoyment, personal investment (quantity)* and *amotivated regulation* revealed skewed distributions. Where data showed non-normality, Spearman's rho correlation coefficients were examined in place of Pearson's correlation for these variables (Schober et al., 2018) when making decisions about covariances to be included in each analysis (see Table 7.4). As noted previously, the MLR function for LGM is robust to non-normality.

Table 7.4

Correlation Matrix, Mean scores and Standard Deviations for Continuous Predictor Variables

	Variable	Age	Teams	Trn	Strss	Enth	Cnstr	Enjoy	Mast	PIQ	Social Supp	EO Clm	Intri	Exter	Amot	M	SD
	Age T1	1														24.72	6.14
Stress	**Teams**	$-.45_s^{**}$	1													1.79	.98
Stress	**Trn hrs**	-0.11_s	$.41_s^{**}$	1												5.53	2.57
Stress	**Stress**	$-.23_s^{**}$	$.18_s^{*}$	0.12	1											17.62	6.09
Commitment	**Enthus.**	$-.27_s^{**}$	$.21_s^{*}$	$.16_s^{*}$	$-.03_s$	1										4.32	.54
Commitment	**Constr**	$-.09_s$	$.03_s$	0.09	$.46^{**}$	$-.36_s^{**}$	1									2.24	.81
Commitment	**Enjoy**	$-.06_s$	$.01_s$	0.12_s	$-.26_s^{**}$	$-.68_s^{**}$	$-.60^{**}$	1								4.61	.46
Commitment	**DtE mast**	$-.15_s^{*}$	$.20_s^{*}$	$.32^{**}$	-0.12	$.63^{**}$	$-.36^{**}$	$.56_s^{**}$	1							4.28	.56
Commitment	**PI-quant**	$-.14_s^{*}$	$.23_s^{**}$	$.44_s^{**}$	0.03_s	$.42_s^{**}$	$-.09_s$	$.30_s^{**}$	$.63_s^{**}$	1						4.59	.46
Commitment	**Soc Supp**	$-.17_s^{*}$	$.08_s$	0.20^{**}	$-.18^{**}$	$.46_s^{**}$	$-.25^{**}$	$.50_s^{**}$	$.49^{**}$	$.35_s^{**}$	1					3.77	.65
Motivation	**EO clim**	$.03_s$	$.16_s^{*}$	$.16^{*}$	$.29^{**}$	$-.23_s^{**}$	$.43^{**}$	$-.40_s^{**}$	-0.08	$-.02_s$	$-.14^{*}$	1				8.63	2.21
Motivation	**Intrinsic**	$-.10_s$	$.15_s^{*}$	0.11	$-.17^{*}$	$.53_s^{**}$	$-.40^{**}$	$.41_s^{**}$	$.55^{**}$	$.32_s^{**}$	$.34^{**}$	$-.19^{*}$	1			5.17	1.19
Motivation	**External**	$-.34_s^{**}$	$.17_s^{*}$	$.18^{*}$	$.22^{**}$	0.03_s	$.50^{**}$	$-.18_s^{*}$	-0.12	$.07_s$	.09	$.19^{**}$	.04	1		3.14	1.20
Motivation	**Amotiv**	$.02_s$	$-.07_s$	-0.11_s	$.39_s^{**}$	$-.53_s^{**}$	$.71_s^{**}$	$-.71_s^{**}$	$-.51_s^{**}$	$-.26_s^{**}$	$-.38_s^{**}$	$.39_s^{**}$	$-.42_s^{**}$	$.31_s^{**}$	1	2.17	1.04

Note: All average scores for complete responses across timepoints (excluding age); Teams = number of teams, Trn = weekly training hours, Enthus = enthusiastic commitment, other hrs = additional weekly hours committed to sport, stress = perceived stress, Enthus = enthusiastic commitment, Constr = constrained commitment, Enjoy = enjoyment DtE Mast = desire to excel – mastery achievement, PI-quant = personal investment – quantity, EO clim = ego-orientated climate, intrinsic = intrinsic regulation, external = external regulation, amotiv = amtotivated regulation; Subscript s ($_s$) = Spearman's rho correlation coefficient

** = $p < .01$; * = $p < .05$ (two-tailed).

7.4.2.2 Playing Level Differences on Predictor Variables. Although, as outlined above, non-normality was only an issue for small number of predictors, non-parametric Mann-Whitney U tests were employed due to the heterogeneity in group sizes for elite (*n* = 63*)* and non-elite (n = 144) athletes. The Bonferonni adjustment was not applied, as the relationships would be undergoing further testing and it was deemed more important to avoid Type I errors at this preliminary stage (Armstrong, 2014). Cohen's *r* ($r = z\sqrt{n}$) was calculated to determine the effect size. Results are outlined in Table 7.5

Table 7.5

Comparison of Predictor Values across Playing Levels

Variable	Elite *Md*	Non-Elite *Md*	*U*	*z*	*r*
Training hours	7.33	4.50	1829.0	-6.831**	.47
Number of Teams	2.17	1.33	1788.5	-6.976**	.48
Perceived stress	19.00	16.00	3624.5	-4.085*	.16
Constrained Commitment	2.10	2.20	4326.5	-0.5278	.04
Enthusiastic Commitment	4.44	4.33	4012.5	-1.321	.09
Enjoyment	4.77	4.80	4326.5	-0.528	.04
Desire to Excel (mastery)	4.57	4.22	2938.5	-4.033**	.28
Social Support	3.99	3.71	4390.0	-2.637*	.18
Personal Invest. (quantity)	4.88	4.62	2924.5	-4.085**	.28
Ego-Orientated Climate	9.94	8.37	3354.0	-2.981**	.21
Intrinsic Regulation	5.50	5.11	3576.0	-2.422*	.17
External Regulation	3.00	3.06	4373.0	-0.411	.03
Amotivated Regulation	1.89	2.00	4082.0	-1.146	.08

Note. r = Cohen's r; ** = $p < .01$, * = $p < .05$

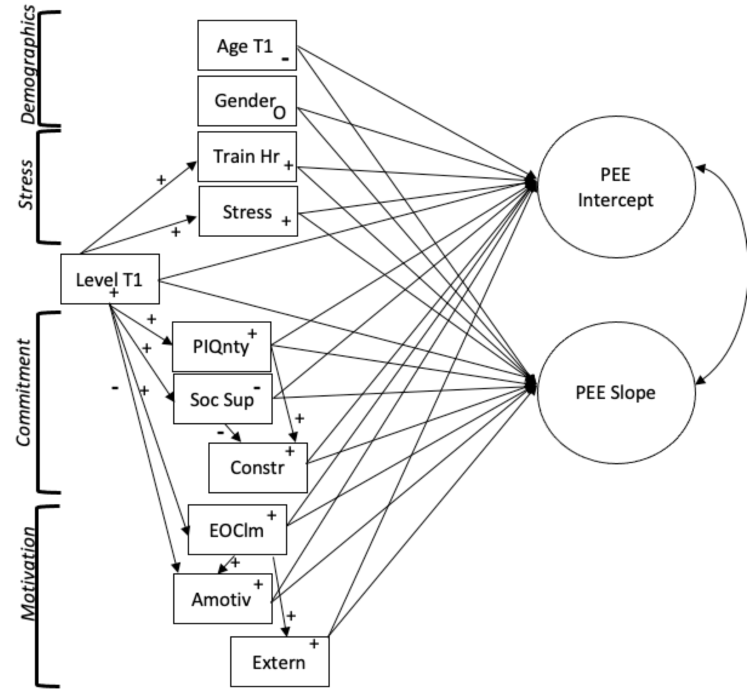
7.4.3 Conditional LGM Analysis

7.4.3.1 Overview of the Models Assessed. Following the exploration of the impact of playing level, conditional latent growth models were specified for PEE, RSA and SD, as outlined in Figures 7.1 – 7.3 (excluding the path from Level T1 → Amotivation; see Table 7.6, Step 1).

Modification indices (MIs) were then reviewed to ensure that the models had been specified as intended. In addition, MIs can also provide insight into opportunities for improvement in model fit, but any decisions to adjust a model should be supported by adequate substantive and/or theoretical rationale (Brown, 2015). MIs indicated that specifying *playing level* as a direct predictor of *amotivated regulation* would improve model fit. Notably, an indirect effect of *playing level* on *amotivated regulation* was already included the model due to the specification of *playing level* as a predictor of *EO climate,* and *EO climate* as a predictor of *amotivated regulation* (see Figures 7.1 to 7.3). As such, the MIs suggests that the impact of *playing level* on *amotivated regulation* is not fully mediated by *EO climate*. This suggestion makes theoretical and substantive sense. Furthermore, and as outlined in Section 7.3.7.1, the specification of factors mediating the impact of *playing level* on burnout was based on exploratory analyses, with preliminary mean comparisons viewed as a useful strategy to narrow the research focus. As such, while mean comparisons did not reveal significant differences in *amotivated regulation* across playing levels, the specification of this relationship based on the MIs and substantive considerations is in line with the exploratory approach specified a priori. The re-specification of models with *playing level* as a direct predictor of *amotivated regulation* (Table 7.6, Step 1b) led to a reduction in *AIC* and an increase in *CFI*, suggesting improved fit despite an increase in model parameters (Bozdogan, 1987; Preacher et al., 2008; see Table 7.6). The respecified were retained moving forward, as per Figures 7.1 – 7.3.

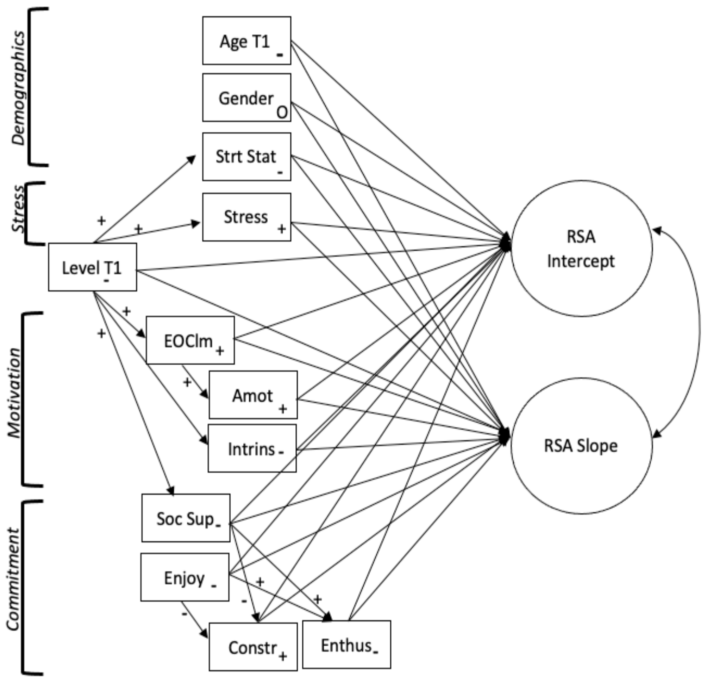
7.4.3.2 Backwards Variable Elimination. The results of the series of backwards elimination steps for the PEE, RSA and SD model are outlined in Table 7.6, Table 7.7 and Table 7.8 respectively. The stopping point was specified as Step 13, Step 16 and Step 13 for the PEE, RSA and SD models respectively. For each model, $p < 0.157$ for all remaining variables at this step, and the subsequent step resulted in an increase in the *AIC* value (see Tables 7.6 – 7.8).

Figure 7.1. *PEE Global Conditional LGM and Hypothesised Pathways*



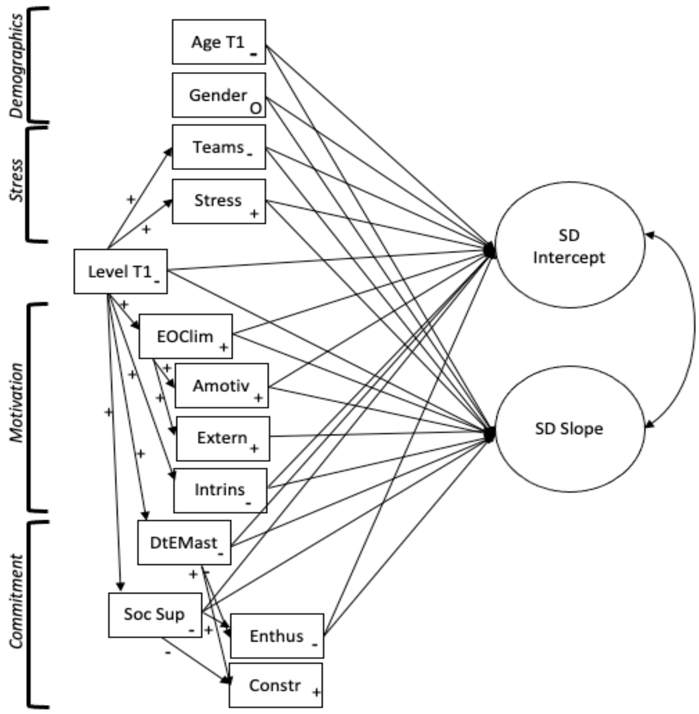
Note: +/- = hypothesised relationship; O = exploratory; Level T1 = Playing level (T1), Train Hr = avg. weekly training hours, Othr Hr = avg. weekly other hours at sport, Constr = avg. constrained commitment, PIQnty = avg. personal investment (quantity), EOClm = avg. ego-orientated climate, Amot = avg. amotivated regulation, Exter = avg. external regulation; Level T1 → Amotiv was no specified in Model 1 (see Table 7.6); Continuous predictors with correlation $p < .05$ (See Table 7.4) allowed to covary.

Figure 7.2 *RSA Global Conditional LGM and Hypothesised Pathways*



Note: +/- = hypothesised relationship; O = exploratory; Strt Stat = starting status (T1), Enthus = avg. enthusiastic commitment, Enjoy = avg. enjoyment, See Fig. 7.1 for additional abbreviations; Level T1 → Amotiv not specified in Model 1 (see Table 7.6); All continuous predictors with correlation $p < .05$ (See Table 7.4) were allowed to covary.

Figure 7.3. *SD Global Conditional LGM and Hypothesised Pathways*



Note: +/- = hypothesised direction of the relationship; O = no specific hypothesised direction; See Fig. 7.1 and 7.2 for additional abbreviations; Level T1 → Amotiv was not specified in Model 1 (see Table 7.6). Although not specified for ease of viewing, all continuous predictors with correlation r/r_s >.20 (See Table 7.4) were allowed to covary.

7.4.3.3 Final Conditional Models of Burnout. The final models in all cases show an acceptable fit for the data, $\chi^2/df < 3$, CFI > 0.9, RMSEA < 0.6, SRMR < 0.1 (Kline, 2005). The final models for PEE, RSA and SD, including standardised coefficients for paths to burnout, are outlined in Figures 7.4 – 7.6. For ease of viewing, additional information relating to confidence intervals and standard errors for direct paths to I and S are outlined in Table 7.9. Standardised coefficients for additional pathways are outlined in the figure notes sections. Results relating to indirect effects are outlined in Tables 7.10 – 7.12.

Table 7.6.

Backwards variable elimination steps and model fit indices for the PEE model

Analysis Step	Model Description	Chi-square (df)	CFI	SRMR	RMSEA [95% CI]	*AIC*
Step 1	Model as per Fig 7.1, excl. playing level → Amotiv.	1015.91 (703)	.903	.08	.046 [.04, .53]	15001.673
Step 1b	Model as per Fig 7.1	1004.81 (702)	.907	.079	.046 [.039,.052]	14992.887
Step 2	Social Supp. → S removed	1004.48 (703)	.907	.079	.046 [.039,.052]	14990.896
Step 3	Constr. Com. → S removed	1004.24 (704)	.907	.079	.046 [.039,.052]	14988.933
Step 4	Social Support → I removed	1004.00 (705)	.908	.079	.045 [.039,.051]	14986.997
Step 5	EO climate → I removed	1003.99 (706)	.908	.079	.045 [.039,.051]	14985.178
Step 6	Training hours → I removed	1003.91 (707)	.908	.079	.045 [.039,.051]	14983.426
Step 7	Perceiv. stress → S removed	1004.04 (708)	.909	.080	.045 [.038,.051]	14981.854
Step 8	EO climate → S removed	1004.12 (709)	.909	.080	.045 [.038,.051]	14980.675
Step 9	Gender → S removed	1004.91 (710)	.909	.080	.045 [.038,.051]	14979.137
Step 10	External Reg → I removed	1005.75 (711)	.909	.080	.045 [.038,.051]	14978.152
Step 11	Age T1 → S removed	1006.73 (712)	.909	.080	.045 [.038,.051]	14976.741
Step 12	Age removed from model	967.10 (677)	.909	.080	.045 [.039,.052]	13659.421
Step 13	Gender removed from model	886.68 (640)	.921	.079	.043 [.036,.050]	13658.695
Step 14	Amotivated → I removed	890.52 (641)	.920	.079	.043 [.036,.050]	13660.521

Note: I = Intercept; S = Slope; Step 13 χ^2/df = 886.68/640 = 1.385

Table 7.7.

Backwards variable elimination steps and model fit indices for the RSA model

Analysis Step	Model Description	Chi, square (df)	CFI	SRMR	RMSEA [95% CI]	*AIC*
Step 1	Model as per Fig 7.2, excl. playing level→ Amotiv	1102.46 (733)	.888	.083	.049 [.043, .055]	15015.909
Step 1b	Model as per Fig 7.2	1092.68 (732)	.891	.083	.049 [.043, .055]	15008.243
Step 2	Constr. Com → I removed	1092.59 (733)	.891	.083	.049 [.043, .055]	15006.246
Step 3	EO Climate → I removed	1092.76 (734)	.892	.083	.049 [.042, .055]	15004.253
Step 4	Starting status → S removed	1093.01 (735)	.892	.083	.049 [.042, .055]	15002.286
Step 5	Intrinsic Reg. → S removed	1093.03 (736)	.892	.083	.048 [.042, .054]	15000.405
Step 6	Start. stat removed from model	1031.81 (698)	.898	.080	.048 [.042, .054]	14998.575
Step 7	Social Supp → S removed	1032.00 (699)	.899	.080	.048 [.042, .054]	14996.815
Step 8	EO climate → S removed	1032.52 (700)	.899	.080	.048 [.042, .054]	14995.386
Step 9	Enthus Com → I removed	1032.98 (701)	.899	.081	.048 [.042, .054]	14993.855
Step 10	Enthus Com removed from model	1033.41 (702)	.899	.080	.048 [.042, .054]	14992.292
Step 11	Enjoyment → S removed	959.95 (670)	.906	.081	.046 [.039, .052]	14789.016
Step 12	Enjoyment → I removed	960.37 (671)	.906	.081	.046 [.039, .052]	14787.345
Step 13	Gender → S removed	961.70 (672)	.906	.081	.046 [.039, .052]	14786.367
Step 14	Play Level → I removed	962.74 (673)	.906	.082	.046 [.039, .052]	14785.437
Step 15	Age → S removed	963.947 (674)	.906	.082	.046 [.039, .052]	14784.372
Step 16	Social Supp removed from model	905.85 (643)	.912	.083	.044 [.038, .051]	14434.796
Step 17	Amotiv. Reg → S removed	908.93 (644)	.911	.082	.045 [.038,.051]	*14435.452*

Note: I = Intercept; S = Slope; Step 16 χ^2/df = 905.85/643 = 1.409

Table 7.8.

Backwards variable elimination steps and model fit indices for the SD model

Analysis Step	Model Description	Chi-square (df)	CFI	SRMR	RMSEA [95% CI]	*AIC*
Step 1	Model as per Fig 7.3, excl. playing level→ Amotiv	1178.16 (736)	.879	.081	.054 [.048, .06]	15305.401
Step 1b	Model as per Fig 7.3	1163.79 (735)	.883	.079	.053 [.047, .059]	15293.493
Step 2	Number of Teams → I removed	1163.79 (736)	.883	.079	.053 [.047, .059]	15291.515
Step 3	Extern. Reg → I removed	1163.80 (737)	.883	.079	.053 [.047, .059]	15289.547
Step 4	Intrinsic Reg → S removed	1163.87 (738)	.883	.080	.053 [.047, .059]	15287.58
Step 5	Gender → I removed	1164.16 (739)	.884	.080	.053 [.047, .058]	15285.653
Step 6	Extern. Reg. removed from model	1098.10 (703)	.888	.081	.052 [.046, .058]	14687.232
Step 7	Enthus. Com → S removed	1098.43 (704)	.888	.080	.052 [.046, .058]	14685.543
Step 8	EO Climate → S removed	1099.47 (705)	.888	.080	.052 [.046, .058]	14684.289
Step 9	Play. Level → S removed	1100.18 (706)	.889	.081	.052 [.046, .058]	14682.782
Step 10	Social Supp. → S removed	1100.94 (707)	.889	.081	.052 [.046, .058]	14681.624
Step 11	Social Supp. → I removed	1101.27 (709)	.889	.080	.052 [.046, .058]	14678.066
Step 12	Dte Mastery → S removed	1101.93 (710)	.889	.080	.052 [.046, .058]	14676.392
Step 13	Gender removed from model	1018.81 (672)	.901	.080	.05 [.044, .056]	14675.474
Step 14	EO climate → I removed	1021.58 (673)	.900	.079	.05 [.044, .056]	14675.921

Note: I = Intercept; S = Slope; Step 13 χ^2/df = 1018.81/672 = 1.516

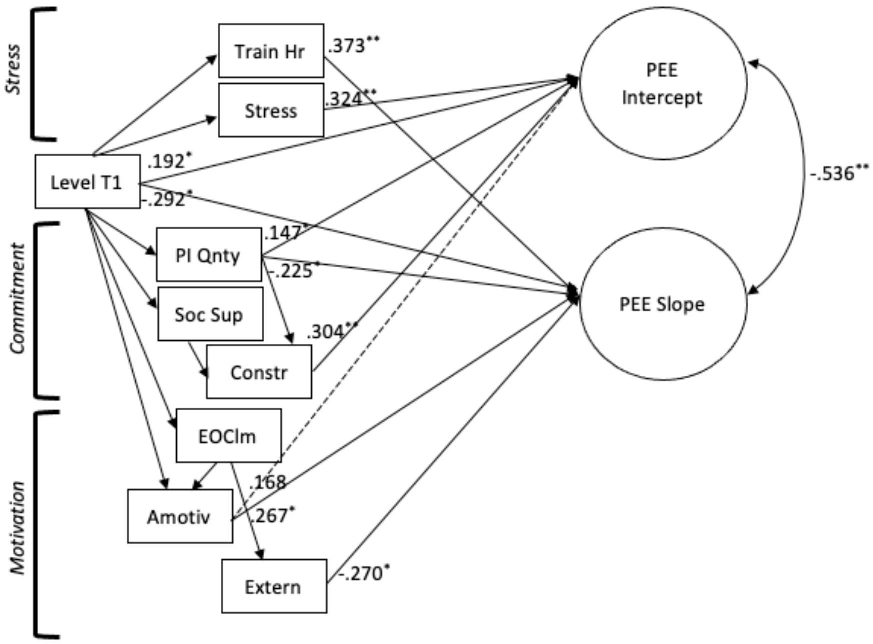
Table 7.9

Standard estimates, confidence intervals and standard errors for direct paths to intercept and slope factors specified in the final conditional LGM analyses

	Predictor of Intercept		Predictor of Slope	
Burnout Model	**β (95% CI)**	**S.E**	**β (95% CI)**	**S.E**
PEE (Fig. 7.4)				
Perceived stress	.324**[.195, .435]	.066	/	/
Playing level	.192*[.052, .333]	.072	-.292*[-.567, -.018]	.140
PI (quantity)	.147*[.027, .266]	.061	-.225*[-.415, -.067]	.097
Constrn. Commit.	.304**[.152, .457]	.078	/	/
Amotiv. Reg	.168 [.000, .337]	.086	..267*[.052, .333]	.116
External Reg.	/		-.270*[.040, .494]	.112
Training Hours	/		.373**[.112, .634]	.133
RSA (Fig. 7.5)				
Age	-.166**[-.270, -.061]	.053	/	/
Gender	-.144*[-.253, -.035]	.056	/	/
Stress	.136 [-.017, .289]	.078	.389 [-.012, .749]	.194
Intrinsic Reg.	-.188*[-.299, -.076]	.057	/	/
Amotiv Reg.	.556**[.444, .668]	.057	.331[-.058, .719]	.198
Playing level	/		-.316*[-.556, -.077]	.112
Constr Commit	/		-.567**[-.955, -.179]	.198
SD (Fig. 7.6)				
EO Climate	-.075[-.172, .023]	.050	/	/
Intrinsic Reg	-.150**[-.261, -.039]	.057	/	/
Amotiv Reg.	.348**[.211, .486]	.070	.280[-.029, .589]	.158
Constrn Commit	.296**[.160, .432]	.069	-0.302 [-.618, .014]	.161
DtE Mastery	-.184**[-.316, -.053]	.067	/	/
Enthus Commit	-.212*[-.328, -.096]	.059	/	/
Playing level	-.098*[-.177, -.019]	.040	/	/
Perceived Stress	-.130*[-.242, -.018]	.057	.262[-.041, .564]	.154
Num. Teams	/		.246*[.026, .466]	.112

Note: β = standardised beta coefficient; 95% CI = 95% Confidence Interval; S.E = standard error; / = relationship not specified in final model; ** = p <.01; * = p < .05

Figure 7.4. *Final Conditional LGM for PEE with Standardised Coefficients*



Note. see Fig 7.1 for abbreviations; All continuous predictors with correlation $p < .05$ (See Table 7.5) were allowed to covary. Additional significant direct relationships not specified for ease of viewing (β [CI 95%]): Level → Training Hours .463**[.350, .577], Level → Stress .156*[.037, .276], Level → PI Quantity .270**[.177, .363], Level → EOClimate .215**[.100, .330], Level → Amotiv -.185**[-.292, -.078], Level → Soc Supp .205**[.177, .363], EOClimate → Amotiv .476**[.361, .591], EOClimate → Extern .176*[.041, .311], PI quantity → Constr .153**[.059, .247]; Soc Supp → Constr -.315**[-.439, .190]; ** = p<.01; * = p<.05.

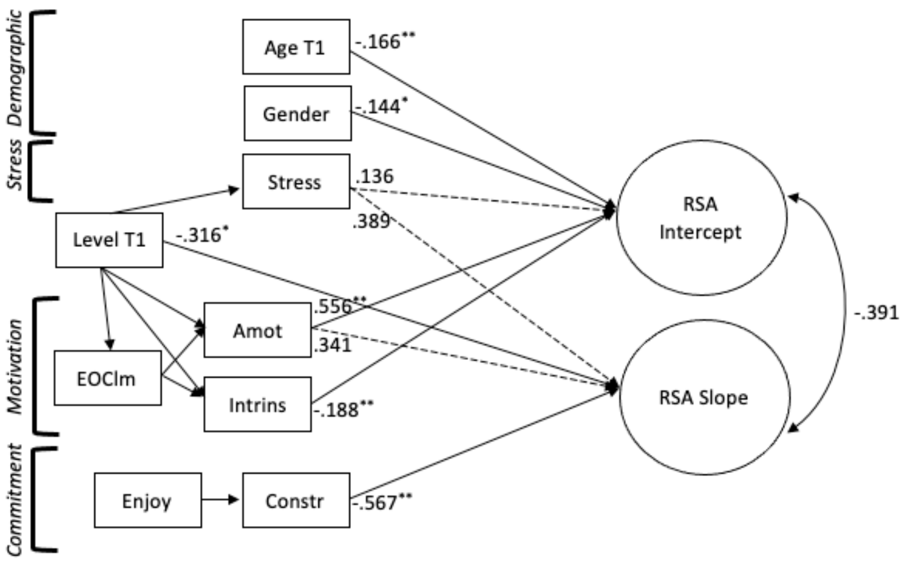
Table 7.10.

Indirect effects on PEE Intercept and Slope

Relationship	Mediator/Moderator	Specific Indirect Effect		Total Indirect Effect	
		β [95% CI]	SE	β [95% CI]	SE
Playing level to I				.069*[.003, .136]	.034
	Perceived stress	.051*[.009, .093]	.034		
	PI quantity	.040*[.005, .074]	.018		
	Amotivated Regulation	*-.031*[-.068, .006]	*.019*		
	PI quantity to Constrn Com	.013*[.002, .024]	.006		
	Social Sup to Constrn Com	-.020*[-.036, -.004]	.008		
	EO Climate to Amotiv Reg	.017 [-.003, .038]	.01		
Playing level to S				*.080*[-.053, .213]	*.068*
	Training Hours	.173*[.041, .305]	.067		
	PI quantity	-.061*[-.115, .007]	.028		
	Amotivated Regulation	*-.049* [-.099, 0.008]	*.025*		
	EO Climate to Amotiv Reg	*.027* [-.002, .056]	*.015*		
	EO Climate to External Reg	*-.01* [-.022, .002]	*.006*		
EO Climate to I				*.080* [-.004, .164]	*.043*
	Amotivated Reg.	*.080* [-.004, .164]	*.043*		
EO Climate to S				*.080* [-.043, .202]	*.062*
	External Reg.	*-.048* [-.099, .004]	*.026*		
	Amotivated Reg.	.127*[.009, .246]	.060		
Social Supp to I				-.096**[-.157, -.034]	.031
	Constrained Commitment	-.096**[-.157, -.034]	.031		

Note. I = intercept, S = Slope, PI Quantity = personal investment quantity, EO Climate = ego-orientated climate ** = p<.01; * = p<.05. *Italics* = non-significant;

Figure 7.5. *Final Conditional LGM for RSA with Standardised Coefficients*



Note. dashed line = $p > .05$; see Fig 7.2 for abbreviations; Although not specified for ease of viewing, all continuous predictors were allowed to covary, except Age with EOClm, Constr, Enjoy, Intrins and Amotiv (correlation $p > .05$; See Table 7.4). Additional significant direct relationships not specified for ease of viewing (β [CI 95%]): Level → Stress .155*[.037, .274], Level → EO Climate .232**[.117, .347], Level → Intrins .203**[.088, .317]; Level → Amotivated Reg -.165**[-.267, -.063], EO Climate → Amotiv .484**[.372, .595], EO Climate → Intrins -.242**[-.371, -,114], Enjoy → Constr -.602**[-.697, -.506];
** = $p < .01$; * = $p < .05$.

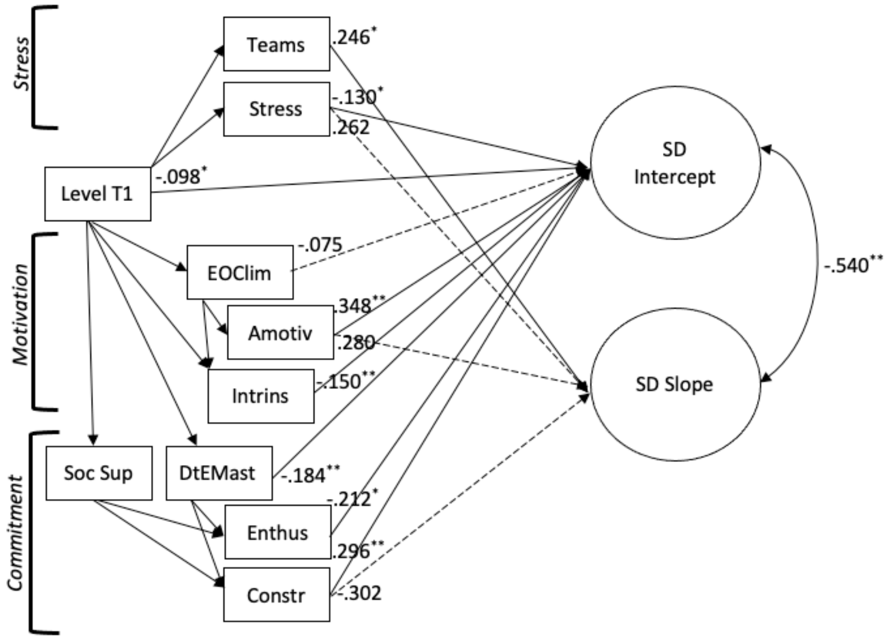
Table 7.11

Indirect effects on RSA Intercept and Slope

Relationship	Mediator/Moderator	Specific Indirect Effect β [95% CI]	S.E	Total Indirect Effect β [95% CI]	S.E
Playing level to I				*-.036* [-.126, .022]	*.035*
	Perceived stress	*.021* [-.007, .049]	*.014*		
	Intrinsic Reg.	-.038*[-.067, -.009]	.015		
	Amotivated Reg.	-.092**[-.153, -.030]	.031		
	EO Climate to Amotiv Reg	.062**[.024, .101]	.020		
	EO Climate to Intrinsic Reg	.011*[.00, .021]	.005		
Playing level to S				.040 [-.042, .112]	.042
	Perceived stress	*.057* [-.014, .129]	*.036*		
	Amotivated Reg	*-.054* [-.122, .013]	*.035*		
	EO Climate to Amotiv	*.037* [-.011, .085]	*.024*		
EO Climate to I				.314**[.225, .404]	.046
	Amotivated Reg.	.269**[.188, .349]	.041		
	Intrinsic Reg.	.045*[.010, .081]	.018		
EO Climate to S				*.160* [-.030, .350]	*.097*
	Amotivated Reg.	*.160* [-.030, .350]	*.097*		
Enjoyment to S				.341**[.107, .575]	.12
	Constrained Commit	.341**[.107, .575]	.12		

Note. I = intercept, S = Slope, PI Quantity = personal investment quantity, EOClim = ego-orientated climate, Amotiv = amotivated regulation ** = p<.001; * = p<.05, *Italics* = non-significant.

Figure 7.6. *Final Conditional LGM for SD with Standardised Coefficients*



Note: see Fig 7.3 for abbreviations; Continuous predictors allowed to covary, where r/r_s > .20 (See Table 7.4); Additional significant direct relationships (β [CI 95%]): Level → Teams .393**[.260, .525], Level → Stress .148*[.032, .264], Level → EOClim .189**[.069, .308], Level → Intrins .232**[.118, .346]; level → DtEMast .277**[.170, .385], level → Soc Sup 0.204**[.095, .313], Level → Amotiv -.212**[-.315, -.110], EOClim → Amotiv .449**[.337, .562], EOClim → Intrins -0.168**[-.292, -.044], DtEMast→ Enthus .480**[.358, .603], DtEMast→ Constr -.248**[-.365, -.131]; ** = p<.01; * = p<.05.

7.5 Discussion

Building on work from chapters 4 – 6, this series of analyses incorporates core elements of the stress, motivation and commitment perspectives of burnout, in addition to key demographic factors, and facilitates the exploration of their utility in accounting for initial burnout levels and the development of burnout symptoms over time. Overall, the emergence of significant predictors of burnout from across existing theoretical perspectives (see Figures 7.4 – 7.6) provides important empirical support for the utility of an integrated burnout model, and suggests that existing theories can be viewed as complementary.

Table 7.12

Indirect effects on SD Intercept and Slope

Relationship	Mediator/Moderator	Specific Indirect Effect β [95% CI]	S.E	Total Indirect Effect β [95% CI]	S.E
Playing level to I				-.217**[-.297, -.138]	.041
	Perceived stress	*-.019* [-.042, .003]	*.014*		
	DtE Mastery	-.051*[-.095, -.007]	.022		
	Intrinsic Reg.	-.035*[-.066, -.004]	.016		
	EO Climate	*-.014* [-.034, .006]	.010		
	Social Sup to Enthus Com	-.010*[-.019, -.001]	.005		
	DtE Mastery to Enthus Com.	-.028**[-.049, -.008]	.011		
	DtE Mastery to Constr Com.	.020*[-.035, -.006]	.007		
	EO Climate to Intrinsic Reg	*.005* [-.001, .011]	*.003*		
	EO Climate to Amotivated Reg.	.030*[.005, .054]	.010		
Playing level to S				.120*[.012, .228]	.055
	Perceived stress	*.039* [-.013, .091]	*.027*		
	Number of teams	.096*[.003, .190]	.048		
	Amotivated regulation	*-.060* [-.129, .010]	*.035*		
	EO Climate to Amotivated Reg.	*.024* [-.007, .055]	*.013*		
	DtE Mastery to Constrained Com	*.021* [-.004, .046]	*.013*		
EO Climate to I				..182**[.096, .267]	.044
	Amotivated Regulation	.157**[.078, .236]	.040		
	Intrinsic Regulation	*.025* [-.001, .051]	*.013*		
EO Climate to S				*.126* [-.017, .269]	*.072*
	Amotivated Regulation	*.126* [-.017, .269]	*.072*		
DtE Mastery to I				-.175**[-.259, -.092]	.043
	Enthusiastic Commitment	-.102**[-.166, -.038]	.038		
	Constrained Commitment	-.073**[-.117, -.029	.022		
DtE Mastery to S				*.075* [-.012, .162]	*.044*
	Constrained Commitment	*.075* [-.012, .162]	*.044*		
Social Supp to I				-.047*[-.083, -.011]	.018
	Enthusiastic Commitment	-.047*[-.083, -.011]	.018		

Note. I = intercept, S = Slope, DtE Mastery = desire to excel – mastery achievement, EOClim = ego-orientated climate, Amotiv = amotivated regulation ** = p <.01; * = p <.05. *Italics* = non-significant

Focusing on PEE, in line with a number of the study hypotheses (Table 7.1), the final model suggested that a higher intercept value (i.e. greater frequency of symptoms at T1) was associated with increased *stress*, a greater *quantity of personal investment* and more *constrained commitment* across the study period, while elite athletes also reported significantly greater frequency of PEE at T1 (intercept). In addition, the specification of indirect effects also facilitated the exploration of the mechanisms through which *playing level* impacted burnout. Specifically, findings indicated that *playing level* was also indirectly associated with increased initial PEE symptom frequency through the increased *perceived stress* associated with elite participation, while greater perceived *quantity of personal investment* associated with elite participation was also positively associated with increased PEE in its own right, and through the associated increase in feelings of *constrained commitment*. In contrast, *social support* was indirectly associated with reduced feelings of PEE by contributing to reduced *constrained commitment.* Finally, although non-significant alongside the other retained predictors, results suggested that the model was improved with *amotivated regulation* retained as a predictor of I. This may indicate that amotivation contributes to feelings of PEE through its relationship with other predictors (Heinze et al., 2018).

Overall, these findings are in the hypothesized directions (Table 7.1, 7.2) and provide further support for the impact of stress and feelings of entrapment on PEE, and the suggestion that elite athletes may be a particularly high-risk group for burnout (e.g. Bicahlo & Costa, 2018). In contrast, the exclusion of *EO climate, training hours* and *external regulation* is in contrast to our hypotheses and results from tests of the stress and motivation perspectives in isolation (Chapter 5), and suggests that these variables do not retain a significant direct impact on initial burnout symptom frequency when the additional components from across perspectives are also considered.

The impact of significant predictors on the PEE slope should be interpreted with consideration of the significant negative mean slope growth factor identified by the unconditional growth model (Chapter 6), which suggests that, on average, athletes reported a decline in frequency of PEE symptoms over the two-year window. However, as outlined in Chapter 6, significant inter-individual variability in growth rate was evident, and the aim of this analysis was to identify factors accounting for this variability. As such, results of this analysis suggest that more weekly *training hours* and increased *amotivated regulation* predicted less decline in PEE over time (i.e. less of a reduction in symptom frequency). In addition, *EO climate* indirectly predicted less decline in PEE through its positive impact on *amotivated regulation*. In contrast, a steeper decline in PEE (i.e. greater reduction in symptom frequency) was predicted by being an elite athlete at T1 and experiencing a larger *quantity of personal investment* and *external regulation* over the season. Notably, the significant indirect effects of *playing level* on change in burnout over time were mixed; elite status indirectly predicted less decline in PEE through its positive relationship with *training hours*, but predicted a greater decline in PEE through increased *quantity of personal investment.* Finally, a greater decline in frequency of PEE symptoms over time was evident for athletes who reported a higher frequency of PEE symptoms initially, which can likely be explained by the fact that, due to the Likert-scale nature of the ABQ, athletes who already report a low frequency of PEE symptoms at T1 have limited room for further reductions.

The emergence of *amotivated regulation* and *training hours* as risk factors for the development of PEE across the two seasons is in line with the hypotheses specified (Table 7.1). In addition, the impact of *training hours* supports substantive concerns about training demands in Gaelic games (e.g. Duffy, 2016), and suggests that managing training load may be an effective means of protecting against the development of feelings of PEE. Furthermore, the indirect effect of *playing level* through *training hours* provides empirical support for the argument that elite athletes are at greater risk of developing burnout (e.g. Bicalho & Costa, 2018). However, the significant impact of *amotivated regulation* in the model also highlights the importance of psychological variables in the onset of PEE, in line with Gustafsson et al.'s (2011) integrated approach. Importantly, this analysis also identifies the additional indirect risk of a *EO climate*, which contributes to the development of PEE through increased *amotivation*, and highlights the role of an athletes' training environment in the development of burnout.

Although contrary to the hypothesis specified, the protective effect of *external regulation* on the development of PEE provides further support for the role of motivation in burnout. It is possible that that this relationship can also be explained by the negative intercept-slope covariance, as external regulation was significantly positively correlated with PEE at T1 (see Appendix I.1). However, the findings from the systematic review (see Table 2.4 and 2.6) outlined in Chapter 2 and previous reviews of the literature indicate that support for the impact of externally driven motivation on burnout is somewhat mixed in the existing literature, with positive, negative and non-significant relationships identified (Bicalho & Costa, 2018a; Li et al., 2013). In the context of the current analysis, findings may suggest that athletes whose motivation to play is based on a desire to please others and to gain the benefits associated sport participation (Pelletier et al., 2013) are at reduced risk of PEE. Considered alongside the impact of *amotivation regulation* on PEE*,* it could be argued that higher levels of motivation are preferable to an absence of motivation, even if the motivation is somewhat maladaptive (Cresswell & Eklund, 2005b). Existing research suggests that athletes on successful teams report higher levels of externally and internally driven motivation (Blegen et al., 2012), while externally driven motivation has also been shown to protect against other dimensions of burnout (Cresswell & Eklund, 2005). However, further longitudinal exploration of these relationships is warranted.

Notably, the opposing impact of *playing level* and *quantity of personal investment* on the intercept and slope are also contrary to the hypotheses specified and appear to be somewhat counterintuitive. It may be that athletes adapt to these demands when exposed to them over a sustained period of time (Schinke et al., 2012) and begin to thrive. However, considering these relationships in the context of the negative intercept-slope covariance may provide an alternative explanation for the findings. Specifically, the covariance indicates that athletes who report a higher frequency of burnout at T1 show a greater decline in PEE over time, and *playing level* and *quantity of personal investment* predict this increased burnout at T1. As such, it may be that by contributing to higher initial frequency of burnout symptoms, these variables are associated with a greater decline in PEE symptom frequency over time. However, further exploration is again needed to tease out these relationships.

Considering the final RSA model (Figure 7.5), results indicated that being male, being a younger athlete and reporting increased *amotivated regulation* was associated with more frequent RSA symptoms at T1 (intercept). In addition, *EO climate* was indirectly associated with increased RSA through its positive impact on *amotivated regulation*, while increased *intrinsic regulation* was associated with lower initial frequency of feelings of RSA. Risk and protective factors associated with playing level were also associated with the RSA intercept value; being an *elite athlete* was associated with reduced frequency of feelings of RSA through increased *intrinsic regulation* and reduced *amotivated regulation*. However, elite status was also associated with more frequent RSA as a consequence of operating in a more *EO climate,* and the resulting impact on motivational regulation. These relationships are as hypothesised (Table 7.1), and suggest that demographic and motivational factors play key roles in feelings of RSA. In contrast, no commitment-related variables were retained, while *perceived stress* was non-significant, thus suggesting that these variables are less influential when considered alongside motivational factors.

Although the mean slope factor in the unconditional RSA model (Chapter 6) was non-significant, the predictors in this model still explain inter-individual differences in the development of RSA over time (Preacher et al., 2008). Results indicated that being an elite athlete and experiencing increased feelings of *constrained commitment* were associated with a decline in feelings of RSA. *Enjoyment* also indirectly predicted growth in RSA by contributing to reduced feelings of *constrained commitment*. The protective effect of elite status against the development of RSA is in line with our hypothesis (Table 7.1) and, as discussed in Chapter 5, may be explained by consideration of the context of Gaelic games in Irish society and the status associated with elite participation; existing research suggests intercounty athletes who identify strongly with their sporting role are proud to represent their families and communities (Kelly et al., 2018; Geary et al., 2021). Furthermore, reaching the top level of their sport may contribute substantially to feelings of accomplishment.

In contrast, the protective effect of *constrained commitment* is contrary to our hypothesis (Table 7.1) and results identified in the cross-sectional analysis (Chapter 5), but again may be explained with consideration of the Gaelic games context. Qualitative work by Hughes and Hassan (2017, p.1) describes Gaelic games athletes as "wearing their chains willingly", insofar as power imbalances and a sense of responsibility to play contribute to feelings of entrapped commitment, but equally athletes are socialized to place substantial value on this commitment or "sacrifice" and continue to participate (Hughes & Hassan, 2017; Kelly et al., 2018). As such, although some Gaelic games athletes may be committed to sport for objectively maladaptive reasons such as social pressures (Scanlan et al., 2016), these perceptions of societal importance and status of sport participation may also contribute to a greater sense of accomplishment over time for athletes involved. Furthermore, the opposing direction of this relationship in the cross-sectional analyses in Chapter 5 and the intercept value in this model (see Appendix I.2) may suggest that remaining committed over time is viewed as an accomplishment in and-of-itself. However, this relationship requires further longitudinal exploration.

Finally, results of significant pathways in the final SD model (Figure 7.6) indicated that being a non-elite athlete, and experiencing increased *constrained commitment* and *amotivated regulation* were associated with greater SD at T1 (intercept). In contrast, *enthusiastic commitment, intrinsic regulation, desire to excel – mastery* and *perceived stress* were associated with lower frequency of SD symptoms at the intercept point. Indirect effects suggest that *EO climate* was indirectly associated with more frequent feelings of SD through *amotivated regulation,* and also provide some insight into the mechanisms through which playing level is associated SD. Specifically, the protective effect of elite athlete status is partly explained by increased *intrinsic regulation, DTE mastery* and *social support*, and the positive impact of the latter two variables on *enthusiastic commitment.* However, elite participation was also associated with more frequent feelings of SD through a more *EO climate* and the associated increase in *amotivated regulation*.

Excluding the negative impact of *perceived stress*, these results are in line with our hypotheses (see Table 7.1). The protective effect of elite participation again provides support for the value placed on Gaelic games participation by inter-county players (Geary et al., 2021; Hughes & Hassan, 2017; Kelly et al., 2018), while the exploration of indirect effects of playing level facilitates the unpacking of mechanisms underlying this protective effect; elite athletes reported more *intrinsic motivation, social support, desire to excel (mastery)* and *enthusiastic commitment*, which are adaptive driving forces for sport participation (Deci & Ryan, 2008; Scanlan et al., 2013). As such, these findings somewhat counteract the argument that elite athletes may be at increased risk for burnout, and instead suggest that the positive psychological attributes possessed by this group may protect them against RSA and SD specifically.

Furthermore, it is possible that the positive association between *playing level* and increased *stress* partly explains the seemingly counter-intuitive negative relationship between stress and SD; specifically, it may be that high-achieving players, such as elite athletes, experience increased stress associated with the substantial investment in and value placed on their sport participation, compared to those who care less about their sport participation and view it as a hobby. For example, research in the academic context has found positive interactions between high academic achievement, high stress and high task value (Joo et al., 2012). However, these results are in contrast to findings from the cross-sectional analyses in Chapter 5, and further exploration is needed to unpack this relationship.

The mean slope of SD in the unconditional model (Chapter 6) was positive, and the significant negative intercept-slope covariance suggests growth in SD over time was greater for athletes with lower SD at T1. Focusing on predictors of change, results suggest that representing more teams was associated with a greater increase in SD over time. Furthermore, elite athlete status also indirectly predicted growth in burnout over time through a combination of increased *perceived stress, number of teams, constrained commitment* and *EO climate. Amotivated regulation* (+), *stress* (+) and *constrained commitment* (-) improved the fit of the model when retained as predictors of change in SD, but were not significant in the model. Analysis incorporating a larger sample, and thus improved power, may find sufficient evidence for the role of these predictors (Muthén & Muthén, 2002).

The emergence of *number of teams* as a risk factor for the development of SD is contrary to our hypothesis (Table 7.1) and results of the cross-sectional analysis (Chapter 5), which suggested that athletes who represent more teams value their participation more highly. While *number of teams* was not significantly associated with the intercept in the final integrated model, it may be that the negative intercept-slope covariance in this model explains this relationship, such that *number of teams* may predict more frequent feelings of SD due its association with lower initial frequency of SD at T1 (see Appendix I.3). However, it may also be that representing more teams over time has a detrimental effect, and this is captured for the first time in this conditional growth model. From this perspective, these results may provide support for substantive concerns in Gaelic games (e.g. Duffy, 2016) about the risks of representing multiple teams simultaneously. Notably, early qualitative work on burnout identified feelings of wanting a break from sport participation and looking forward to the end of the season as characteristics of sport devaluation in rugby players representing multiple teams (Cresswell & Eklund, 2003). As discussed in Chapter 1, there is no designated off-season in Gaelic games and athletes may participate in multiple competitions both concurrently and consecutively across 12 months of the year. As such, it is possible that the prolonged nature of multi-team demands contribute to feelings of SD over time. In addition, the total positive indirect effect of *playing level* is contrary to the hypothesised positive direct effect of playing level, but again serves to highlight the risk factors for burnout associated with elite participation. Specifically, while elite athletes reported less frequent feelings of SD at T1 (intercept), they were more likely to experience increases in frequency of feelings of SD across the two year window due to higher levels of stress, operating in more ego-orientated climates and representing a greater number of teams.

7.5.1 Limitations

While this analysis provides novel insight into key predictors of burnout, there are some limitations to the work that should be acknowledged. Notably, restrictions related to the relatively small sample size impacted decision making in this analysis. Specifically, the need to ensure that the number of parameters did not exceed the observations, informed the decision to use average scores as time-invariant predictors of change, in place of the specification of time-varying predictors, which would have allowed for the assessment of the of impact of these variables on frequency of burnout symptoms at each timepoint (Preacher et al., 2008). The decision to specify covariances between variables that were significantly correlated was also informed by this consideration. In addition, the relatively small sample size to parameter ratio may have resulted in reduced power to detect additional key relationships in the data. As such, it is possible that a study with a larger sample size, which can facilitate a more complex model specification with greater power, would identify different significant paths.

In addition, the backwards elimination approach employed is limited by the issue of multiple testing, which can lead to an underestimation of *p*-values and biased regression coefficients (Chowdhury & Turin, 2020; Heinze et al., 2018). Furthermore, once a variable has been removed in the backwards approach, it is not re-entered into the model. However, it is possible that a dropped variable could become significant when other variables are removed (Chowdhury & Turin, 2020). As such, *p*-values can only be viewed as an indication of whether a variable is relevant or not when considered alongside the other variables in the model (Heinze et al., 2018). In addition, collinearity can have a substantial negative impact on the procedure (Chowdhury & Turin, 2020). Despite these limitations, this was considered to be the most appropriate approach in the current analysis due to the exploratory nature of the work and the aim of working towards a parsimonious model of burnout. In addition, preliminary tests of collinearity and the relatively conservative stopping points were implemented with a view to limiting the potential impact of these issues (Chowdhury & Turin, 2020).

7.5.2 Conclusion and Implications for the Thesis

These series of analyses are the first to integrate core components of the stress, motivation and commitment perspectives of burnout, with the aim of explaining both initial frequency and changes in burnout symptom frequency across a two-year period. Taken together, results of these analyses provide substantial support for an integrated approach to theoretical and practical work in the area of athlete burnout; a range of stress, commitment, motivation and demographic variables predicted both initial symptom frequency and rates of changes in PEE, RSA and SD, thus suggesting that each plays an important role in our understanding of burnout. In line with the overarching aim of identifying risk and protective factors for the development of burnout, findings indicated that athletes who train more across the season and are experiencing a sustained absence of motivation are at risk of a growing frequency of PEE. In contrast, athletes who play on more teams in the season show an increase in frequency of feelings of SD, and inter-county athletes and those experiencing constrained commitment are more likely to experience a reduction in feelings of RSA. In addition, the exploration of indirect effects provide a more nuanced insight into the mechanisms through which these factors impact upon the development of burnout.

In the context of this thesis, this analysis can be viewed as a culmination of the work in preceding chapters, insofar as it integrates and extends findings from the distinct cross-sectional analyses (Chapters 4 and 5) and the unconditional growth modelling (Chapter 6). Additional discussion of the implications of these findings in the context of the thesis and the literature more broadly is provided in Chapter 9.

Chapter 8. Exploring Athletes' Experiences of the Suspension of Organised Sport due to COVID-19, and the Impact on Athlete Burnout

8.1 Introduction

As noted briefly in Chapter 3 (Section 3.2.5), an additional research aim was specified while this project was already underway, in response to the unprecedented COVID-19 outbreak and the associated suspension of organised sport. Specifically, as data collection for this longitudinal project was taking place throughout the pandemic period, it was viewed as a unique opportunity to explore athletes' experiences of the suspension of sport and the impact of this period on athlete burnout. This chapter will outline the specific rationale underlying this analysis, as well as the methods employed, results and a discussion of these findings.

8.1.1 Analysis Rationale

A novel strain of coronavirus (COVID-19) associated with pneumonia-like symptoms emerged in the Wuhan province of China in late 2019 (WHO, 2020). The virus spread around the world and a pandemic was declared by the World Health Organization (WHO, 2020). With the aim suppressing the further spread of COVID-19, governments across the globe implemented a range of conditions and restrictions on the lives of citizens (Hale et al., 2020). These restrictions also resulted in the suspension, cancellation or deferral of sporting events globally. In Ireland, the organising bodies for Gaelic games announced the closure of facilities and a suspension of all activity in March 2020 (GAA, 2020). Players were eventually allowed to return to small-group training in June 2020 followed by the resumption of games in July 2020. However, restrictions remained in place, with weekly training sessions limited and teams prohibited from gathering indoors (GAA, 2020b).

As such, while there is no doubt that the pandemic disrupted every aspect of normal life, in the context of sport it can be viewed as a transition period or "change-event" that disrupts the quality and intensity of athletic engagement (Samuel & Tennenbaum, 2020). This conceptualisation is supported by recent a finding that almost 70% of American collegiate athletes feel "a lot has changed" since the onset of the pandemic (Garver et al., 2021). Supporting athletes through change-events has been identified as a key aspect of a sport psychologist's role (e.g. Samuel, 2013), and understanding how change-events impact athletes can facilitate this work (Samuel & Tenenbaum, 2011a). As such, the pandemic-induced suspension of the season provides us with a unique opportunity to explore athletes' experiences of a "longitudinal, multifaceted, unpredicted, non-controlled change-event" (Samuel & Tenenbaum, 2020, p.3).

In line with existing research highlighting the negative impact of unpredicted and uncontrolled change-events, such as injury (Samuel & Tenenbaum, 2011a), emerging research highlights the negative implications of the COVID-19 pandemic and associated restrictions on mental health outcomes. To date, researchers have identified increased levels of anxiety, depression and stress in the general population (Xiong et al., 2020), while negative mood (Aghababa et al., 2021) and significant increases in both perceived stress and dysfunctional psychobiosocial states (di Fronso et al., 2020) have been identified in athletes. However, the enforced suspension of organised sport may also have provided athletes with a break from the demands of sport, which have also been suggested to be a source of stress (Silva, 1990). For example, elite Irish Gaelic games players, 40% of whom report no time-off in an average season (Kelly et al., 2018), experienced an unprecedented 3-month suspension of organised sport. Detachment from sport, whereby athletes get a physical, cognitive and emotional break from sport demands, can act as a buffer against the negative effects of these demands (Balk et al., 2017). Furthermore, Balk and De Jonge (2021) identified a paradoxical relationship between sport demands and detachment, whereby athletes who report higher daily sport demands, and therefore are most in need of rest, tend to report lower daily detachment from sport. Our understanding of whether players treated the period as a break or continued to train in some capacity remains limited and requires further exploration. However, it is possible that a reduction in sport demands associated with the suspension period may have been beneficial in counteracting maladaptive responses to sport, such as athlete burnout. While, to our knowledge, the impact of change-events on burnout has yet to be explored, existing research indicates that unanticipated change-events that may commonly be viewed as negative, such as injury, can also be associated with positive psychological outcomes for athletes (Wadey et al., 2011).

As outlined in detail in Chapter 1 and Chapter 5, athlete burnout has been closely linked to sport demands and stress, both in existing research (Lin et al., 2021; see Chapter 5) and theoretically (Gustafsson et al., 2011; Silva, 1990; Smith, 1986). As such, while it is possible that feelings of burnout may have been impacted by increased stress levels associated with the COVID-19 change-event (e.g. di Fronso et al., 2020), athletes may also have experienced benefits associated with a reduction in training demands and possible increased detachment as a result of the enforced break from organised sport.

Furthermore, Samuel et al. (2020) argue that the impact of the COVID-19 change-event may vary depending on how athletes appraise and respond to it. Cognitive appraisal has also been shown to impact feelings of athlete burnout (Gomes et al., 2017). As such, a negative appraisal of the suspension period may involve focusing on lost opportunities to compete (Samuel et al., 2020), and may be associated with increased feelings of burnout. In contrast, a positive appraisal could involve focusing on the opportunity to improve skills or optimise rest and recovery (Samuel et al., 2020; Samuel & Tenenbaum, 2011), which may help to counteract feelings burnout. Similarly, athletes' feelings about the return to sport may differ; while many athletes likely welcomed the return, others may have experienced concerns due to the potential increased injury risk (Mohr et al., 2020) or the risk related to contracting the virus (e.g. Fogarty, 2020). In addition, due to the unprecedented nature of the suspension period, further exploration is needed to understand how athletes viewed and utilised this period from a training perspective and physical activity.

Overall, our understanding of the impact of this unanticipated change-event, namely the pandemic-induced suspension of sport, on maladaptive responses associated with sport participation remains limited. Furthermore, we currently have a limited understanding of how athletes appraised this change-event, how it affected training demands, and whether these factors impacted the extent to which athletes' experienced an adaptive or maladaptive response, in the context of burnout. Such insight may be used to inform next steps as sport resumes, as well as responses to future unanticipated change-events in sport.

8.1.2 Aims and Objectives

The aim of this analysis was to specifically examine whether levels of burnout and stress following the suspension of sport due to COVID-19 differed from the same point in the preceding season, and to explore how athletes perceived and utilised this suspension period and the subsequent return to sport. Specific research objectives were as follows;

1. To compare levels of PEE, RSA, SD and stress reported by athletes at T2 and T5.

2. To compare training demands reported by athletes at T2 and T5.
3. To examine athletes' positive and negative emotions about the return to sport.
4. To examine the extent to which athletes' utilised the suspension period as an opportunity to rest, to try different types of physical activity, and to work on sport-specific skills.
5. To assess whether changes in training demands, emotions about return to sport and how athletes' utilised the suspension period predicted burnout at T5.
6. To explore athletes perceptions of the positive and negative impact of the suspension period on their lives.

8.1.3 Hypotheses

Hypothesis 1. Levels of stress would increase, in line with existing research (di Fronso et al., 2020)

Hypothesis 2. Temporal demands of sport would decrease as a result of restrictions associated with the pandemic.

Hypothesis 3. Questions relating to athletes' positive and negative perceptions of the suspension period, how they utilised this period, and their feelings about the return to sport, were exploratory, with no specific hypotheses, and centred around improving our understanding of how athletes appraised this change-event.

Hypothesis 4. It was hypothesised that reduced on and off-field time demands, a positive perception of the suspension period, viewing the suspension period as an opportunity to rest, and positive emotions about the return to sport would predict lower levels of burnout following the change-event. As existing research and analyses conducted as part of this thesis suggests burnout is impacted both by stress (Lin et al., 2021; see Chapter 5) and previous levels of burnout (e.g. Lonsdale & Hodge 2011), we controlled for post-suspension stress and pre-pandemic burnout scores.

8.2 Method

8.2.1 Design

This analysis can be described as a subcomponent of the broader longitudinal work described in preceding chapters. Specifically, and as outlined above, the aims and analytic approach discussed in this chapter emerged in response to the COVID-19 outbreak and the associated suspension of Gaelic games, which occurred during T4 of data collection and continued for a number of months. As such, retaining a longitudinal approach but a specific focus of comparing data from before and after the suspension of sport and understanding athletes' experiences of this period, this analysis focused specifically on two of the six longitudinal data collection points discussed in this thesis; T2 (June – August 2019), and T5 (July – August 2020). T2 was a regular "in-season" period for Gaelic games athletes, and thus can be described as a period "Before COVID-19" (BC-19). In contrast, at T5 Gaelic games athletes were returning to a restricted training and games schedule following a 3-month suspension of all organised activity after the onset of the COVID-19 outbreak and, as such, this period can be described as a time "After the COVID-19-induced Suspension of sport" (AC-19S).

8.2.2 Overview of Participants

As outlined in detail in Chapter 3, any individual aged 18 or over at the time of initial recruitment (March 2019), and playing Gaelic games was eligible for participation in this study. However, only data from participants who completed the questionnaire at both T2 (BC-19) and T5 (AC-19S), and continued to participate in Gaelic games at these timepoints, were eligible for inclusion in the analyses described herein

8.2.3 Materials Relevant to this Analysis

As per the preceding chapters, the ABQ (Raedeke & Smith, 2001) was used to measure the three dimensions of athlete burnout (PEE, RSA and SD), and the 10-item PSS-10 (Cohen et al., 1994) was used to assess perceived daily-life stress at both the BC-19 and AC-19S time-points. In addition, data relating to average number of hours spent training for Gaelic games each week (*training hours)*, and the average number of hours dedicated to Gaelic games outside of physical training each week (*other hours)* was included in this analysis.

As outlined in detail below, additional materials were added to the questionnaire that athletes received at T5 specifically to address the aims associated with this chapter (see Appendices J1 – J3). Ethical approval for these additions was obtained from DCU Research Ethics Committee following the submission of an amendment form in June 2020 (See Appendix J4).

8.2.3.1 Perceived Impact and Utilisation of the Lockdown Period. A number of questions were included in the online questionnaire at the AC-19S timepoint with the aim of understanding how athletes utilised and perceived the suspension period and the initial resumption of sport. As our understanding of how athletes perceived this unprecedented period remains limited, a combination of closed and open-ended questions were deemed to be most appropriate (Brace, 2013), as outlined below.

Perceived impact of the suspension of training and games. Participants were asked to indicate the extent to which they felt the suspension period had a positive and negative impact on their life, in response to the following questions; "*to what extent has the suspension of training and games had a negative impact on your life?*" and "*to what extent has the suspension of training and games had a positive impact on your life?*". Responses were given on a Likert scale, from 1 (*not at all)* – 5 (*a great extent)*. These questions are based on similar questions from the change-event literature work (e.g. "how positive or negative were the outcomes of this event"; Samuel & Tenenbaum, 2011a, p.396).

Open-ended questions. Two open-ended questions were included to gain a deeper insight (Brace, 2013) into athletes' perceptions of the negative and positive impact of the suspension of the season; after the Likert-scale questions described above, participants were asked to "*please provide a short explanation for your response*". No character restrictions were applied.

How the lockdown period was utilised. Participants were asked a series of questions relating to how they utilised the lockdown period with respect to training/physical activity, including "*to what extent did you view the suspension of training/games as an opportunity to rest and recover away from Gaelic games?*", "*to what extent did you view the suspension of training/games as an opportunity to try different types of physical activity?*", and "*to what extent did you view the suspension of training/games as an opportunity to work on specific skills for Gaelic games?*". Responses were rated on a Likert scale from 1 (*not at all)* – 5 (*a great extent*). The extent to which athletes perceived a change in their level of physical activity during the lockdown period compared to the same time in a regular season was assessed using the following question "*How did your amount of weekly physical activity while training/games suspended compare to the same period in a regular season*?", with responses measured on a Likert scale from 1 (*much less*) – 5 (*much more*). We also asked about the degree to which athletes followed a specific training plan, including "*to what extent did you follow a specific training plan during the suspension of training/games?*" and "*to what extent was your training prescribed by your Gaelic* *games coach?*". Responses to both question were given on a Likert scale from 1 (n*ot at all*) – 5 (*to a great extent*).

The questions included were framed with the aim of capturing whether athletes used the period to rest, or whether they continued to focus on and train for Gaelic games. Furthermore, due to restrictions in access to facilities required for sport-specific training (e.g. Gaelic games pitches), the researcher felt it was important to explore whether athletes engaged in other forms of physical activity.

8.2.3.2 The Sport Emotion Questionnaire (SEQ). The SEQ (Jones et al., 2005) was used to assess athletes' emotions about the return to sport. Athletes rated the degree to which they were experiencing 22 specific feelings, on a Likert scale from 0 (*not at all*) – 4 (*strongly*). These feelings are representative of five different emotions, namely *anxiety, dejection, anger, excitement* and *happiness,* which can be further divided into the higher-order categories of *unpleasant emotions (anxiety, dejection, anger)* and *pleasant emotions (excitement, happiness)*. Average scores on the higher order subscales of *pleasant emotions* and *unpleasant emotions* were calculated (Jones et al., 2005), such that participants could score a maximum of 4 and a minimum of 0. Jones et al. (2005) found strong support for the face validity of the SEQ as a measure of emotions prior to competition, while factor analysis indicated item loadings ranging from 0.60 to 0.82 for items on their respective subscales. Arnold and Fletcher (2015) also support the validity and reliability of the SEQ and suggest that the hierarchical structure described may be appropriate in situations where parsimony is important. This was the case in the current analysis, as sample size was relatively small and we aimed to achieve the recommended participant-predictor ratio of 10:1 for multiple regression (VanVoorhis & Morgan, 2007).

With permission from the author (Appendix J3), the instructions for the scale were changed such that the original sentence "*indicate on the scale next to each item how you feel right now, at this moment, in relation to the upcoming competition*", read "*indicate on the scale next to each item how you feel right now, at this moment, in relation to the return to competition following the suspension of training and games due to the COVID-19 pandemic*". As such, the measure remained an assessment of pre-competition emotions, in line with its intended and validated use (Jones et al., 2005). Reliability of the two higher order scales was assessed using data from the 104 participants who completed the questionnaire. Cronbach's alpha levels 0.92 and 0.95 for the *unpleasant* and *pleasant* subscales respectively indicate reliability.

The above measures were incorporated at the beginning of the online questionnaire at T5, along with the additional materials outlined in Chapter 3.

8.2.4 Data Analysis

Only participants who completed the questionnaire both BC-19 and AC-19S and continued to participate in Gaelic games AC-19S were eligible for inclusion in the final analyses described below. As the COVID-19 outbreak was an unanticipated variable impacting the broader longitudinal study, the inferential analyses described are, by necessity, post-hoc, and therefore a priori power analyses were not conducted. Confidence intervals are reported for parametric tests, and the researcher ensured that the sample to predictor ratio was in line with the recommendation of 10:1 for multiple regression (VanVoorhis & Morgan, 2007).

8.2.4.1 Descriptive Statistics. Mean scores and standard deviations of the variables of interest were calculated for both timepoints, as were the bivariate correlations between variables.

8.2.4.2 Comparing Data Before and After the Suspension of Sport

Athlete Burnout. As preliminary analyses indicated that data from the SD and PEE subscales did not meet the assumption of normality, it was not appropriate to conduct a RM MANOVA as originally planned. As such, in line with other burnout studies that have encountered similar issues (e.g. Aktas et al., 2021), we employed a combination of univariate non-parametric and parametric tests; Wilcoxon Signed-Ranks tests were used to compare SD and PEE across the two time-points, and a paired sample t-test was used to compare scores on the RSA dimension.

Perceived Stress. A paired sample t-test was used to compare participant's mean scores on the PSS-10 BC-19 and AC-19S.

Training demands. Preliminary analyses revealed that the data violated the assumptions of a t-test, namely normality and an absence of outliers. As such, the non-parametric Wilcoxon Signed-Ranks test was employed to compare mean scores on these variables across BC-19 and AC-19S.

8.2.4.3 Assessing Predictors of Burnout after the Suspension of Sport due to COVID-19. Hierarchical multiple regression (HMR) analysis was used to identify predictors of burnout AC-19S, with separate models specified for PEE, RSA and SD. In order to partial-out the impact of burnout BC-19 and *perceived stress*, which has been strongly associated with burnout (Lin et al., 2021; also see Chapter 5), the burnout dimension score BC-19 and PSS-10 score AC-19S were included in step 1 in each HMR. The following variables were included at step 2; (1) perceived negative impact of the suspension period, (2) perceived positive impact of the suspension period, (3) extent to which the period was viewed as an opportunity to rest/recover from sport, (4) pleasant emotions about the return to sport, (5) unpleasant emotions about the return to sport, and the difference in weekly sport-specific (6) *training hours* and (7) *other hours* reported AC-19S compared to BC-19.

While additional descriptive data gathered as part of this analysis (i.e. extent to which athletes followed a training plan, tried different physical activities, focused on sport-specific skills, and levels of physical activity differed compared to the regular season) provided novel insight into how athletes utilised this unprecedented period without Gaelic games, these variables were excluded from the multiple regression with the aim of achieving a parsimonious model and achieving a sample to predictor ratio of 10:1, as recommended for multiple regression (VanVoorhis & Morgan, 2007). Furthermore, the variables retained for the HMR more broadly captured athletes' appraisal of the period, as well as rest and training demands.

Notably, a range of additional predictors of burnout have been identified throughout the preceding chapters of this thesis. However, this analysis had a unique and singular focus on the pandemic period as a change event and, as such the predictors of interest were those related specifically to the COVID-19 outbreak and the associated suspension of sport.

8.2.4.4 Content Analysis of Open-ended Responses

All participants responded to the open-ended questions relating to the perceived positive and negative impact of the suspension of the season. Responses were coded using content analysis, which allowed us to make inferences about textual data and to quantify this data (Downe-Wambolt, 1992). Responses were transferred to an Excel file, and were then reviewed independently by the researcher and a colleague, who was a masters student operating in a research assistant role over a number of months. Following the steps outlined by Bengtsson (2016), both reviewers familiarised themselves with the data, and then used inductive coding to label each response (*decontextualization*; Bengtsson, 2016). Where participants gave multi-faceted answers, different aspects of the response could be coded separately. Codes were then reviewed alongside the raw data (*recontextualization*; Bengtsson, 2016). Both researchers independently conducted *categorisation* of data, grouping codes together based on patterns of meaning across the codes (Bengtsson, 2016). The agreement between the two reviewers on coding and associated categories was assessed using Cohen's Kappa (Cohen, 1960). The reviewers met to discuss any disagreements, and all final decisions were agreed by both. Appropriate quotes were identified as exemplars of each category and the instances of each were counted for the purpose of descriptive data (Bengtsson, 2016).

8.3 Results

8.3.1 Descriptive Statistics

One hundred and seventy-six participants completed the survey BC-19, and 103 of these athletes went on to complete the questionnaire at the AC-19S timepoint (male n = 44, female n = 59). However, eleven participants (male n = 5, female n = 6) indicated that they were no longer playing Gaelic games AC-19S, and thus were excluded from the final analyses. As such, 92 participants (male n = 39, female n = 53; Age AC-19S = 19 – 56, M = 27.05, SD = 7.56) were retained for the subsequent analyses. At the BC-19 timepoint 27.2% (n = 25) of participants were playing at the elite level of Gaelic games. 31.5% (n = 29) participants were playing at the elite level at the AC-19S timepoint.

Mean scores and standard deviations of scores are outlined in Table 8.1. A breakdown of participants' responses to questions about their experience of the suspension period are outlined in Table 8.2; no one response emerged as most common, with mean values indicating that, on average, athletes viewed the period as both moderately positive and negative, and also used the time to *rest/recover, try new things,* *work on GAA skills* and *followed a specific training plan* all to a moderate extent. Athletes' emotional responses to the return to play AC-19S were as follows; *pleasant emotions* $M = 2.58$, $SD = 1.01$, and *unpleasant emotions* $M = 0.74$, $SD = 0.69$. The correlation matrix is available in Appendix K.

Table 8.1

Means and standard deviations of variables assessed across time-points

Variable	Before COVID-19		After COVID-19 Suspension	
	M	***SD***	***M***	***SD***
PEE	2.23	0.68	2.10	0.81
RSA	2.62	0.81	2.72	0.78
SD	2.11	0.88	2.23	0.94
PSS	17.73	6.93	17.14	7.82
Training Hours	5.74	2.95	5.36	3.25
Other Hours	3.79	3.27	1.92	1.86

8.3.2 Comparison of Retained Athletes v. AC-19S Non-Responders and Sport Leavers

Mann-Whitney U tests (with Bonferonni adjustment 0.05/6 = 0.008) revealed no significant differences between athletes who completed the BC-19 time-point only (AC-19S "non-responders"; $n = 73$) and those who completed both the BC-19 and AC-19S phases ("retained athletes"; $n = 103$) on PEE ($z = -0.14$, $p > 0.05$, $U = 3713$; non-responders Md = 2.0, retained athletes Md = 2.2), RSA ($z = -0.88$, $p > 0.05$, $U = 3468.5$; non-responders Md = 2.6, retained athletes Md = 2.6), SD ($z = -1.10$, $p > 0.05$, $U = 3394.5$; non-responders Md = 1.8, retained athletes Md = 2.0), *perceived stress* ($z = -0.41$, $p > 0.05$, $U = 3573.5$; non-responders Md = 18.0, retained athletes Md = 17.0), *training hours* ($z = -0.03$, $p > 0.05$, $U = 3697.5$, non-responders Md = 5.5, retained athletes Md = 5.0), or *additional hours* ($z = -0.93$, $p > 0.05$, $U = 3607.5$; non-responders Md = 2.0, retained athletes Md = 2.0).

Mann-Whitney U tests (with Bonferonni adjustment 0.05/3 = 0.017) were also used to assess whether scores reported BC-19 by athletes who responded to the AC-19S timepoint but indicated they had dropped out of their sport ("sport leavers"; n = 11), and therefore were excluded from subsequent analyses, differed from those who stayed in sport ("sport maintainers"; n = 93). No significant differences between the groups were identified in PEE (z = -0.32, p > 0.05, U = 481.5, sport leavers Md = 2.1, sport maintainers Md = 2.2), RSA (z = -1.34, p > 0.05, U = 381.5, sport leavers Md = 2.6, sport maintainers Md = 2.6), SD (z = -2.43, p > 0.05, U = 282.0 sport leavers Md = 2.0, sport maintainers Md = 2.0), *perceived stress* (z = -0.67, p > 0.05, U = 443.5, sport leavers Md = 18.0, sport maintainers Md = 17.0), *training hours* (z = -1.18, p > 0.05, U =401.0, sport leavers Md = 5.5, sport maintainers Md = 6.0), or *additional hours* (z = -.92, p > 0.05, U = 417.0, sport leavers Md = 2.0, sport maintainers Md = 3.0).

Table 8.2

Breakdown of responses about the perception and utilisation of the lockdown period

Question	**not at all**	**slightly**	**moder-ately**	**conside-rably**	**greatly**	***M***	***SD***
Negative impact of suspension	5.4%	23.9%	22.8%	27.2%	20.7%	3.34	1.21
Positive impact of suspension	14.1%	26.1%	26.1%	21.7%	12.0%	2.91	1.24
Chance to rest/recover	15.5%	21.6%	24.7%	23.7%	14.4%	3.04	1.26
Chance to try different physical activities	12.2%	21.4%	24.5%	20.4%	21.4%	3.20	1.28
Chance to work on GAA skills	18.6%	19.6%	27.8%	17.5%	16.5%	3.02	1.31
Followed specific training plan	18.4%	22.4%	21.4%	19.4%	18.4%	3.00	1.37
Plan prescribed by coach	23.5%	22.4%	23.5%	12.2%	18.4%	2.86	1.40
How did your physical activity compare to same time in a regular season?	**Much less**	**somewhat less**	**about the same**	**somewhat more**	**much more**		
	28.9%	24.7%	23.7%	18.6%	4.1%	2.45	1.19

8.3.3 Comparing Data Before and After COVID-19

As data was being compared across time-points on six different measures (PEE, RSA, SD, PSS-10, *training hours, other hours*), the Bonferonni adjustment was applied with the aim of reducing the risk of Type 1 error, such that $\alpha = 0.05/6 = 0.008$ for each analysis.

8.3.3.1 Athlete Burnout. Wilcoxon signed ranks tests indicated there was a significant reduction in PEE scores from BC-19 (Md = 2.2) to AC-19S (Md = 2.0) at the

0.05 alpha level (*z* = -2.12, $p < 0.05$, r = 0.22), but this result was not significant at the reduced alpha level ($p > 0.008$). A Wilcoxon signed ranks test also revealed no significant changes SD from BC-19 (Md = 2.0) to AC-19S (Md = 2.2, *z* = -1.19, $p > 0.008$). A paired sample t-test revealed no significant difference in RSA across time-points; t (91) = -1.38, $p > 0.008$, *M* difference = -0.09, *SD* difference = 0.65, 95% CI [-0.23 – 0.04].

8.3.3.2 Perceived Stress. Preliminary analyses indicated that the *perceived stress* data, as measured by the PSS-10, did not violate the assumptions of a paired-sample t-test. Results of the test did not indicate any significant differences in *perceived stress* from BC-19 (*M* = 17.59, *SD* = 7.09) to AC-19S (*M* = 17.14, *SD* = 7.82); *t*(91) = 0.703, $p > 0.008$, *M* difference = 0.45, *SD* difference = 6.08, 95% CI [-0.81, 1.70]

8.3.3.3 Training Hours and Other Hours. A Wilcoxon Signed-Ranks test revealed that *additional hours* were significantly reduced AC-19S (Md = 1.0) compared to BC-19 (Md = 3.0); *z* = -5.16, $p < 0.001$, *r* = 0.54 (large effect size). No significant difference was evident in *training hours* across the two timepoints (z = 1.15, p > 0.05; BC-19 Md = 6.0, AC-19S Md = 5.0).

8.3.4 Hierarchical Multiple Regression

Preliminary analyses confirmed that the data did not violate the assumptions of normality, linearity, multicollinearity, homoscedasticity or independence of residuals in each case. For each analysis, the maximum Mahalanobis distance (33.35 – 34.25) was above the critical chi-square for nine independent variables (27.88), indicating the presence of multivariate outliers. However, the data was retained as the maximum Cook's distance value in each case was well below the critical value of 1 (0.10 – 0.20) suggesting there were no influential cases impacting the models (Pallant, 2013). The results of each HMR, including beta values, standard error beta values, significance levels, R^2 and adjusted R^2 are outlined in Table 8.3. Inter-item correlations for the variables included in the HMR are provided in the Appendix K.

8.3.4.1 PEE. Step 1 of the model, which included *Stress AC-19S* and *PEE BC-19*, was significant, accounting for 36.2% of variance in PEE scores AC-19S [$R^2 = 0.36$, $F(2,87) = 24.66$, $p < 0.001$]. With the addition of Block 2 (*positive impact, negative impact*, *rest/recovery, pleasant emotions, unpleasant emotions, change in training hours* and *change in other hours*), the model accounted for 50.5% of variance in PEE scores AC-19S [$R^2 = 0.51$, $F(9, 80) = 9.08$, $p < 0.001$]. Block 2 alone accounted for 14.4% of variance, which was significant [R^2 change =0.144, F change (7,80) = 3.32, $p < 0.01$]. In the final model, *stress* AC-19S ($t = 2.26$, $p < 0.05$; 95% CI 0.002, 0.04), PEE BC-19 ($t = 3.65$, $p < 0.001$; 95% CI 0.18, 0.62), *unpleasant emotions* ($t = 2.24$, $p < 0.05$; 95% CI 0.03, 0.48) and *change in other hours* ($t = -2.18$, $p <0.05$; 95% CI -0.09, -0.00) were significant contributors to the model.

8.3.4.2 RSA. Step 1 of the model (*Stress AC-19S* and *RSA BC-19)*, was significant, accounting for 49.2% of variance in RSA scores AC-19S [$R^2 = 0.49$, $F(2,87) = 42.13$, $p < 0.001$]. With the addition of Block 2, the model accounted for 57.4% of variance in RSA scores AC-19S [$R^2 = 0.57$, $F(9,80) = 12.00$]. Block 2 alone accounted for 8.2% of variance in RSA, which was significant [R^2 change =0.082, F change (7,80) = 2.07, $p < 0.05$]. *Stress* AC-19S ($t = 2.37$, $p < 0.05$; 95% CI 0.00, 0.04), RSA BC-19 ($t = 6.88$, $p < 0.001$; 95% CI 0.41, 0.73) and *pleasant emotions* about the return to play ($t = -2.77$, $p < 0.01$; 95% CI -0.33, -0.05) were significant contributors to the final model.

8.3.4.3 SD. Step 1 of the model (*Stress* AC-19S and *SD* BC-19*)*, was significant, accounting for 47% of variance in SD scores AC-19S [$R^2 = 0.47$, $F(2,87) = 38.62$, $p < 0.001$]. With the addition of Block 2, the model accounted for 61.5% of variance in SD scores AC-19S [$R^2 = 0.62$, $F(9,80) = 14.199$, $p < 0.001$]. Block 2 alone accounted for 14.5% of variance in *SD*, which was significant [R^2 change =0.15, *F* change (7,80) = 4.30, $p < 0.001$]. SD BC-19 ($t = 7.79$, $p < 0.001$; 95% CI 0.46, 0.78), *pleasant emotions* ($t = -3.49$, $p < 0.005$; 95% CI -0.43, -0.12) and *chance to rest/recover* ($t = 2.01$, $p < 0.05$; 95% CI 0.00, 0.22) were significant contributors to the final model.

8.3.5 Content Analysis of Open-ended Questions

The categories generated, sample quotes, number of responses under each category and Cohen's Kappa are outlined in Table 8.4. Responses under the category "more time for other things" were the most frequently cited positive outcome of the suspension of the season due to the pandemic, while "missed the team environment" was the most commonly cited negative aspect of the suspension period. Agreement on coding ranged from 92.59 – 97.09%, indicating strong agreement between reviewers (McHugh, 2012).

8.4 Discussion

This analysis has provided novel insight into the impact of an unanticipated, longitudinal change-event, namely the pandemic-induced suspension of organised sport, on athlete burnout and the related factors in Gaelic games athletes. In contrast to other studies highlighting the negative impact of the pandemic on mental health (e.g. di Fronso et al., 2020; Xiong et al., 2020), findings did not indicate any significant increases or decreases in symptoms of athlete burnout or perceived stress reported by participants following the suspension of sport. However, while *training demands* also remained stable, there was a significant reduction in off-field sport demands upon the resumption of sport. Predictors of burnout following an unanticipated change-event were also examined; in line with existing theory (e.g. Smith, 1986) and results of Chapter 5, burnout BC-19 and stress were significant positive predictors of burnout.

Table 8.3

Results of HMR Analyses (including; beta values, standard error beta values, significance levels, R^2 and adjusted R^2).

Variable	Exhaustion HMR					Reduced Sense of Accomplishment HMR					Sport Devaluation HMR				
	B	**SEB**	**β**	**R^2**	**ΔR^2**	**B**	**SEB**	**β**	**R^2**	**ΔR^2**	**B**	**SEB**	**β**	**R^2**	**ΔR^2**
Step 1				0.362***	0.347				0.492***	0.480				0.470***	0.458
Step 2				0.505***	0.450				0.574***	0.527				0.615***	0.572
(Constant)	0.41	0.36				1.59	0.37				1.20	0.39			
Stress AC-19S	0.02	0.01	0.20*			0.02	0.01	0.21*			0.01	0.01	0.08		
PEE BC-19	0.40	0.11	0.34***			/	/	/			/	/	/		
RSA BC-19	/	/	/			0.57	0.08	0.59***			/	/	/		
SD BC-19	/	/	/			/	/	/			0.62	0.08	0.58***		
Negative Impact	-0.07	0.06	-0.10			0.02	0.05	0.02			-0.05	0.06	-0.06		
Positive Impact	0.08	0.05	0.13			-0.06	0.05	-0.09			0.01	0.06	0.02		
Rest/recover	0.08	0.06	-0.10			-0.03	0.05	-0.05			0.11	0.06	0.15*		
Unpleasant emotions	0.08	0.04	0.22*			-0.03	0.03	-0.09			-0.01	0.04	-0.02		
Pleasant emotions	-0.02	0.04	-0.06			-0.10	0.03	-0.24**			-0.14	0.04	-0.29**		
Change in training hours	-0.00	0.02	-0.01			-0.01	0.02	-0.03			-0.01	0.02	-0.04		
Change in other hours	-0.05	0.02	-0.18*			-0.03	0.02	-0.12			-0.04	0.02	-0.13		

Key: *(p<.05); **(p<.01); ***(p<.001); / = variable not included in this model

Table 8.4

Content Analysis of the open-ended responses relating to positive/negatives of the suspension of sport due to COVID-19

Question	Categories Generated	Description	Quotes	Freq-uency	κ
Positive aspects of the suspension period	*More time for other things*	Reference to additional free time for other priorities, as a result of reduced sport commitments	*"it allowed me to focus more on spending time with my family and completed online courses I've been looking to do for a long time";"more time to do things I wanted to do but never had time to"*	47	0.85
	Enjoyed the break/rest from the demands of Gaelic games	Reference to enjoying the break or rest from the demands/commitment associated with Gaelic games participation	*"really enjoyed the down time and not having to constantly plan my life around training and games";"forced me to slow down and take a break"*	31	0.88
	Chance to reflect	Reference to opportunity for reflection/realisations made during the period	*"Re-found [sic] why I like it"; "I realised that I'd be fine without playing sport and that I enjoy other forms of exercise"*	17	0.89
	Chance to improve as a player	Reference to using the time to focus on improving as a Gaelic games player	*"more free time to concentrate on other areas of game which require individual rather than collective participation";"it turned out by having time to train myself and work on running I became fitter from the time off as I could pick and choose days I trained and maximised my recovery"*	10	0.78
	There are no positives	No reference to any positives/benefits of the period	*"the suspension had no positive impact on my mental health and well-being"*	15	1.00
Negative aspects of the suspension period	*Missed the team environment*	Reference to missing teammates and the group environment	*"not having the usual group environment to train in was tough to deal with at times"; "missed group training sessions and seeing the team"*	59	0.89
	Missed sport the routine	Reference to missing the sport itself and the associated routine/structure	"lack of routine and structure to my week"; "complete flip of lifestyle and routine"	32	0.81
	Negative impact on physical health and activity levels	Reference to the negative impact on physical health and activity levels	*"fitness levels dropped dramatically"; "it lead to reduced physical activities"*	32	0.84
	Absence of outlet negatively impacted mental health	Reference to negative impact on mental health without sport as an outlet	*"my mental health wasn't as good without football, as a healthcare worker I really struggled without the time out football gave me"*	26	0.93
	'*no negative impact*'	No reference to negative impact	*"didn't miss the game that much"*	11	1.00

Notes. Frequency = number of responses categorised; **κ** = Cohen's Kappa

Furthermore, when levels of burnout BC-19 and stress were controlled for, a *reduction in other hours* predicted less frequent feelings of PEE AC-19S, while *unpleasant emotions* predicted more frequent feelings of PEE. In contrast, *pleasant emotions* about the return to sport predicted less frequent RSA and SD AC-19S. While these findings are in line with our hypotheses, the positive relationship between SD and *viewing the suspension period as a time to rest*, and the absence of significant impacts of *training hours* and appraisal of the change-event on burnout were contrary to our hypotheses.

As such, the data suggests that the change-event neither exacerbated nor relieved the maladaptive responses of burnout or stress. The stable stress levels identified in this sample are in contrast to the significant increase in perceived stress, from low to moderate, identified in Italian athletes following the COVID-19 outbreak (di Fronso et al., 2020). However, it was notable that mean *perceived stress* for these Gaelic games athletes were in the 'moderate stress' category (Cohen et al., 1994) before and after the change-event, which may indicate that these athletes found their sport particularly stressful during a regular season. As such, it is possible that any potential increase in stress associated with the pandemic was offset by a reduction in stress associated with sport participation and increased detachment from sport; an argument that is supported when we consider the qualitative data, where "more time for other things" and "enjoyed the break/rest from the demands of Gaelic games" (e.g. "*no busy schedule, time to appreciate life*") were the most commonly cited positive outcomes of the suspension period. Previous quantitative (Woods et al., 2020) and qualitative (Hughes & Hassan, 2017) research has identified the struggle to balance competing priorities with sport commitments as an issue negatively impacting Gaelic games players and other amateur sports-people such as student-athletes (e.g. Kristiansen, 2016), while increased demands have also been associated with less detachment from sport (Balk & De Jonge, 2021). However, beyond *training hours* and *other hours*, it was not possible to disaggregate specific sources of stress or primary "stressing factors" (Cerclé et al., 2008, p. 228) to explore this further in either this analysis or di Fronso et al.'s (2020) work based on the general stress measure employed (i.e. PSS-10).

In addition, while the researcher theorised that the suspension period may have provided athletes with a break from the demands of sport, examination of the range of responses to this change-event suggests that many athletes were likely unable to achieve the necessary conditions for complete detachment, which is characterised both by physical rest, and cognitive and emotional disengagement or "switching off" from one's sport (Balk et al., 2017; Eccles & Kazmier, 2019); this may provide some explanation for the absence of a change in burnout. Specifically, although the data does indicate that a majority of athletes were less active during the suspension period than in a regular season, off-field demands were reduced, and "*enjoying the break from the demands of Gaelic games*" emerged as a positive outcome of the change-event, there were no significant changes in the temporal demands of physical training, and most athletes continued to focus on improving Gaelic games-specific skills to at least some extent, with a number viewing the period as a "*chance to improve as a player*". Furthermore, open-ended responses pointed to a range of negative consequences associated with the suspension period, including a negative impact on physical and mental health, and missing routine and the team environment. The latter point may suggest athletes' need for social relatedness, which has been associated with decreased burnout (e.g. Li et al., 2013), was unfulfilled during the suspension. In combination, these data highlight the variety and complexity of responses to an unanticipated, non-controlled change-event, and suggest that, despite suspensions to organised sport, this period did not provide sufficient opportunity for sport detachment for all athletes.

In addition, although no significant changes in burnout symptoms were identified in this analysis, our results suggest that frequency of feelings of burnout can be predicted by factors and responses associated with a change-event, and, as such, highlight the importance of exploring and understanding these variables. Specifically, results indicate that, following an unanticipated suspension of sport, reducing *other hours* associated with sport participation, working to promote *pleasant emotions* of excitement and happiness, and guarding against feelings of anxiety, anger and dejection about returning to sport may reduce the risk of burnout. The impact of athletes' appraisals of the return to sport here provides some support for the argument that a positive emotional response to a change-event is adaptive, while a negative emotional response is maladaptive (Samuel & Tenenbaum, 2011b). In addition, the positive association between a reduction in *other hours* committed to sport, averages for which almost halved AC-19S compared to pre-pandemic data, and less frequent feelings of exhaustion provides support for existing research and theory linking sport demands and burnout (e.g. Cresswell & Eklund, 2006b; Silva, 1990), and suggests that efforts to reduce off-field time commitments can reduce feelings of burnout even if physical training demands are maintained. The qualitative data further highlights the reduction in demands on athletes' time as a positive outcome of this change-event, under the categories of '*more time for other things*' and '*enjoyed the break from the demands of Gaelic games'*. Away from the focus on change-events, these results also provide further support both for the importance of creating opportunities for detachment from sport (Balk et al., 2017), and for the argument that an imbalance in sport-life demands may play a role in burnout in amateur athletes (Woods et al., 2020). Key stakeholders in amateur sports should consider the positive impact of this reduction in *other hours*, which was likely a direct result of COVID-19-related restrictions (GAA, 2020), when making decisions around the continuation or cessation of these policies as we emerge from the pandemic change-event.

Furthermore, in a result that appears to be at odds with research highlighting the importance of rest for athletes (e.g. Tabei et al., 2012), key stakeholders in sport should be aware that athletes who view a change-event involving the suspension of sport as a *chance to rest/recover* can experience more frequent feelings of sport devaluation. While contrary to the researcher's hypothesis, some explanation for this relationship may be provided by the sentiments expressed through the open-ended responses; under the "*chance to reflect*" category, which relates to realisations and reflections made by athletes as a result of the change-event, a number of respondents suggested that the enforced break from the demands of sport led them to the realisation that sport no longer held the same level of importance in their lives (e.g. "*I realised I'd be fine without playing sport*" and "*I have decided that the effort of Gaelic games is no longer worth the reward*"). These findings may also support the idea that athletes employ sport devaluation as a coping strategy to deal with exhaustion, as suggested in the job burnout literature (Maslach et al., 2001), although support for this temporal relationship between burnout dimensions is lacking in the sport context (Lundkvist et al., 2018).

Finally, and again in contrast to the hypotheses specified, athletes' positive and negative appraisals of this change-event did not impact feelings of burnout. However, this may be explained by the fact that the majority of respondents reported a mixture of positive and negative perceptions, thus highlighting the complex nature of this change-event. Specifically, while almost 95% of participants noted some negative impact of this suspension period, which is in line with data from American collegiate athletes (Garver et al., 2021), almost 86% of participants also felt there were some positives associated with the suspension of sport. Importantly, the qualitative data allowed us to explore the rationale behind these responses with greater nuance, and may help to inform responses to future change-events; categories from this content analysis associated with the negative impact of the change-event highlight the important role of sport in these athletes' lives, and suggest that, in cases where a change-event substantially disrupts sport participation, maintaining social interactions and a routine, as well as encouraging athletes to continue to be physically active, may be especially important. In addition, practitioners and key stakeholders working with athletes through similar change-events should consider how they could facilitate some of the positive responses reported here; for example, focusing on having time to explore other interests or improving as an athlete. Furthermore, it is also important to consider how we might create opportunities for athletes to continue to experience the benefits associated with the suspension period, beyond this change-event. For example, designated time off from the physical, emotional and cognitive demands of sport, which has been associated with reductions in stress (e.g. Balk et al., 2017), and optimal rest conditions (Eccles & Kazmier, 2019) may be beneficial to allow for these experiences.

Overall, this analysis provides novel and important insight into the complexities of a change-event experience, and the implications for burnout. While no significant changes in burnout or stress were identified, results suggest that close attention should be paid to previous burnout and stress levels reported by athletes, as these factors predicted more frequency symptoms of burnout following a change-event. Furthermore, in the context of the return to sport following a change-event, findings suggest that key stakeholders, such as sport psychologists, coaches and organising bodies, should work to reduce off-field temporal demands associated with sport, and encourage feelings of excitement and happiness about resuming sport participation, while working to address any anxiety, fear or anger. Interventions aimed at reducing anxiety around the return to sport following injury may be beneficial in this context, for example reducing pressure to return and providing sufficient social support (e.g. Podlog et al., 2011).

8.4.1 Limitations

Notwithstanding the novel insight into athletes' experiences of an unanticipated change-event provided by this analysis, we must acknowledge some limitations of the analysis. Firstly, because data was gathered for the AC-19S (i.e. T5) time-point four months after the onset of social distancing measures in Ireland, it is possible that this analysis did not account for changes that may have occurred earlier on in the pandemic. Notably, and as outlined in Chapter 6, the introduction of COVID-19 restrictions in Ireland and the subsequent suspension of the Gaelic games season were announced just four days before data collection at T4 was scheduled to begin. In addition, due to the completely novel and unprecedented nature of the pandemic, the researcher could not anticipate the length of the disruption or potentially key considerations relating to its impact. As such, no amendments or additions were made to the questionnaire at T4. In contrast, as the pandemic and associated restrictions continued approaching T5, the researcher was better positioned to identify useful additions to the questionnaire and to apply for appropriate ethical approval. Furthermore, as the longitudinal analysis outlined in Chapter 6 had not been conducted at this point, the decision to compare data from T2 and T5 was also informed by existing literature that has identified changes in burnout across different points of the sport season (Cresswell, 2009; Cresswell & Eklund, 2006a), with a view to mitigating the potential the impact of this variability by comparing data gathered at the same time-point in the two seasons.

In addition, as a result of attrition across time-points, sample size for this specific analysis was relatively small, although we did achieve the recommended ratio of participations to predictors (10:1; VanVoorhis & Morgan, 2007) for HMR. Where data is available for athletes pre- and post-change-event, future research should examine changes in burnout across a larger sample of athletes from a range of sports. A focus on specific stressors, such as general life and sport-specific stress, as well as an exploration of potential mediators and moderators of the stress-burnout relationship, may also provide a more nuanced insight into the impact of such a change-event.

Findings from this analysis can help to inform decisions relating to how athletes are supported during unanticipated, non-controlled changed-events, and the return to play. As we move out of the pandemic, researchers should continue to explore the impact of unanticipated change-events and suspension periods on athlete burnout and stress, with a view to developing guidelines aimed at reducing maladaptive responses.

8.4.2 Implications for the Thesis.

As noted in Chapter 6 and discussed throughout the current chapter, it cannot be denied that the sporting season, and life more generally, in 2020 differed substantially from what might be described as a normal year. However, this period could also be viewed as a unique opportunity to gain insight into the implications of an unanticipated break from the demands of sport and change-events more broadly on symptoms of athlete burnout, thus adding to our understanding of this complex syndrome in a novel way. As such, this chapter aligns closely with the overarching aim of thesis, which is to understand risk and protective factors for the development of burnout. Furthermore, the findings of this analysis, which suggest that frequency of burnout symptoms during the COVID-19-affected season were comparable to a regular season, may increase the generalisability of findings from longitudinal analyses conducted across this period (i.e. Chapters 6 and 7).

Chapter 9. General Discussion of the Research Programme

9.1 Introduction

This final chapter will begin with an overview of key findings across this programme of research, followed by efforts to contextualise this work within the existing literature more broadly. This discussion will focus on the contribution of this work to our understanding of athlete burnout, and the implications of findings for research and practice in the area. The chapter will also discuss the strengths and limitations of the research programme in full, and provide concluding remarks on the body of work.

9.2 Overview of Key Findings across the Programme of Research

Sport participation is commonly associated with positive psychosocial outcomes (Eime et al., 2010, 2013). However, athletes are now experiencing burnout at a greater frequency than ever before (Madigan et al., 2022), with those affected at an increased risk of sport dropout (Cresswell & Eklund, 2006b, 2007; Gustafsson et al., 2008) and psychological and physical ill-health (Cresswell & Eklund, 2006b; De Francisco et al., 2016; Gerber et al., 2018; Gustafsson et al., 2008). As such, understanding the risk and protective factors for the development of burnout symptoms is hugely important, with a view to informing intervention methods for reducing burnout frequency across the athlete population. Furthermore, existing research and substantive concerns suggest that athlete burnout may be an issue of particular concern in the traditional Irish team sports of Gaelic games (Duffy, 2015; Hughes & Hassan, 2017; Turner & Moore, 2016; Woods et al., 2020).

Notably, existing research on athlete burnout has identified a range of variables from across prevailing theoretical perspectives that may be associated with symptoms of athlete burnout (Bicalho & Costa, 2018; Goodger et al., 2007; Pacewicz et al., 2019).

However, the array of variables examined and the prevalence of cross-sectional approaches have contributed to a lack of consensus around the key risk and protective factors for the development of burnout (Eklund & DeFreese, 2015; Madigan et al., 2021). As such, this research programme was developed with a view to understanding the frequency of burnout symptoms over time in Gaelic games, identifying key factors related to symptoms of burnout, and assessing predictors of change in burnout over time. The subsequent sections focus on the key findings from this programme of research, and consider the contribution of the work to our understanding of athlete burnout.

9.2.1 Systematic Review of Factors Associated with Burnout in Team Sport

With a view to exploring the predictors of change in burnout over time, a key component of this programme of research involved concerted efforts to first identify the variables that are most strongly associated with burnout in Gaelic games. As outlined in Chapter 2, a systematic review of the factors associated with athlete burnout in team sports specifically was identified as an important step in this process. To the researcher's knowledge, this was the first review to explore the breadth of potential correlates of burnout from across theoretical perspectives since Goodger et al.'s (2007) early work. Notably, the specific focus on team-sport athletes was informed by research suggesting the burnout experience differs for these athletes compared to their individual-sport counterparts (e.g. Baella-Vigil et al., 2020; Davis et al., 2019; Nafian et al., 2014), and facilitated a more focused review into this population of athletes for the first time.

Fifty-nine papers examining burnout in athletes from a range of different team-sports were eligible for inclusion in the review. In results that highlight the breadth of the existing research, 125 different variables were examined in relation to burnout in team sport across these studies. Importantly, where variables were examined across three or more independent samples, the WMA facilitated exploration of the consistency of the relationship between these variables and the dimensions of burnout across papers. In line with existing reviews (Li et al., 2013; Bicalho & Costa, 2018; Pacewicz et al., 2019), findings indicated support for relationship between burnout and constructs such as motivation, perfectionism, passion, and social support. Furthermore, additional psychological, demographic and sport-specific characteristics, such as playing experience and *EO* climate, were also identified and incorporated in meta-analysis of the literature for the first time. These results and the additional narrative syntheses provide insight into the range of factors associated with burnout, while variability in the strength of evidence for relationships between variables and the different burnout dimensions highlight the importance of the multi-dimensional conceptualisation of athlete burnout (Pacewicz et al., 2019; Raedeke & Smith, 2001).

Furthermore, to the researcher's knowledge, this is the first review to explore the extent to which different theoretical perspectives have informed existing research approaches. While the findings indicated the most substantial support for the motivation-based perspective, the additional prevailing stress-based (e.g. Chiou et al., 2020) and commitment-based (e.g. Woods et al., 2020) perspectives continue to inform research approaches across studies. In addition, this review highlighted the relatively small number of studies (e.g. Appleby et al., 2018; Schellenberg et al., 2013; Smith et al., 2010) that have utilised an integrated approach to the study of athlete burnout, examining predictors from across key theoretical perspectives.

Importantly, the results of the systematic review suggested that research in this area may benefit from a move away from the "scattergun" approach (Goodger et al., 2007), and support calls for a more specific focus on the existing theoretical perspectives of burnout (Gustafsson et al., 2018). In addition, the review highlighted the importance of incorporating female athletes in burnout research, and the need for longitudinal research. More specifically in the context of this thesis, the findings also informed the selection of the variables and materials included in the subsequent empirical phases of the project.

9.2.2 Demographic and Sport-Specific Predictors of Burnout.

Chapter 4 describes the first empirical analysis of the data, which was designed to assess the frequency of burnout symptoms reported in Gaelic games athletes and to explore the impact of demographic and sport-specific characteristics on athlete burnout. Results provide support for concerns relating to the risk of burnout in Gaelic games (e.g. Duffy, 2015); when compared to a recent meta-analysis incorporating data from over 21,000 athletes (Madigan et al., 2022), Gaelic games athletes reported slightly more frequent feelings of RSA and SD, and slightly less frequent PEE symptoms.

Importantly, in contrast to existing burnout research in Gaelic games which has focused exclusively on elite, youth, male athletes (Hughes, 2008; Turner & Moore, 2016), this is the first study to assess burnout in adult athletes from across playing levels and genders. Furthermore, the diversity of the sample facilitated exploration of demographic and sport-specific characteristics as predictors of burnout. Findings highlighted the increased risk of PEE and RSA for younger athletes, and thus provide support for concerns raised about burnout among young adults, both in Gaelic games specifically (e.g. Duffy, 2015), and more broadly in the literature (Isoard-Gautheur et al., 2015). In addition, and in line with research in rugby (Cresswell & Eklund, 2006b), findings also indicated that substitute players are at an increased risk for feelings of RSA. Notably, the data highlighted risk and protective effects of elite status; the increased risk of PEE for this group provide partial support for the seemingly prevalent assumption that elite athletes are at an increased risk of burnout (e.g. Bicalho & Costa, 2018; Casper & Andrew, 2008), but non-elite athletes were at greater risk for RSA and SD. These findings the importance of exploring the burnout experience in athletes across levels.

In the context of the overarching aims of the thesis, the results of these analyses served to narrow the research focus to potential key demographic and sport-specific characteristics that warranted further longitudinal exploration as predictors of burnout. The practical implications of these findings are discussed below (Section 9.3).

9.2.3 The Utility of Existing Theoretical Perspectives of Burnout

The series of SEM analyses outlined in Chapter 5 provide novel insight into the utility of existing perspectives of burnout. Specifically, the substantial contribution of this analysis lies in the fact that it goes beyond existing conceptual work (Gustafsson et al., 2011), in what is, to the researcher's knowledge, the first attempt to empirically identify the key predictors of burnout from across stress-, motivation- and commitment-based models, in the same sample of athletes. Results indicated that each of the models assessed showed a good fit for the burnout data, and findings broadly support the tenets of the existing theoretical perspectives (Lonsdale et al., 2009; Raedeke, 1997; Smith, 1986), with stress, maladaptive motivation and feelings of entrapped commitment associated with increased burnout. As such, this series of analyses provides further empirical support for the idea that multiple existing theoretical perspectives can inform our understanding of burnout (Gustafsson et al., 2011).

Importantly, the exploration of distinct models of PEE, RSA and SD highlighted differences in significant pathways and variance explained by the models across the dimensions of burnout. Findings suggested that stress-related variables had the most substantial impact on feelings of PEE, compared to the impact on RSA or SD, while in contrast, the commitment- and motivation-based models contributed more substantially to feelings of SD, followed by RSA and PEE. The comparatively greater impact of stress on PEE may be anticipated when one considers that this perspective (i.e. Smith, 1986; Silva, 1990) emerged prior to the multi-dimensional definition of burnout (Raedeke, 1997), and was based on a more exhaustion-focused conceptualisation of burnout. Notably, the motivation- and commitment-based perspectives were developed in attempts to provide a more comprehensive insight into the burnout experience, with specific consideration of the multidimensional conceptualisation of the syndrome (Lonsdale et al., 2009; Raedeke, 1997).

In the context of this thesis and the literature more broadly, these series of analyses can be viewed as part of a necessary “winnowing process” (Madigan, 2021, p.668), with results highlighting the key predictors of the dimensions of burnout from across existing perspectives. As such, these findings informed the selection of variables for inclusion in the subsequent integrated analyses of predictors of change in PEE, RSA and SD over time. The key implications of this series of analyses in the context of the integrated analyses and practical considerations is discussed in the subsequent sections.

9.2.4 The Trajectories of Change in Burnout Symptoms over Time

To the researcher’s knowledge, this was the first study to track the frequency of burnout symptoms reported by adult athletes across two full athletic seasons. Importantly, fitting and comparing multiple latent growth trajectories to this data allowed for the identification of the shape and rate of growth in frequency of burnout symptoms reported by athletes across these consecutive seasons, which can provide insight into potentially high-risk periods and increase our understanding of how the symptoms of burnout develop.

Comparison of a range of model trajectories indicated that frequency of PEE, RSA and SD symptoms was best described by a linear trajectory across the two seasons. These linear trajectories suggest that changes in burnout tend to continue across the course of consecutive Gaelic games seasons, and are not characterised by distinct periods of increased risk within each season, in contrast to some existing research (e.g. Cresswell & Eklund, 2006) and suggestions from Gaelic games administrator (Duffy, 2015).

Notably, while the trajectory of burnout symptoms were characterised by the same general shape, distinct differences in the direction and rate of change over time was evident. Athletes reported the most frequent symptoms of PEE earlier in the season, followed by a decline in symptoms over time, while feelings of SD increased in frequency across the two seasons, becoming a greater issue for athletes through the year. The mean slope for RSA was non-significant, suggesting that, on average, frequency of symptoms did not change over time.

These trajectories provide novel insight into how symptoms of athlete burnout may develop over time. In addition, analyses also highlighted significant inter-individual variability in initial symptom frequency and the rate of change over time for PEE, RSA and SD, thus indicating that additional factors impact the development of burnout beyond time alone (Preacher et al., 2008). As such, these analyses highlight the importance of incorporating additional predictors of change in burnout, and thus informed the penultimate step in the analysis.

9.2.5 Examining an Integrated Model of Predictors of Change in Burnout

While preceding chapters focused on identifying significant factors associated with burnout and the rate of change in burnout over time, Chapter 7 outlines novel efforts to combine and extend this work in line with the overarching aims of the thesis, namely identifying predictors of change in burnout. Importantly, in addition to extending the analysis of predictors to a longitudinal design, an integrated approach was employed, whereby key predictors from across the stress, motivation and commitment perspectives were assessed in combination, alongside demographic and sport-specific characteristics. Despite conceptual support for the utility of an integrated model of burnout (Gustafsson et al., 2011), to the best of the researcher's knowledge, this was the first study to empirically integrate such a range of variables from across existing theoretical perspectives.

Examination of the final conditional models for PEE, RSA and SD suggests that the stress, motivation and commitment perspectives, in addition to demographic and sport-specific characteristics, all account for substantial variability in burnout, and thus provides empirical support for the utility of an integrated approach (Gustafsson et al., 2011). The following subsections will discuss the specific relationships identified across models in the context of the existing literature, considering both the factors associated with initial burnout and change over time.

9.2.5.1 Variables Associated with Initial Burnout in the Final Integrated Models. Considering factors that were directly associated with initial frequency of burnout symptoms, an increased risk of PEE was associated with higher levels of average *stress, constrained commitment* and *quantity of personal investment,* and playing at the elite *level,* in line with existing research and theory (e.g. Bicalho & Costa, 2018; Lin et al., 2021; Woods et al., 2020). In contrast, a greater frequency of RSA symptoms was associated with increased *amotivated regulation,* lower levels of *intrinsic regulation,* in line with motivation perspective (Li et al., 2013), and being a younger athlete and being male. Finally, in results that provide support for the stress (Smith, 1986), commitment (Raedeke, 1997) and motivation (Lonsdale et al., 2009) perspectives, an increased frequency of SD symptoms was associated with *amotivated regulation* and *constrained commitment,* while increased *intrinsic regulation, enthusiastic commitment, desire to excel (mastery)* and *perceived stress* were associated with lower SD frequency. In addition, playing at the elite level were associated with less feelings of SD, in contrast to prevailing perceptions (e.g. Bicalho & Costa, 2018).

Notably, while not all hypothesised relationships were retained in the integrated analyses, these findings are broadly in line with results of Chapter 5, in that stress- and commitment-related factors contributed more substantially to initial frequency of PEE, commitment and motivation factors were more prominent in the SD model, and motivation-related factors contributed more substantially than either commitment or stress to frequency of RSA symptoms. However, these analyses also extend earlier results and add substantially to the area by demonstrating that existing theories can be viewed as complementary, with each perspective adding to our understanding of the complex burnout process.

In addition, consideration of demographic and sport-specific characteristics in this integrated approach also highlights the importance of these factors in contributing to initial frequency of burnout symptoms, and identifies groups at a greater risk for burnout. Furthermore, to the best of the researcher's knowledge, this was the first exploration of the simultaneous risk and protective factors associated with elite sport, and results indicated that the increased risk of PEE for elite athletes at T1 was partially explained by increased stress and greater investment in sport reported by players at this level, while a greater desire to master the skills of the game and more self-determined motivation partly explained the contrasting reduced risk of SD for elite athletes at T1. The potential implications of these findings are discussed in more detail below (Section 9.3).

9.2.5.2 Predictors of Changes in Burnout in the Final Integrated Models.

Importantly, while the focus on initial burnout levels allowed for the integration of previously distinct models and the identification of key variables associated with burnout, it is the exploration of predictors of the inter-individual variability in the slope factors that provides insight into the characteristics that predict growth or decline in burnout symptoms over time across athletes. As with the previous analyses conducted throughout this programme of research, assessing distinct models for PEE, RSA and SD facilitated the identification of the key predictors of each symptom of burnout.

The findings in Chapter 7 indicated that, in line with the research hypotheses and existing literature (e.g. Cresswell & Eklund, 2005; Lonsdale & Hodge, 2011; Silva, 1990), substantial training demands across the season and a sustained absence of motivation predicted an increase in frequency of PEE symptoms across the two seasons, while *EO climate* also increased the risk of growth in PEE by contributing to feelings of *amotivated regulation*. Interestingly, results also suggested that motivation based on a desire to gain benefits or please others through sport participation (*external regulation;* Pelletier et al., 2013) can protect against feelings of PEE in Gaelic games. Although contrary to the research hypothesis, this finding may be explained by existing research that suggests athletes on successful teams report higher levels of externally and internally driven motivation (Blegen et al., 2012), while externally driven motivation has also been shown to protect against other dimensions of burnout (Cresswell & Eklund, 2005). Taken together, these findings provide empirical evidence to support concerns around the training demands faced by Gaelic games athletes (GAA, 2016; Kelly et al., 2018), but also stress the importance of additional psychological components such as motivation in the development of PEE.

Notably, the protective effects of *quantity of personal investment* and elite status on PEE over time were also contrary to initial hypotheses, and are in the opposite direction to the effects of these variables on initial frequency of PEE. As discussed in Chapter 7, it may be that these variables predict a greater reduction in PEE over time because athletes with these characteristics have increased symptom frequency at T1. However, it is also possible that athletes adapt to psychological demands over time (Schinke et al., 2012), and these longitudinal relationships warrant further explanation.

Being an elite athlete and sustained feelings of *constrained commitment* predicted a reduction in RSA over time. The protective effect of elite status is in line with cross-sectional results from Chapter 4, and, as noted therein, may be explained by the gravitas associated with elite-level Gaelic games participation, and recognition that playing at the highest level of the sport is an accomplishment in and of itself (Kelly et al., 2018; Geary et al., 2021). Furthermore, athletes at this level may be afforded more opportunities to achieve their goals and potential. As such, this finding again calls into question the prevailing assumption in the literature that elite athletes are inherently at a greater risk of experiencing burnout (e.g. Bicalho & Costa, 2018; Eklund & DeFreese, 2015). In addition, and as discussed in greater detail below (section 9.3), while contrary to our hypothesis and cross-sectional results, the protective effect of constrained commitment may be explained by the value placed on the notion of sacrifice and commitment by Gaelic games athletes and society more broadly (Hughes & Hassan, 2017).

Finally, focusing on the SD model, in contrast to the range of factors associated with initial frequency, representing a greater *number of teams* across the season was the only significant predictor of change in SD, and was associated with an increase in frequency of SD symptoms over time. As noted in Chapter 7, this may due to the fact that *number of teams* is associated with lower initial SD (see Appendix I3) and thus may facilitate greater capacity for growth in SD over time. However, it may also be that sustained multi-team demands become detrimental over time, and such an interpretation provides some support for concerns about this facet of Gaelic games participation (e.g. Duffy, 2015).

The implications of these findings for research and practice are discussed in further detail in Section 9.3 below.

9.2.6 Athlete Burnout and the COVID-19 Change-Event

In addition to the programme of research discussed above, additional analyses were incorporated into the project following the COVID-19 outbreak and the associated suspension of sport. This period can be viewed as an unanticipated change-event (Samuel et al., 2020), and to the researcher's knowledge, the analyses outlined in Chapter 8 provide the first insight into how athletes perceived and utilised this period, and the impact of this period on symptoms of burnout and stress.

Notably, findings indicated that athletes viewed the period in a number of different ways, including as time to rest, to try non-sport-related activities, and to work on sport-specific skills, with many continuing to train as much as usual. As such, while it was theorised that the suspension period may have been a break from the demands of sport, this data suggests that athletes did not experience the conditions necessary for, and thus the benefits associated with, detachment from sport (Balk et al., 2017).

In addition, athletes also reported mixed feelings about the suspension period, viewing it as both somewhat negative and positive. Importantly, open-ended questions facilitated a more in-depth exploration of athletes' experiences, and led to the identification of positive themes, such as having more time for other things in life and a chance to reflect on sport participation, while themes relating to the negative impact of the period included missing the team environment and routine associated with sport participation. As such, these findings highlight athletes' complex and varied reactions to such an unprecedented and unanticipated change-event.

Interestingly, in contrast to emerging work identifying a negative psychological impact of the pandemic (e.g. di Fronso et al., 2020; Xiong et al., 2020), no significant differences in burnout or stress were evident following the suspension period when compared with data from the same time in the previous season. However, this analysis did suggest that a reduction in off-field demands and the promotion of positive feelings about returning to sport can protect against the risk of burnout following an unanticipated absence from or suspension of organised sport.

9.3 Implications for Future Research, Theory and Practice

This section discusses the implications of this body of work for research and practice.

9.3.1 Implications for Research and Theory

Taken together, these series of analyses have important implications for our understanding of how athlete burnout develops over time. Firstly, the novel exploration of distinct trajectories of PEE, RSA and SD frequency over multiple seasons highlights the importance of examining burnout in line with its conceptualisation as an enduring, multidimensional syndrome. Specifically, findings indicate that symptoms do not develop in tandem, and suggests that, while PEE is greatest earlier in the season and RSA remains stable on average, the risk of feelings of SD grows significantly as the seasons progressed.

Considering our understanding of the factors associated with burnout, the systematic review outlined in Chapter 2 highlights the absence of a common research focus in the athlete burnout literature, with findings indicating that existing research has continued to progress in a multitude of different directions. As discussed throughout this body of work, this is particularly evident in the fact that researchers continue to examine burnout through multiple theoretical lenses of stress, motivation or commitment. Importantly, while the support evident in Chapter 5 for each of these perspectives is line with existing research, the current thesis can be viewed as a novel and important contribution to the research area insofar as the integration of variables from across these perspectives was a core consideration throughout. Specifically, in Chapter 5, the exploration of the distinct models in the same sample of athletes for the first time allowed for the identification of key predictors from across all prevalent perspectives, and thus narrowed the research focus and informed the selection of variables to be included in the longitudinal integrated models of PEE, RSA and SD (Chapter 7), which were the first of their kind in terms of complexity and range of variables considered.

To the researcher's knowledge, the findings of the analyses from Chapter 7 signify the first empirical support for the use of an approach integrating commitment, stress, motivation and demographic factors in the study of athlete burnout (Gustafsson et al., 2011; Gustafsson et al., 2018). Specifically, the emergence of stress-, motivation- and commitment-related variables within the integrated models assessed goes beyond support for the distinct models, indicating that these perspectives can be viewed as complementary and that considering them in combination can provide a more comprehensive understanding of risk and protective factors for burnout. As such, the findings from this body of work suggest that, with a view to advancing the athlete burnout literature in a single, focused direction, researchers should work to overcome the challenges of combining existing theoretical perspectives, and focus their efforts on developing an empirical integrated model of athlete burnout. These efforts should involve testing across a range of sport contexts, with an emphasis on developing a model with practical utility. Furthermore, the emergence of different key predictors of PEE, RSA and SD highlights the importance of employing a multidimensional conceptualisation of burnout, and suggests that distinct integrated models for each burnout dimension may be most appropriate.

Importantly, while the above proposal could be described as a grand aim for the research area, particularly considering that the complexities of integrating such a range of variables of potential interest has been identified as an obstacle to the integrated approach (De Francisco et al., 2022), this programme of research could be viewed as a template for use in future work. Specifically, following the systematic review (Chapter 2), the initial cross-sectional exploration of distinct perspectives (Chapter 5) and demographic and sport-specific characteristics (Chapter 4) were undertaken to identify key factors associated with burnout in this population of athletes. Furthermore, the specification of unique models for each dimension of burnout ensured a more nuanced insight into the factors associated with PEE, RSA and SD. These steps facilitated the identification of a relatively small number of potential key predictors for each dimension of burnout, which could then be explored alongside each other in a more focused integrated analysis with a view to understanding the key risk and protective factors for burnout in Gaelic games. Notably, recognising the complex nature of athlete burnout (Gustafsson et al., 2011), such an approach could be utilised across research on team and individual sports with a view to identifying the predictors that may be most relevant in a specific context and tailoring the analyses accordingly. As such, this work may help to facilitate the use of an integrated approach in future research.

9.3.2 Practical Implications

Importantly, in addition to the contribution to theory and research, the findings of this programme of research have important practical implications for athletes and key stakeholders involved in Gaelic games and team sports more broadly. Specifically, these findings provide insight into variables and characteristics associated with increased risk of burnout symptoms, and those that may predict growth and decline in symptoms over time. This information can help to identify athletes who are at a potentially high risk of experiencing burnout, and the factors that can be targeted to help reduce the risk of burnout. Notably, this included stress-, commitment-, and motivation-related variables, in addition to sport-specific and demographic characteristics.

Stress-based predictors emerged from the integrated analyses (Chapter 7) as risk factors for an increase in frequency of PEE and SD. Specifically, while it was positive to see that athletes on average experienced a reduction in PEE symptom frequency over time, this decline was significantly lower for those who reported a greater sustained training load. In addition, feelings of SD tended to become more frequent as the season progressed, and this growth was more substantial for athletes who play across multiple teams. Importantly, the inclusion of demographic factors in the model highlighted that increased training demands and multi-team representation are characteristics that were positively predicted by elite athlete status.

As such, findings suggest that working to reduce the average training load that athletes are exposed to and limiting multi-team participation may protect against more frequent feelings of PEE and SD across the season, and that such an intervention could be most relevant for elite athletes. Notably, the extant research suggests that many coaches view limiting physical stressors as a tool for burnout prevention (Kroshus &

DeFreese, 2017), and these findings provide some support for such an approach. In addition, findings also provide empirical support for the efforts to limit multi-team eligibility and reduce training demands which were undertaken at an organisation-wide level in the GAA with the explicit aim of reducing the risk of burnout in younger male athletes (GAA, 2016, p. 12). However, this data suggests this is an issue that continues to be relevant for adult male and female athletes. Furthermore, such organisational-level approaches are extremely difficult to implement, as evidenced by the 10-year period from the recommendation (GAA, 2007) to implementation of these changes in the GAA context (Duffy, 2016). As such, team- and individual-level approaches may be more impactful. For example, in a review of the experience of elite intercounty Gaelic games players, Kelly et al. (2018, p.116) highlighted the existing "ad-hoc" arrangements between club and intercounty managers relating to player availability, and suggest the need for a more systemised collaboration with a view to minimising conflicting or excessive demands. The current research indicates that such an approach may also be beneficial in reducing the risk of burnout.

The current results (Chapter 7) also highlight the potential utility of a motivation-based intervention for burnout in team sports, with athletes who reported a persistent absence of motivation experiencing significantly less decline in the frequency of PEE symptoms across the season. Notably, Langan et al. (2015) found that the promotion of SDT-based coaching practices in Gaelic games had a preventative effect on growth in PEE, while player-focused rational emotive therapy techniques (Davis & Turner, 2020) have also been shown to be affective in promoting more self-determined motivation.

Finally, while commitment also played a role in predicting change in burnout over time, this result was contrary to hypotheses, with constrained commitment associated with a reduction in RSA symptoms. As such, while this may be viewed as a protective effect, it would not be appropriate for stakeholders or practitioners to promote feelings of obligated commitment among athletes. Rather, the impact of this variable may be symbolic of the perceived importance Gaelic games holds in Irish society (Duffy, 2014; Geary et al., 2021; Hughes & Hassan, 2017; Liston, 2015), insofar as athletes who are influenced by this perception may place greater gravitas on performance and achievements in their sport. As such, key stakeholders may wish to promote the history and values associated with Gaelic games, but should do so from a standpoint of enjoyment and opportunity, rather than pressure or obligation. Such an approach is in line with the stated purpose of the GAA (2021), namely “to promote Gaelic games, culture and lifelong participation”, and could be facilitated through interventions aimed at promoting meaning in sport (e.g. Luzzeri, 2021). In addition, results of the integrated analysis (Chapter 7) indicated that non-elite athletes are at an increased risk for growth in frequency of RSA symptoms over time, and thus highlight the need for greater awareness of this burnout symptom for those playing or coaching at this level, and suggest intervention efforts may be especially beneficial for this cohort.

Notably, targeting characteristics associated with lower initial symptom frequency may also be beneficial insofar as it may facilitate the maintenance of relatively infrequent feelings of burnout over time. This may be especially relevant in the case of RSA, where symptom frequency remained relatively stable, but could also help to ensure that where growth does occur across symptoms over time, it is at a lower level of symptom frequency. For example, where athletes “almost never” experience SD symptoms initially, growth may occur to the point of “rarely” experiencing symptoms, rather than from “sometimes” to “frequently”. Furthermore, current findings suggest that such interventions may be especially relevant for younger athletes and males, who report higher levels of RSA at the outset of the season, non-elite athletes who are at greater risk for feelings of SD, and elite athletes who report more frequent feelings of PEE.

To this end, the current findings suggest that promoting and fostering a desire for skill mastery and boosting social supports, which could be achieved through a coach-focused skill-mastery intervention (Hassan & Morgan, 2015), may increase enthusiastic commitment, which is associated with less frequent SD symptoms. Furthermore, interventions promoting self-determined motivation, for example by encouraging need-supportive behaviours by coaches (Langan et al., 2015), or an athlete-focused rational emotive behaviour therapy approach (Davis & Turner, 2020) may be beneficial in contributing to lower initial frequency of RSA and SD. Finally, efforts to facilitate better stress management and to reduce feelings of entrapment in sport may also be beneficial in promoting lower initial frequency of PEE. Notably, existing research provides support for a person-centred self-regulation intervention approach in reducing perceived stress, PEE and RSA (Dubuc-Charbonneau & Durand-Bush, 2015), while a systematic review (Li et al., 2019) suggests there is some evidence to support the utility of mindfulness interventions. Furthermore, a writing-based intervention has also been shown to promote a reduction in feelings of constrained commitment in athletes (Luzzeri, 2021). However, as discussed in detail previously, this is likely also a symptom of the societal importance Gaelic games hold (Hughes & Hassam 2017), and as such, it is possible that an organisational-level approach to addressing feelings of entrapment may be most impactful. This could consist of, for example, a broader campaign of awareness relating to sport-life balance. Such an approach underpins the philosophy in Danish elite sport (Henriksen et al., 2011), wherein the importance of sport-life balance is included as a key focus for interventions delivered by a sports psychology team. As outlined in the preceding sections, this work provides important nuanced insight into the intervention and prevention approaches that may be most beneficial in protecting against feelings of PEE, RSA and SD. As such, where practitioners or coaches are planning to address burnout, assessing the symptoms of most relevance to the athletes may be especially useful. However, the existing research on interventions remains extremely limited (Madigan, 2021), and systematic evaluations of the efficacy of the approaches discussed above, for example through reviews or meta-analysis, is further lacking. As such, this may an important step for future research, with a view to providing insight into the utility of existing interventions.

Furthermore, while the examples above provide potentially useful interventions for specific circumstances, it is also understandable that there may be a desire to apply an intervention across a team or organisation as a whole, with a view to targeting all burnout symptoms. As such, it could be argued that a key focus or ambition of future intervention efforts should be to avoid following the existing research in a multitude of different directions, and instead work towards a single, more comprehensive approach that attempts to account for the complexity of athlete burnout. To this end, the findings from this work suggest an integrated approach aimed at addressing risk factors from across theoretical perspectives may be most impactful. To the researcher's knowledge, a writing-based intervention targeting feelings of constrained commitment and stress (Luzzeri, 2021) is one of the only integrated approaches to be piloted to date. Importantly, this body of work may point to additional avenues for the development or piloting of more integrated interventions developed to address risk factors related to stress, commitment and motivation. Such efforts, while likely challenging, are of the utmost importance if we are to address the rising frequency of burnout symptoms

(Madigan et al., 2022). Furthermore, it is the researcher's view that a more explicit focus on effective prevention and intervention would benefit the athlete burnout research moving forward.

Finally, while efforts to prevent the onset of burnout are essential to address the trend of rising symptom frequency among athletes (Madigan et al., 2022), a focus on facilitating recovery for those already impacted is also of substantial importance. Notably, researchers in the area of job burnout have started to explore such tertiary intervention approaches, but existing work is relatively limited (Aloha, 2017). While such efforts likely involve challenges in access where burnt out athletes may have left their sport, attempts to re-engage these individuals and provide avenues for recovery should be viewed as essential to the research area, and warrants further exploration.

9.4 Limitations

The primary limitation of this body of work is the relatively small sample size when considering the complexity of the analyses. As outlined previously, considerable efforts were made to recruit participants using multiple avenues, while efforts to retain participants across timepoints included the use of personalised email communication and multiple personalised reminder messages. However, although the amount of data gathered from participants across timepoints was beyond that in existing work on burnout in Gaelic games and longitudinal work on burnout more broadly (e.g. Lundkvist et al., 2018), the sample size was not large when considered in the context of the complexity of the analysis.

Specifically, and as noted in Chapter 7, the number of parameters that could be specified in the integrated conditional growth models was somewhat restricted by the sample size, precluding the specification of time-varying predictors which would have allowed for the assessment of the impact of these variables on frequency of burnout symptoms at each timepoint (Preacher et al., 2008). Notably, the use of time-invariant predictors and the relatively small sample size to parameter ratio may have resulted in reduced power to detect additional key relationships in the data. This may provide some explanation for the fact that just seven of the 26 predictor-slope relationships specified in Chapter 7 emerged as significant, suggesting the majority of variables associated with initial burnout did not predict changes in symptom frequency over time. As such, future research should aim to recruit a larger sample to facilitate more complex analyses, or examine a smaller number of time-varying predictors in an integrated approach.

The nature of the sample and the data collection window may also be viewed as limitations of this work. Specifically, the results of this series of analyses may not be generalizable beyond the Gaelic games context. As noted throughout, these sports can be viewed as relatively unique in some aspects, including their substantial societal importance and amateur status. However, other sports also possess similar characteristics, such as those at the collegiate-level in the United States, where athletes are amateur but the sports hold substantial importance at the cultural and societal levels (Beyer & Hannah, 2000). Furthermore, even where the sporting context does differ substantially to that explored in this programme of research, the template employed herein could be used to inform the selection of the most relevant risk and protective factors for burnout in any specific population. For example, preliminary analyses could indicate that EO motivational climate is less influential in an individual-sport context (van de Pol & Kavussanu, 2012), and thus does not warrant inclusion in an integrated model when exploring burnout in these athletes. Such an approach recognises the complexity and individualised nature of the burnout process (Gustafsson et al., 2011).

In addition, it is also possible that athletes' experiences of burnout and related factors in the second season of data collection were substantially impacted by the suspension of organised sport due to COVID-19, and the findings therein findings may not be generalizable to multi-season data that was not interrupted in a similar fashion. However, this was an unanticipated event, and concerted efforts were made to assess and account for the potential impact of this period. These limitations may be addressed in future research through the recruitment of a larger sample from a more diverse range of sports, with data collection across multiple, uninterrupted seasons.

9.5 Concluding Remarks

Athlete burnout is an enduring multidimensional psychological syndrome that can have significant negative implications for those affected. Understanding how burnout develops over time is essential in order to inform targeted intervention and prevention strategies, and address the increasing prevalence (Madigan et al., 2022) of burnout among athletes. As such, this programme of research was developed with the aim of providing novel insight into how frequency of burnout symptoms changes across two consecutive seasons of sport, and understanding the key risk and protective factors for this development. This project focused specifically on burnout in Gaelic games, in response to substantive concerns and existing research relating to the risk of burnout in this population (e.g. Duffy, 2015; Hughes & Hassan, 2015; Woods et al., 2020).

Across this body of work, results highlight the importance of exploring burnout in its distinct multi-dimensional components, as different key predictors were identified for PEE, RSA and SD cross-sectionally and over time, and these dimensions were characterised by different trajectories of change. Furthermore, this programme of research also highlights the need for an integrated approach in the exploration of burnout with a view to gaining a more comprehensive insight into the burnout experience. Specifically, findings suggest that stress-, motivation- and commitment-based perspectives can be complementary, contributing significantly as predictors of burnout alongside each other, while demographic and sport-specific characteristics can also inform our understanding of burnout.

Importantly, considering the range of variables that have been associated with burnout (Chapter 2) and the possibility that key predictors may vary across sport contexts (e.g. van de Pol & Kavussanu), the approach employed herein could be viewed as a template for future research. Specifically, a systematic approach wherein cross-sectional analyses of distinct models inform the selection of variables for subsequent integrated longitudinal analyses may help to address concerns around the potential complexity of an integrated approach.

To the researcher's knowledge, this is also the first study to explore burnout in Gaelic games athletes from across playing levels and genders, and to examine the impact of characteristics of participation on burnout. Notably, findings support concerns relating to burnout in Gaelic games, and also highlight potentially high risk groups for burnout, including younger athletes and substitute players. Interestingly, elite athletes were at an increased risk for PEE and, but showed protective effects against RSA and SD initially, thus questioning the prevailing assumption that burnout is an issue of primary concern for elite athletes (e.g. Bicalho & Costa, 2018). The longitudinal exploration of the data also highlighted that the risk for feelings of SD increases over time, while feelings of PEE become less frequent.

Finally, in work that was undertaken in response to the unprecedent and unanticipated COVID-19 pandemic, this research provided novel insight into the complexity of responses to the suspension of sport. Furthermore, findings suggest that efforts to reduce off-field demands and promote positive emotions about the return to sport can reduce the risk of burnout following an unanticipated absence from sport.

Overall, this programme of research has contributed substantially to our understanding of how athlete burnout symptoms develop over time, the key risk and protective factors for the development of burnout, potentially high-risk groups for burnout, and key considerations for future research in this area. In addition, this body of work may provide a template for an approach to future integrated analyses. As such, this research has important implications for researchers, athletes, coaches and additional key stakeholders in sport.

9.6 Publications and Outputs Arising from the Thesis

The research outputs that have arisen through this programme of research are listed in Table 9.1 below;

Table 9.1 *Research Outputs*

Research Output	Title	Status	Related Chapter
Manuscript	Is a pandemic as good as a rest? Comparing athlete burnout and stress before and after the suspension of organized team sport due to Covid-19 restrictions, and investigating the impact of athletes' responses to this period.	Published in *Psychology of Sport and Exercise* (Woods et al., 2022)	Chapter 8
Manuscript	A systematic review of the factors associated with athlete burnout in team sports.	Revised submission under review	Chapter 2
Manuscript	A burning question: An analysis of distinct stress-, motivation- and commitment-based perspectives of athlete burnout'	Revised submission under review	Chapter 5
Conference Presentation (poster)	Examining the trajectories of burnout symptoms in Gaelic games players across two seasons.	Presented at the *European Health Psychology Society Annual Conference (EHPS),* 2022	Chapter 4
Conference Presentation (oral)	A burning question: How well do existing burnout theories explain athlete burnout in Gaelic games players?	Presented at the *Psychological Society of Ireland Annual Conference,* 2021	Chapter 5
Conference Presentation (oral)	A Systematic review of factors associated with athlete burnout in team sports.	Presented at the *EHPS Annual Conference,* 2021	Chapter 2
Conference Presentation (oral)	COVID-19 and Gaelic games: How players dealt with the suspension of training and games, and its impact on stress and athlete burnout.	Presented at the *British Psychological Society, Division of Sport and Exercise Psychology Conference,* 2020	Chapter 8
Conference Presentation (oral)	Comparing the impact of variables across the different dimensions of athlete burnout.	Presented at the *North American Society for the Psychology of Sport and Physical Activity (NASPSA) Annual Conference,* 2020	Chapter 5
Conference Presentation (oral)	The impact of gender on athlete burnout and associated factors.	Presented at the *NASPSPA Annual Conference,* 2020	Chapter 4

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Appendix A. PRISMA Checklist

Table A.

PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	Title page
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	p.1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	p. 2 – 6
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	p.6
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	Although inclusion criteria were specified in advance, no official protocol was registered
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	p.7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	p.6

Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Table 1
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	p.7; Figure 1
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	p.8
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	p.8
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	p.9 – 11

Section/topic	#	Checklist item	Reported on page #
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	p.9 – 11
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	p.9 – 11
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	p.8; Supp File 2
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	p. 9 – 12
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Table 2

Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	p. 13 – 14, Supplementary File 2
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Table 3, 4
Synthesis of results	21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency.	Table 3,4,5,6
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	p. 14, Supplementary File 2
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	Table 5,6
Section/topic	**#**	**Checklist item**	**Reported on page #**
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	p.20-25
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	p.25 – 26
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	p.27
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	p.27

Appendix B. Quality Appraisal for the Systematic Review

Table B. *Quality appraisal results for each paper including in the Systematic Review (Jeffries et al., 2012)*

Ref No.	Aims clearly stated	Participant eligibility, recruitment strategy described	Features of popul-ation and design described	Non-responders and non-participants described	Control group	Limitations identified and acceptable	Sample size justified	No evidence of selective reporting	Statistical methods described	Statistical methods approp-riate	Measures relevant, validated, described adequately	Results discussed adequately	Total Score	Quality Appraisal
1	1	0.5	1	0	0	1	0	1	1	1	1	1	**8.5**	**Good**
2	1	1	1	0.5	0	1	0	1	1	1	1	1	**10**	**Good**
3	1	0.5	0.5	0	0	0	0	1	1	1	1	0.5	**6.5**	**Adequate**
4	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
5	1	1	1	0	0	0.5	0	1	1	1	1	1	8.5	**Good**
6	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
7	1	1	1	0	0	1	0	1	1	0.5	1	1	**8.5**	**Good**
8	1	0.5	0.5	0.5	0	0.5	1	1	0.5	1	1	1	**8.5**	**Good**
9	1	1	1	0.5	0	0.5	0	1	1	1	1	1	**9**	**Good**
10	0.5	0.5	1	0	0	0	0	1	0.5	1	1	0.5	**6**	**Adequate**
11	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
12	**1**	**0.5**	**1**	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**8.5**	**Good**
13	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
14	1	0.5	1	0	0	1	0	1	1	1	1	1	**8.5**	**Good**
15	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
16	1	1	1	0	0	0.5	0	1	1	1	1	0.5	**8**	**Good**
17	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
18	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
19	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
20	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
21	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
22	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
23	1	1	1	0	0	1	0	1	1	1	1	1	9	**Good**
24	1	1	1	0	0	1	0	1	1	1	0.5	1	**8.5**	**Good**
25	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
26	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
27	1	0.5	0.5	0	0	0	0	1	0.5	1	0.5	1	**6**	**Adequate**
28	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
29	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**

Ref No.	Aims clearly stated	Participant eligibility and recruit-ment strategy described	Features of popul-ation and design described	Non-responders and non-participants described	Control group	Limitations identified and acceptable	Sample size justified	No evidence of selective reporting	Statistical methods described	Statistical methods approp-riate	Measures relevant, validated and described adequately	Results discussed adequately	Total Score	Quality Appraisal
30	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
31	1	1	1	0	0	0.5	0	1	1	1	1	1	**9**	**Good**
32	1	1	1	0.5	0	1	0	1	1	1	1	0.5	**9**	**Good**
33	1	1	1	0	0	1	0	1	0.5	1	1	1	**8.5**	**Good**
34	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
35	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
36	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
37	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
38	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
39	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
40	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
41	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
42	1	1	1	0	0	0	0	1	1	1	1	0.5	**7.5**	**Good**
43	1	1	1	0.5	0	0.5	0	1	1	1	1	0.5	**8.5**	**Adequate**
44	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
45	1	1	1	0	0	0.5	0	1	1	1	1	1	**8.5**	**Good**
46	1	1	1	0	0	0.5	0	1	1	1	1	1	**8.5**	**Good**
47	1	1	1	0.5	0	1	0	1	1	1	1	1	**9.5**	**Good**
48	1	0.5	0.5	0	0	0	0	1	1	1	1	1	**7**	**Adequate**
49	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
50	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
51	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
52	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
53	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
54	1	1	1	0	0	1	0	1	1	1	1	1	**9**	**Good**
55	1	1	1	0	0	1	0	1	1	1	0.5	1	**8.5**	**Good**

Appendix C. Plain Language Statement

Appendix C.1: *Online Plain Language Statement*

Plain Language Statement

PhD, School of Nursing and Human Sciences, Dublin City University.

PhD Researcher: Siobhan Woods, siobhan.woods24@mail.dcu.ie

Research Supervisors: Dr. Simon Dunne, simon.dunne@dcu.ie; Prof. Pamela Gallagher, pamela.gallagher@dcu.ie

What is this research about and why is it being conducted?
This PhD research project aims to examine a range of factors related to the experiences of Gaelic footballers, Ladies footballers, Hurlers and Camogie players, including motivation, playing and training environment, athlete burnout, stress, and commitment, and how these factors might interact with each other and change over time. The study is funded by the DCU School of Nursing and Human Sciences.
Participation in the study involves the completion of a questionnaire at 6 different time points over two seasons. The questionnaire should take approximately 20-30 minutes to complete. If you agree to participate, we would send you the same survey to complete at beginning, middle and end of the next two seasons. This research is being conducted with the hope of gaining a better understanding of the experience of male and female GAA players today!

Am I eligible to participate?
To be eligible for participation in this research you must be over the age of 18, fluent in English, and be an active player on a Gaelic Football, Ladies Football, Hurling or Camogie team. This can be a club, college or county team!

How do I take part and what will happen if I decide to take part?
Participation in this study is completely voluntary. If you would like to participate, please click the link in the attached email. This link will bring you through to the questionnaire, where you will first be asked to complete a consent form. If you consent to participating in the study, you will be asked to complete the rest of the questionnaire. The consent form and questionnaire should take approximately 20-30 minutes to complete. As the aim of this study is to examine how players' experiences change throughout the season, you will be invited to complete this survey at 5 more time points over the next 2 seasons, with about 3 months between each. However, if you do not complete the questionnaire at any stage, or decide you do not want to be contacted again in the future, we will not send you the survey again. If you agree today to be contacted again, we will send you some reminder information about the study, a new consent form and the same questionnaire again in 3 months time. Each time you are sent the questionnaire, you will be asked again whether you would like to continue on with the study or not – you can stop participating at any time!

Will I be asked to do anything else?
The researchers also hopes to interview a small number of players in the future to get a better understanding of players' experiences, subject to ethical approval. You will be asked in the consent form whether you agree to be contacted for a series of interviews at a later date. *Once again, you are free to answer yes or no to this question*. You can consent to take part in the questionnaire aspect of the study and decline to be contacted for an interview if you wish.

Can I change my mind and withdraw from the study?
If at any stage during the study you feel distressed or uncomfortable, or you just decide you no longer want to participate, you can exit the online questionnaire, withdrawing from the study without having to provide any reason. You can also withdraw at any stage in the follow-up questionnaires. There will be no consequences for withdrawing, and you are free to do so at any stage.

Are there any benefits associated with participating in this study?
While you might not experience any direct benefits to your participation, we hope that this research will benefit all players and individuals involved in Gaelic games, by providing important insight into the lives of modern-day players. We plan to inform the GAA, LGFA and Camogie Association of our findings, and also hope to work with the WGPA and GPA. All participants are invited to contact the researcher on the email address below if they would like to receive a summary of the results upon completion of the study!

Are there any risks associated with participating in this study?
There are no anticipated risks associated with participation in this study. Although it is not expected that you experience any issues as a result of your participation, in the unlikely event that you do experience any upset or distress, you can free-phone Samaritans (Phone: 116 123), contact Dublin City University Counselling Service (Phone: 01-7005165; email: counselling@dcu.ie), or contact your local GP. If you are a member of the Gaelic Players' Association (https://www.gaelicplayers.com/WhatWeDo/GPACounsellingService.aspx) or the Women's Gaelic Players' Association (http://wgpa.ie/?page_id=2666) you can also contact their respective 24 hour helplines should you wish.

Why do you ask for my name and email address?
We ask you for your name and email address for two reasons. Firstly, if you agree to be contacted for the follow-up phases of the study, we can easily send you the questionnaire again and you can complete it in your own time! We will also match your name and email address to a unique code. This code will be attached to your questionnaire, allowing us to track players' experiences over time without having any identifying information, such as your name, attached to your answers.

How will my data be protected?
As this study is looking at changes in players' experiences over time, participant data must be identifiable to the researcher at each stage. As described above, this will be done by matching your name and email address to a unique ID code, and linking this ID code to your questionnaire answers. This means all data can be de-identified after it is collected and in any of the results we report. As a result, no participant will be identifiably in any of the results or analysis. In order to provide your consent to participate in this study, you will be asked only to tick a number of boxes, and no signature or other identifiable marker must be given.
Data will be processed and protected in compliance with GDPR guidelines at all times, and will be used solely for research purposes.

How will my data be kept secure?
The survey was developed on Qualtrics, a secure, cloud-based platform. Your data will be stored on a password-protected Qualtrics account. Only the researcher and the DCU hosting website administrator will have access to this account. The data will be downloaded to an encrypted, password-protected laptop. At this stage, the data will be de-identified, with your name and email address transferred to a password-protected file in which it will be matched with a unique ID code, and accessible to the researcher only. This ID code will then be assigned to your questionnaire data in a separate, password-protected document. The supervising researchers and the examiners will have access to the de-identified data upon request, and this data may also be shared via online data sharing repositories. No individual participant would be identifiable in any of this data!

What will happen to my data?
The data collected for this study will be analysed and reported on as part of a PhD thesis. All data will be stored securely using the cloud service of an online server (Qualtrics). It will then be downloaded to a secure file on the researcher's encrypted, password-protected laptop where it will be stored for a period of one year following the completion of the research project, after which it will be destroyed. The data collected may also be used in the future to form the basis of further work including academic reports, journal articles and conference presentations. In such cases it would be stored for a period of 5 years before being destroyed. The data will remain confidential at all times. Although unlikely, it is possible that the data could be subject to a subpoena or the Freedom of Information Act, and under such circumstances the researcher would be obliged to provide the information requested.

Does this study have ethical approval?
This study has received ethical approval from the Research Ethics Committee (REC) in DCU. If you have any concerns about the manner in which this study was conducted, or should any concerns arise in the future in relation to this study, please do not hesitate to contact the supervising researcher Dr. Simon Dunne, of Dublin City University School of Nursing and Human Sciences (Tel: 01 700 7796; Email: simon.dunne@dcu.ie), the DCU REC administrator (rec@dcu.ie) as an independent contact. For queries relating to data protection, you can contact the DCU Data Protection Officer, Mr. Martin Ward (data.protection@dcu.ie Ph: 7005118 / 7008257).

If you are interested in participation, please click the link in the attached email to access the consent form and questionnaire.

Thank you!

Appendix C.2 *Hard Copy Plain Language Statement*

Plain Language Statement

PhD Psychology, School of Nursing and Human Sciences, Dublin City University.

PhD Researcher: Siobhan Woods, siobhan.woods24@mail.dcu.ie

Research Supervisor: Dr. Simon Dunne, simon.dunne@dcu.ie; Prof. Pamela Gallagher, pamela.gallagher@dcu.ie

What is this research about and why is it being conducted?
This PhD research project aims to examine a range of factors related the experiences of Gaelic footballers, Ladies footballers, Hurlers and Camogie players, including motivation, playing and training environment, athlete burnout, stress, and commitment, and how these factors might interact with each other and change over time. The study is funded by the DCU School of Nursing and Human Sciences.
Participation in the study involves the completion of a questionnaire at 6 different time points over two seasons. In total, this questionnaire should take approximately 20-30 minutes to complete. If you agree to participate, we would give you the same survey to complete at beginning, middle and end of the next two seasons. This research is being conducted with the hope of gaining a deeper insight into the experience of male and female GAA players today!

Am I eligible to participate?
To be eligible for participation in this research you must be over the age of 18, fluent in English, and be an active play on a Gaelic Football, Ladies Football, Hurling or Camogie team.

How do I take part and what will happen if I decide to take part?
Participation in this study is completely voluntary. If, after reading this information, you would like to participate, please take a consent form when they are offered by the researcher. Consent forms will be attached to the front of the questionnaire booklet. Completion of the consent form requires you to tick the 'yes' or 'no' box in response to each question. Completing the consent form in the affirmative (answering 'yes') indicates that you wish to participate in the study. If you answer 'no' to any question on the consent form, other than the question asking about future contact or interview participation, your data will not be included for analysis. However, under such circumstances you are still free to complete the questionnaire! The questionnaire should take approximately 20-30 minutes to complete. As the aim of this study is to examine how players' experiences might change over time, for example at different points in the season, participants will be invited to complete this survey again at 5 time points over the next 2 seasons, with about 3 months between each. If you do not consent to be contacted again, or do not complete the questionnaire today, we will not send you the survey at any future time points.
If you do consent be contacted for the next phase, we may arrange to visit your team again if possible, as we're doing today, or we will send you some reminder information about the study, a new consent form and the same questionnaire again via email. Each time you are sent

the questionnaire, you will be asked again whether you would like to continue on with the study or not – you can stop participating at any time!

Will I be asked to do anything else?
The researchers also hope to interview a small number of players in the future to get a better understanding of your experiences, subject to ethical approval. You will be asked in the consent form whether you agree to be contacted for a series of interviews at a later date. *Once again you are free to answer yes or no to this question.* You can consent to take part in the questionnaire aspect of the study and decline to be contacted for an interview if you wish.

Can I change my mind and withdraw from the study?
If at any stage during the study you feel distressed or uncomfortable, or you just decide you no longer want to participate, you can stop answering the questions and leave the room, withdrawing from the study without having to provide any reason. There will no consequences for withdrawing, and you are free to do so at any stage. You can also submit a blank questionnaire if you do not wish to leave the room!

Are there any benefits associated with participating in this study?
While you might not experience any direct benefits to your participation, we hope that this research will benefit all players and individuals involved in Gaelic games, by providing important insight into the lives of modern-day players. We plan to inform the GAA, LGFA and Camogie Association of our findings, and also hope to work with the WGPA and GPA. All participants are invited to contact the researcher on the email address below if they would like to receive a summary of the results upon completion of the study!

Are there any risks associated with participating in this study?
There are no anticipated risks associated with participation in this study. Although it is not expected that you experience any issues as a result of your participation, in the unlikely event that you do experience any upset or distress, you can free-phone Samaritans (Phone: 116 123), contact Dublin City University Counselling Service (Phone: 01-7005165; email: counselling@dcu.ie), or contact your local GP. If you are a member of the Gaelic Players' Association (https://www.gaelicplayers.com/WhatWeDo/GPACounsellingService.aspx) or the Women's Gaelic Players' Association (http://wgpa.ie/?page_id=2666) you can also contact their respective 24 hour helplines should you wish.

Why do you ask for my name and email address?
We ask you for your name and email address for two reasons. Firstly, while we do hope to visit your team again if you agree to be contacted for the follow-up phases of the study, we ask you for your email address so that we can easily send you the questionnaire and you can complete it in your own time if you prefer, or if visitation cannot be arranged.
We will also match your name and email address to a unique code – you can see this code on your consent form and questionnaire booklet. This code will be attached to your questionnaire, allowing us to track players' experiences over time without having any identifying information, such as your name, attached to your answers.

How will my data be protected?
As this study is looking at changes in players' experiences over time, participant data must be identifiable to the researcher at each stage. As described above, this will be done by giving each participant a unique ID code (it will be on the consent form and questionnaire). We will also ask for your name and email address in the consent form, and this will be matched with your code. You will be given two envelopes, and will be asked to return your consent form and

questionnaire in separate, sealed envelopes. This means your email address will not be stored with your answers. You can return the envelopes to the researcher directly if you wish to complete the questionnaire now, or you can take the questionnaire with you and return it via post (stamped and addressed envelopes are available on request!).
Coding the data means it can be de-identified after it is collected and in any of the results we report. As a result, no participant will be identifiably in any of the results or analysis. In order to provide your consent to participate in this study, you will be asked only to tick a number of boxes, and no signature or other identifiable marker must be given.
Data will be processed and protected in compliance with GDPR guidelines at all times, and will be used solely for research purposes.

How will my data be kept secure?
All of the consent forms and questionnaires collected will be stored in separate locked drawers in a locked office on Dublin City University campus. Only the postgraduate researcher will have keys for these drawers. The data will also be transferred to computer file on an encrypted, password-protected laptop. Your name and email address will be included in a password-protected file in which it will be matched with your unique ID code, and accessible to the postgraduate researcher only. Your ID code and questionnaire data will also be inputted in a separate, password-protected file, which only the postgraduate researcher can access. The supervising researchers and the examiners will have access to the de-identified data upon request, and this data may also be shared via online data sharing repositories. No individual participant would be identifiable in any of this data!

What will happen to my data?
The data collected in this study will be analysed and reported on as part of a PhD thesis. All hard copies of the questionnaires will be stored securely in a locked cabinet on Dublin City University campus for a period of one year following the completion of the research study, after which it will be destroyed. Only the postgraduate researcher and the supervising researcher will have access to this data. Examiners may request access to the de-identified e-data. The data collected may be used in the future to form the basis of further work including academic reports, journal articles and conference presentations. However, the data will remain confidential. If this study is published in a journal, the data will be retained for period of 5 years before being destroyed. Although unlikely, it is possible that the data could be subject to a subpoena or the Freedom of Information Act, and under such circumstances the researcher would be obliged to provide the information requested.

Does this study have ethical approval?
This study has received ethical approval from the Research Ethics Committee (REC) in DCU. As stated previously, this research is being conducted as a requirement of a PhD degree. The postgraduate researcher is being supervised throughout the process by a principle researcher. If you have any concerns about the manner in which this study was conducted, or should any concerns arise in the future in relation to this study, please do not hesitate to contact the supervising researcher Dr. Simon Dunne, of Dublin City University School of Nursing and Human Sciences (Tel: 01 700 7796; Email: simon.dunne@dcu.ie), or the DCU REC administrator (Email: rec@dcu.ie) as an independent contact. For queries relating to data protection, you can contact the DCU Data Protection Officer, Mr. Martin Ward (data.protection@dcu.ie Ph: 7005118 / 7008257).

If you are interested in participation and would like to receive a copy of the consent form and questionnaire, please remain in the location and await instructions from the researcher. If you do not wish to participate you are free to leave.

Thank you!

Appendix D. Consent Forms

Appendix D.1: *Online Consent form*

Consent Form

PhD Researcher: Siobhan Woods **Supervising Researchers:** Dr. Simon Dunne, Prof Pamela Gallagher

- I confirm that I have read the attached Plain Language Statement, and that I understand the information provided therein and have had time to consider this information.
  Yes ☐ No ☐

- I confirm that I am 18 years of age or older.
  Yes ☐ No ☐

- I understand that my participation in this study is completely voluntary, and that I am free to withdraw at any time, without giving any reason and without being penalised for doing so.
  Yes ☐ No ☐

- I understand that the data collected as part of this study will be kept entirely confidential, and is for use in a PhD research project.
  Yes ☐ No ☐

- I understand that this data may also be used for the purpose of peer reviewed articles, academic reports and/or conference presentations.
  Yes ☐ No ☐

- I understand that data will be stored securely on encrypted files and on the hosting website (Qualtrics).
  Yes ☐ No ☐

- I understand that only the postgraduate researcher, the supervising researcher, the DCU School of Nursing and Human Sciences Qualtrics administrator, and the examiners will have access to the data collected.
  Yes ☐ No ☐

- I give my consent to participate in this project.
  Yes ☐ No ☐

- I consent to be contacted in the future, via the below email, to re-send the questionnaire aspect of this research project.
  Yes ☐ No ☐
  If YES: Please provide your email address: ______________________
  Please provide your name: ________________

- I consent to be contacted in the future, via the email address I provided, to send information about the interview phase of this research project, with the possibility that I may be invited to take part in an interview.
  Yes ☐ No ☐

Appendix D2. *Hard Copy Consent form*

Consent Form

Postgraduate Researcher: Siobhan Woods **Supervising Researchers:** Dr. Simon Dunne, Prof. Pamela Gallagher

- I confirm that I have read the attached Plain Language Statement, and that I understand the information provided therein and have had time to consider this information.
  Yes ☐ No ☐

- I confirm that I am 18 years of age or older.
  Yes ☐ No ☐

- I understand that my participation in this study is completely voluntary, and that I am free to withdraw at any time, up until I have submitted my data, without giving any reason and without being penalised for doing so.
  Yes ☐ No ☐

- I understand that the data collected as part of this study will be kept entirely confidential, and is for use in a PhD research project.
  Yes ☐ No ☐

- I understand that this data may also be used for the purpose of peer reviewed articles, academic reports and/or conference presentations.
  Yes ☐ No ☐

- I understand that data will be stored securely in hard copy in a locked cabinet on Dublin City University campus, and that soft copies of the data will be stored in encrypted files.
  Yes ☐ No ☐

- I understand that only the postgraduate researcher, the supervising researcher and the examiners will have access to the data collected.
  Yes ☐ No ☐

- I give my consent to participate in this postgraduate research project.
  Yes ☐ No ☐

- I consent to be contacted in the future, via a team representative or email, to re-send the questionnaire aspect of this research project.
  Yes ☐ No ☐
  If YES: Please provide your email address ______________________
  Please provide your name: ________________

- I consent to be contacted in the future, via the email address I provided, to send information about the interview phase of this research project, with the possibility that I may be invited to take part in an interview.
  Yes ☐ No ☐

By completing this questionnaire, you are giving consent to participate. Please return this consent form and the questionnaire in SEPARATE sealed envelopes *i.e. one in each of the envelopes provided.*

***NB** if you have answered 'no' to any of the above questions, *other than the questions relating to future contact and interview participation*, your data will not be included in the study. You are free to complete the questionnaire if you wish. If you do not wish to complete the questionnaire, please seal it in the envelope provided and return it to the researcher.

Thank you for your time!

Appendix E. Questionnaire

Questionnaire

Thank you for agreeing to participate in this study! Before you begin the questionnaire you will be asked to complete some short demographic questions.

Q1. What gender do you identify with?

- Female
- Male
- Other

Q2. What age are you? ____

Q3. Which sports do you play? *(Please select all that apply)*

- Gaelic Football
- Ladies Football
- Camogie
- Hurling

Q4. From the options below, please select **all** the teams for which you are currently playing.

	Football/Ladies football	Camogie/Hurling
Club Minor	O	O
Club U20/21	O	O
Club Senior	O	O
County Minor	O	O
County U20/21	O	O
County Senior	O	O
College	O	O
Other (name level)	________	________

Q.6 How many hours a week do you usually spend training? ____________

Q7. How many days training have you missed as a result of injury over the last 3 months?_____________

FOR DUAL PLAYERS ONLY

Q. If you selected two sports (e.g. football and hurling), there may be one that you ***prioritise****, or view as your main sport. If this is the case, please select that ONE sport from the options below. If this is not the case, and you view both sports equally, please select ONE sport at random, for the purpose of this study.*

- *Gaelic Football*
- *Ladies Football*

- *Camogie*
- *Hurling*

Q8. Do you start most (i.e 75% or more) matches for your team? *(if you play for multiple teams, please choose the team for which you play at the **highest level** in the ONE sport you have selected e.g. if you play for your club and county, answer in relation your county team)*:

Yes OR No

Q. 9 (a) Do you feel that your gender has ever impacted your playing experience in any way (e.g. have you ever felt your access to things such as playing facilities, equipment or coaching was restricted or improved because of your gender)?

Yes OR No

Q. 9 (b) If **yes**, please indicate whether that impact has been mostly positive or negative.

- Positive
- Negative

- *The following questions will ask about factors related to your experience of motivation, stress, burnout and the training environment in your chosen sport*
- *Please answer the questions in relation to the **ONE** sport you selected in the above section (dual players should answer in relation to the sport you selected in Q.8).*
- *Where questions relate to a specific team, please answer the question in relation to the team with whom you train **MOST OFTEN**.*
- *Please answer as truthfully as possible – there are no right or wrong answers!*

Please read each statement carefully and decide if you ever feel this way about your current sport participation. Your current sport participation includes all the training you have completed during this season. Please indicate how often you have had this feeling or thought this season by circling a number 1 to 5, where 1 means "I almost never feel this way" and 5 means "I feel that way most of the time." There are no right or wrong answers, so please answer each question as honestly as you can. Please make sure you answer all items.

	How often do you feel this way?	Almost Never	Rarely	Sometimes	Frequently	Almost Always
9.	I'm accomplishing many worthwhile things this sport	1	2	3	4	5
10.	I feel so tired from my training that I have trouble finding energy to do other things.	1	2	3	4	5
11.	The effort I spend in this sport would be better spent doing other things.	1	2	3	4	5
12.	I feel overly tired from my sport participation.	1	2	3	4	5
13.	I am not achieving much in this sport.	1	2	3	4	5
14.	I don't care as much about my performance in this sport as I used to.	1	2	3	4	5
15.	I am not performing up to my ability in this sport.	1	2	3	4	5
16.	I feel "wiped out" from this sport.	1	2	3	4	5
17.	I'm not into this sport like I used to be.	1	2	3	4	5
18.	I feel physically worn out from this sport.	1	2	3	4	5
19.	I feel less concerned about being successful in this sport than I used to.	1	2	3	4	5
20.	I am exhausted by the mental and physical demands of this sport.	1	2	3	4	5
21.	It seems that no matter what I do, I don't perform as well as I should.	1	2	3	4	5
22.	I feel successful at this sport.	1	2	3	4	5
23.	I have negative feelings toward this sport.	1	2	3	4	5

Based on the sport you have selected, please rate how much you agree/disagree with each statement by circling a number from 1 to 5 using the scale given below. There are no right or wrong answers. We only want your honest opinion about the following statement below!

	Do you agree with this statement?	**Strongly disagree**	**Somewhat disagree**	**Neither agree nor disagree**	**Somewhat agree**	**Strongly agree**
24.	Playing this sport is fun.	1	2	3	4	5
25.	I have spent a lot of time in this sport.	1	2	3	4	5
26.	Other things in my life make it difficult to play this sport.	1	2	3	4	5
27.	I try to dominate in this sport.	1	2	3	4	5
28.	In this sport I am constantly trying to improve my skills.	1	2	3	4	5
29.	The mental effort I have put into this sport makes it hard to stop playing.	1	2	3	4	5
30.	Staying in this sport is more of a necessity than a desire.	1	2	3	4	5
31.	There are future events in this sport that I would really miss experiencing if I no longer played.	1	2	3	4	5
32.	I am being pulled away from this sport by other things in my life.	1	2	3	4	5
33.	The physical effort I have put into this sport makes it difficult to stop playing.	1	2	3	4	5
34.	I like playing this sport.	1	2	3	4	5
35.	I am dedicated to keep playing this sport.	1	2	3	4	5
36.	Once I attain a goal in this sport, I challenge myself to continue improving.	1	2	3	4	5
37.	I would really miss the travel experiences I have if I no longer played this sport.	1	2	3	4	5
38.	People would be upset if I stopped playing this sport because they have invested so much.	1	2	3	4	5

39.	In this sport, I strive for the perfect performance.	1	2	3	4	5
40.	In this sport, I have put in a lot of training.	1	2	3	4	5
41.	People would be disappointed if I didn't keep playing this sport.	1	2	3	4	5
42.	I have a mentor who provides guidance in this sport.	1	2	3	4	5
43.	People who are important to me attend the majority of my matches.	1	2	3	4	5
44.	I feel trapped in football/ hurling/ camogie.	1	2	3	4	5
45.	People who are important to me are there for me when I perform poorly in this sport.	1	2	3	4	5
46.	The time that I have spent in this sport makes it difficult to stop playing.	1	2	3	4	5
47.	I constantly try to learn from my mistakes in this sport.	1	2	3	4	5
48.	When things get tough in this sport, people that are important to me provide comfort.	1	2	3	4	5
49.	It is almost impossible to keep playing this sport because of other things in my life.	1	2	3	4	5
50.	People that are important to me teach me the strategies of this sport.	1	2	3	4	5
51.	I love to play this sport.	1	2	3	4	5
52.	In this sport I strive to be better than my opponents.	1	2	3	4	5
53.	I would really miss the things I learn in this sport I didn't play.	1	2	3	4	5
54.	I am willing to overcome any obstacle to keep playing this sport.	1	2	3	4	5
55.	Although I think about quitting this sport, I feel I must keep playing.	1	2	3	4	5
56.	I push myself to win every time I compete in this sport.	1	2	3	4	5
57.	I have to put a great deal of mental effort into this sport.	1	2	3	4	5

58.	People who are important to me teach me about the mental side of this sport.	1	2	3	4	5
59.	There are other things in life that limit my participation in this sport.	1	2	3	4	5
60.	Because people that are important to me are involved in this sport, it is assumed that I will keep playing.	1	2	3	4	5
61.	In this sport, I strive to improve every aspect of my performance.	1	2	3	4	5
62.	I feel I am forced to keep playing this sport.	1	2	3	4	5
63.	Other things in my life compete with playing this sport.	1	2	3	4	5
64.	I push myself to reach my full potential in this sport.	1	2	3	4	5
65.	It is difficult to stop playing because of the personal discipline I have maintained in this sport.	1	2	3	4	5
66.	I feel I have to keep playing this sport even though I don't want to.	1	2	3	4	5
67.	To improve in this sport, I push myself to achieve the goals I have set.	1	2	3	4	5
68.	Playing this sport is very pleasurable.	1	2	3	4	5
69.	I am determined to keep playing this sport.	1	2	3	4	5
70.	In this sport, I challenge myself to be better than everyone else	1	2	3	4	5
71.	I have put a great deal of physical effort into this sport.	1	2	3	4	5
72.	I am very attached to this sport.	1	2	3	4	5
73.	I would really miss the competition in this sport if I no longer played.	1	2	3	4	5
74.	The time that I have spent in this sport makes it difficult to stop playing.	1	2	3	4	5
75.	When I play matches, people who are important to me cheer me on.	1	2	3	4	5

76.	People that are important to me expect me to keep playing this sport.	1	2	3	4	5
77.	I will continue to play this sport for as long as I can.	1	2	3	4	5
78.	People give me trustworthy advice about this sport.	1	2	3	4	5
79.	Playing this sport makes me happy.	1	2	3	4	5
80.	It is difficult to stop playing because of the training I have put into this sport.	1	2	3	4	5
81.	In this sport, people provide useful instructions to help me improve.	1	2	3	4	5
82.	I am willing to do almost anything to keep playing this sport.	1	2	3	4	5

You're doing great – nearly there!

Please think about how it has felt to play on your team throughout this season (i*f you play for multiple teams, please answer the question in relation to the team with whom you train* ***MOST OFTEN****).* What is it usually like on your team? Read the following statements carefully and respond to each in terms of how you view the typical atmosphere on your team. Perceptions naturally vary from person to person, so be certain to take your time and answer as honestly as possible. Select the number that best represents how you feel.

	Do you agree with this statement?	**Strongly disagree**	**Somewhat disagree**	**Neither agree nor disagree**	**Somewhat agree**	**Strongly agree**
83.	On this team, the coach wants us to try new skills.	1	2	3	4	5
84.	On this team, the coach gets mad when a player makes a mistake.	1	2	3	4	5
85.	On this team, the coach gives most of his or her attention to the stars.	1	2	3	4	5
86.	On this team, each player contributes in some important way.	1	2	3	4	5
87.	On this team, the coach believes that all of us are crucial to the success of the team.	1	2	3	4	5
88.	On this team, the coach praises players only when they outplay team-mates.	1	2	3	4	5
89.	On this team, the coach thinks only the starters contribute to the success of the team.	1	2	3	4	5
90.	On this team, players feel good when they try their best.	1	2	3	4	5
91.	On this team, players are taken out of a game for mistakes.	1	2	3	4	5
92.	On this team, players at all skill levels have an important role on the team.	1	2	3	4	5
93.	On this team, players help each other learn.	1	2	3	4	5
94.	On this team, players are encouraged to outplay the other players.	1	2	3	4	5
95.	On this team, the coach has his or her own favourites.	1	2	3	4	5
96.	On this team, the coach makes sure players improve on skills they're not good at.	1	2	3	4	5

97.	On this team, the coach yells at players for messing up.	1	2	3	4	5
98.	On this team, players feel successful when they improve.	1	2	3	4	5
99.	On this team, only the players with the best `stats' get praise.	1	2	3	4	5
100.	On this team, players are punished when they make a mistake.	1	2	3	4	5
101	On this team, each player has an important role.	1	2	3	4	5
102.	On this team, trying hard is rewarded.	1	2	3	4	5
103	On this team, the coach encourages players to help each other.	1	2	3	4	5
104.	On this team, the coach makes it clear who he or she thinks are the best players.	1	2	3	4	5
105	On this team, players are `psyched' when they do better than their team-mates in a game.	1	2	3	4	5
106	On this team, if you want to play in a game you must be one of the best players.	1	2	3	4	5
107	On this team, the coach emphasizes always trying your best.	1	2	3	4	5
108	On this team, only the top players `get noticed' by the coach.	1	2	3	4	5
109	On this team, players are afraid to make mistakes	1	2	3	4	5
110	On this team, players are encouraged to work on their weaknesses.	1	2	3	4	5
111	On this team, the coach favours some players more than others.	1	2	3	4	5
112	On this team, the focus is to improve each game/practice.	1	2	3	4	5
113	On this team, the players really `work together' as a team.	1	2	3	4	5
114	On this team, each player feels as if they are an important team member.	1	2	3	4	5
115	On this team, the players help each other to get better and excel.	1	2	3	4	5

You're nearly there – just a few questions left. Thank you for your time!

Please think about why your practice your primary sport and respond to the questions below. Using the following scale, please indicate to what extent each of the following items corresponds to one of the reasons for which you are presently practicing your sport.

		Does not Corres-pond at all	Corres-ponds very little	Corre-sponds a little	Corre-sponds moderate ly	Corre-sponds quite a bit	Corre-sponds quite a lot	Corre-sponds comple tely
		1	2	3	4	5	6	7
116.	Because I would feel bad about myself if I did not take the time to do it.	1	2	3	4	5	6	7
117.	I used to have good reasons for doing sports, but now I am asking myself if I should continue.	1	2	3	4	5	6	7
118.	Because it is very interesting to learn how I can improve.	1	2	3	4	5	6	7
119.	Because practicing sports reflects the essence of whom I am.	1	2	3	4	5	6	7
120.	Because people I care about would be upset with me if I didn't.	1	2	3	4	5	6	7
121.	Because I found it is a good way to develop aspects of myself that I value.	1	2	3	4	5	6	7
122.	Because I would not feel worthwhile if I did not.	1	2	3	4	5	6	7
123.	Because I think others would disapprove of me if I did not.	1	2	3	4	5	6	7
124.	Because I find it enjoyable to discover new performance strategies	1	2	3	4	5	6	7
125.	I don't know anymore; I have the impression that I am incapable of succeeding in this sport.	1	2	3	4	5	6	7
126.	Because participating in sport is an integral part of my life.	1	2	3	4	5	6	7
127.	Because I have chosen this sport as a way to develop myself.	1	2	3	4	5	6	7
128.	It is not clear to me anymore; I don't really think my place is in sport.	1	2	3	4	5	6	7
129.	Because through sport, I am living in line with my deepest principles.	1	2	3	4	5	6	7
130.	Because people around me reward me when I do.	1	2	3	4	5	6	7
131.	Because I feel better about myself when I do.	1	2	3	4	5	6	7
132.	Because it gives me pleasure to learn more about my sport.	1	2	3	4	5	6	7
133.	Because it is one of the best ways I have chosen to develop other aspects of myself.	1	2	3	4	5	6	7

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

		1 = Never	2 = Almost Never	3 = Sometimes	4 = Fairly often	5 = Very Often
134.	111. In the last month, how often have you been upset because of something that happened unexpectedly?	1	2	3	4	5
135.	112. In the last month, how often have you felt that you were unable to control the important things in your life?	1	2	3	4	5
136.	113. In the last month, how often have you felt nervous and “stressed”?	1	2	3	4	5
137.	114. In the last month, how often have you felt confident about your ability to handle your personal problems?	1	2	3	4	5
138.	115. In the last month, how often have you felt that things were going your way?	1	2	3	4	5
139.	In the last month, how often have you found that you could not cope with all the things that you had to do?	1	2	3	4	5
140.	116. In the last month, how often have you been able to control irritations in your life?	1	2	3	4	5
141.	117. In the last month, how often have you felt that you were on top of things?	1	2	3	4	5
142.	118. In the last month, how often have you been angered because of things that were outside of your control?	1	2	3	4	5
143.	119. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	1	2	3	4	5

You're Finished! Thank you so much for time and the insight into your experience.

If you are happy for your answers to be sent to the researcher, please click 'SUBMIT'.

If you have any concerns about the manner in which this study was conducted, or should any concerns arise in the future in relation to this study, please do not hesitate to contact the postgraduate researcher Siobhan Woods (siobhanwoods24@mail.dcu.ie), supervising researcher Dr. Simon Dunne, of Dublin City University School of Nursing and Human Sciences (Tel: 01 700 7796; Email: simon.dunne@dcu.ie), the DCU REC administrator (rec@dcu.ie) as an independent contact.

If participation in this research has caused you to experience any upset or distress, you can free-phone Samaritans (Phone: 116 123), contact Dublin City University Counselling Service (Phone: 01-7005165; email: counselling@dcu.ie), or contact your local GP. If you are a member of the Gaelic Players' Association (https://www.gaelicplayers.com/WhatWeDo/GPACounsellingService.aspx) or the Women's Gaelic Players' Association (http://wgpa.ie/?page_id=2666) you can also contact their respective 24 hour helplines should you wish.

Appendix F. Research Ethics Committee Approval Letter

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University

DCU

Ms Siobhan Woods,
School of Nursing and Human Science

21st February 2019

REC Reference:	**DCUREC/2019_028**
Proposal Title:	**The road to burnout: a longitudinal study of the athlete burnout process and associated factors in competitive Gaelic Games players**
Applicant(s):	**Ms Siobhan Woods, Dr Simon Dunne, Prof. Pamela Gallagher**

Dear Colleagues,

This research proposal qualifies under our Notification Procedure, as a low risk social research project. Therefore, the DCU Research Ethics Committee approves this project.

Materials used to recruit participants should state that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee.

Should substantial modifications to the research protocol be required at a later stage, a further amendment submission should be made to the REC.

Yours sincerely,

Dr Dónal O'Gorman
Chairperson
DCU Research Ethics Committee

DCU
Research & Innovation

Appendix G. Item Parcelling Information, Chapter 5

Appendix G.1 *Parcelling Rationale.* In line with the single factor method (Landis et al., 2000), the item with the highest loading in the CFA was paired with the item with lowest loading, and so on. Where the number of items was ≤ 4, the individual subscale items were retained to ensure a minimum of 3 items/parcels and avoid under-identification (Blunch, 2008; Matsunaga, 2008),. The specific item parcels are outlined below.

Table G. *Item Parcelling and Factor Loadings for the SCQ-2 and PMCSQ-2*

Subscale	Items *(factor loading)*	Parcels *(factor loadings)*
SCQ-2		
Enthusiastic Commitment	12*(.70),* 31*(.81),* 46*(.83),* 49*(.67),* 53*(.73),* 58*(.83)*	(46 + 49)/2 *(.86)*; (58 + 12)/2 *(.91)*; (31 + 53)/2 *(.88)*
Constrained Commitment	7*(.67),* 21*(.85),* 32*(.58),* 39*(.74),* 43*(.84)*	(21 + 32)/2 *(.85)*; (43 + 7)/2 *(.84)*; 39 retained unparcelled *(.72)*
Sport Enjoyment	1*(.60),* 11*(.81),* 28*(.87),* 45*(.77),* 55*(.85)*	(1 + 28)/2 *(.82)*; (55 + 45)/2 *(.88)*; 11 retained unparcelled *(.79)*
Other Priorities	3*(.70),* 9*(.80),* 26*(.72),* 36*(.79),* 40*(.66)*	(9 + 40)/2 *(.85)*; (36 + 3)/2 *(.81)*; 26 retained unparcelled *(.72)*
Valuable Opportunities	1*(0.44),* 14*(.45),* 30(*.73*)*,* 50*(.59)*	All items retained unparcelled
Personal investment – loss	6*(.64),* 10*(.73),* 23*(.72),* 42*(.57),* 56*(.71)*	(10 + 42)/2 *(.80)*; (26 + 6)/2 *(.84)*; 56 retained unparcelled *(.71)*
Personal investment – Quantity	2*(.31)***,* 17*(.77),* 34*(.65),* 48*(.79)*	17 *(.79)*, 34 *(.63)*, 48 *(.80)* retained unparcelled; 2 excluded
Social constraints	15*(.81),* 18*(.85),* 37*(.44),* 52*(.62)*	All items retained unparcelled
Social Support – Emotional	20*(.79),* 22*(.61),* 25*(.60),* 51*(.86)*	All items retained unparcelled
Social Support – Informational	19*(.63),* 27*(.65),* 35*(.62),* 54*(83),* 57*(73)*	(54 + 35)/2 *(.85)*; (57 + 19)/2 *(.74)*; 27 retained unparcelled *(.69)*
Desire to Excel – Mastery achiev.	5*(.70),* 13*(.79),* 24*(.72),* 38*(.81),* 41*(.80),* 44*(77)*	(38 + 5)/2 *(.86)*; (41 + 24)/2 *(.90)*; (13 + 44)/2 *(.84)*
Desite to Excel – Social achiev.	4*(0.64),* 16*(.67),* 29*(.39),* 33*(.70),* 47(*.80*)*,*	S1*(0.78)*, S2*(0.82),* 33 retained unparcelled *(0.69)*
PMCSQ-2		
Intra-team member rivalry	6*(.77),* 12*(.36)***, 23*(.42)*	All items retained unparcelled
Unequal recognition	3*(.80),* 13*(.78),* 17*(.69),* 22*(.74),* 24*(.56),* 26*(.79),* 29*(.80)*	(3 + 24)/2 *(.81)*; (29 + 17)/2 *(.87)*; (26 + 22 + 13)/3 *(.91)*
Punishment for mistakes	2*(.73),* 7*(.62),* 9*(.65),* 15*(.77),* 18*(.78),* 27*(.66)*	(18 + 7)/2; (15 + 9)/2; (2 + 27)/2
Cooperative learning	11*(.76),* 21*(.69),* 31*(.70),* 33*(.80)*	All items retained unparcelled
Effort/improvement	1*(.70),* 8*(.64),* 14*(.83),* 16*(.66),* 20*(.57),* 25*(.64),* 28*(.79),* 30*(.73)*	(14 + 20)/2 *(.86)*; (28 + 8)/2 *(.85)*; (30 + 16)/2 *(.83)*; (1 + 25)/2 *(.80)*
Important role	4*(.67),* 5*(.79),* 10*(.66),* 19*(.81),* 32*(.73)*	(19 + 10)/2 *(79)*; (5 + 4)/2 *(.88)*; 32 retained unparcelled *(.73)*

Note: All factor loadings were significant ($p < 0.05$); * Item 2 was removed as the factor loading was < 4; ** Item 12 was retained despite a factor <0.4, as removing it would leave just two indicator items for the subscale (Landis et al., 2000; Matsunaga, 2008).

Appendix H. Rationale for Model Amendments, Chapter 6

Appendix H.1 *Rationale for Amendments to RSA and SD Measurement Invariance Model 1b*

As outlined in Table 6.2, while the fit indices for RSA and SD Model 1b were acceptable (χ^2/df < 3,CFI > 0.9, RMSEA < 0.06, SRMR < 0.1), the fit was relatively weak for RSA (*CFI* = .908) and SD (*CFI* = .916). As measures of fit generally deteriorate further when models become more complex (Perry et al., 2015), this was recognised as an issue that may impact the analysis as it progressed (e.g. with the addition of predictors). Modification indices (MIs) can provide insight into potential issues or opportunities for improvement in model fit. However, the information provided therein is based purely of mathematical calculations, and, consequently, a range of suggested modifications may be provided which are effectively non-sensical when considered theoretically and/or practically (Brown, 2015). As such, decisions to adjust a model should never be made based on solely on MIs, and instead should be supported by adequate substantive and/or theoretical rationale (Brown, 2015). This was in to the forefront of the researcher's mind when reviewing MIs for the RSA and SD models, and decision-making process is outlined in detail below.

RSA MIs indicated that allowing the residual errors for items ABQ13 and ABQ7 to correlate at T4 would lead to the largest drop in chi-square (*MI* = 34.149). Correlated errors suggest that some portion of covariance in the indicator items is accounted for by shared causes (Wang & Wang, 2012), and support for such an association between the items mentioned is evident both when one considers item content and the timepoint context (Brown, 2015); the ABQ13 ("*It seems that no matter what I do, I don't perform as well as I should*") and ABQ7 ("*I am not performing up to my ability in sport")* items are similar in content and focus, and may have become particularly conflated during the T4 window as a result of the pandemic-induced sport suspension. Specifically, questions around performance may have been similarly impacted by the limited opportunity to perform or train in a sport-specific manner during this period. As such, the error variances for these items were allowed to correlate at T4 (Brown, 2015), and the updated RSA model showed improved fit (χ^2 (314) = 481.31, *CFI* = .926, *RMSEA* = .051, *SRMR* = .071).

However, the *CFI* remained relatively low and exploration of MIs suggested that further improvement would be made if items ABQ14 "*I feel successful at sport*" and ABQ1 "*I am accomplishing many worthwhile things in sport* were each correlated at T3 (*MI* = 12.648*)*. Consideration of item content and the context of the data collection point again provides support this modification (Brown, 2015); the items are similar in content, and it is possible that they became particularly conflated at T3 due to its positioning at the latter end of the Gaelic games season, when most competitions are finished and athletes may have fewer opportunities to evaluate success or accomplishments, and instead may be reflecting back. The updated RSA with both inter-item correlations (Model 1c) showed further improvements in fit (see Table 6.2). While MIs continue to suggest additional modifications, these suggestions were not well-supported substantively (e.g. covarying items from different timepoints) and/or would have relatively small impact on model fit. As such, in line with the recommended cautious approach to the use of MI indices (Hooper et al., 2008), no further adjustments were made and the RSA Model 1c was retained moving forward.

For the SD model 1b, MIs indicated that allowing items ABQ3 and ABQ6 to correlate at T5 would improve model fit (*MI* = 9.322). This modification was again supported by consideration of both question content and timepoint context; ABQ3 "*The effort I spend in sport would be better spent doing other things*" and ABQ6 "*I don't* *care as much about my sport performance as I used to*" are similar in content, and it is possibly that, similar to the RSA items above, these questions became particularly conflated following the suspension of sport due to COVID-19. Specifically, exploration of athletes' experiences of this period (Woods et al., 2022), suggests that it was used by some as a chance to reflect on their sport participation, and this included realisations that their time would better spent elsewhere and that they enjoyed have time to commit to other activities. This adjustment led to improved fit (χ^2 (314) = 503.02, *CFI* = .920, *RMSEA* = .054, *SRMR* = .067), but *CFI* again remained relatively low. Further exploration of the updated MIs indicated that allowing items ABQ15 and ABQ9 at T3 would further improve the model (*MI* = 8.427). This modification was supported by consideration of both question content and timepoint context; items ABQ15 ("*I have negative feelings toward sport")* and ABQ9 ("*I'm not into sport like I used to be*") are similar in content, and, as per the rationale outlined above relating to the positioning of T3 at the latter end of the season, athletes may have had more opportunity to reflect on their feelings towards their sport. This adjustment led to improved model fit, as outlined in Table 6.2 (Model 1c). No further modifications were made to the SD model, as the additional MIs were not well-supported by substantive rationale and/or would have relatively small impact on model fit (Hooper et al., 2008). As such, SD Model 1c was retained moving forward.

Appendix H.2 *Rationale for the specification of partial scalar invariance for the RSA Model*

Fit indices indicated a significant worsening of fit for the full scalar invariance model for RSA when compared to Model 2 (Table 6.2). In line with the approach for *partial scalar invariance* (Putnick & Bornstein, 2016) specified a priori, examination of

MIs and theoretical considerations informed the decision to free the ABQ1 item at T5. The rationale that informed decision-making is outlined herein.

Notably, the MIs indicated that freeing the ABQ1 item at T5 (ABQ1_5) would lead to a substantial reduction in the chi-square value for the RSA model (*MI* = 19.807). Exploration of the relevant descriptive statistics and placing the data in context provides further support for the freeing of this parameter; descriptive statistics indicate that average scores on ABQ1 ("*I'm accomplishing many worthwhile things in sport*"; *M* = 2.78, *SD* = 0.98) were higher at T5 than at T1 – T4 or T6 (ABQ1 *M* = 2.39 – 2.55, *SD* = 0.92 – 0.96; ABQ6 *M* = 2.09 – 2.34, *SD* = 1.14 – 1.29). As this is a reverse coded item, the data indicates that participants disagreed with this statement to a greater extent at T5 than at the other timepoints. The apparent variance in these responses when compared to other timepoints may be explained by the fact that T5 data collection followed the period of suspension of organised sport in Ireland, which meant that athletes were unable to compete over the preceding months and consequently may have felt they were accomplishing less in their sport. As such, the model was respecified to reflect *partial scalar invariance* (Model 3b) for both RSA, with ABQ1_5. As outlined in Table 3, results indicated that this partially invariant model (Model 3b) was a better fitting model than the *full scalar invariance* model for RSA, and did not have a significantly worse fit than the *metric invariance* model. The overall fit indices indicated acceptable fit. As such, and in consideration of the theoretical rationale above, the model of partial scalar (Model 3b) invariance was accepted for the RSA.

Appendix I. Correlation Matrices for Conditional LGM Predictors with Slope and Intercept Factors - Chapter 7

Table I.1.

Estimated correlation matrix for predictor variables with PEE Intercept and Slope Factors

Variables	Correlation with I (r)	*SE*	Correlation with S (r)	*SE*
PSS	0.569**	*0.052*	0.01	*0.061*
Train Hours	0.172**	*0.043*	0.093	*0.114*
Contrained Com	0.578****	*0.055*	0.048	*0.095*
PI Qnty	0.226**	*0.063*	-0.191*	*0.092*
EO Climate	0.348**	*0.051*	0.025	*0.07*
Amotiv	0.487**	*0.065*	0.191	*0.114*
Soc Support	-0.126*	*0.053*	-0.158*	*0.052*
External	0.316**	*0.045*	-0.174	*0.119*

** = p <.01; * = p < .05

Table I.2.

Estimated correlation matrix for predictor variables with RSA Intercept and Slope Factors

Variables	Correlation with I (r)	*SE*	Correlation with S (r)	*SE*
Age	-0.188**	*0.054*	-0.042	*0.041*
PSS	0.406**	*0.077*	0.189	*0.181*
Constrn	0.526**	*0.041*	-0.172	*0.144*
Enjoy	-0.484**	*0.043*	0.037	*0.098*
EO Climate	0.313**	*0.044*	-0.069	*0.082*
Amotiv	0.670**	*0.045*	0.099	*0.136*
Intrins	-0.396**	*0.062*	0.009	*0.07*

** = p <.01

Table I.3.

Estimated correlation matrix for predictor variables with SD Intercept and Slope Factors

Variables	Correlation with I (r)	*SE*	Correlation with S (r)	*SE*
PSS	0.074	*0.071*	0.241	*0.148*
Teams	-0.149**	*0.032*	0.255	*0.111**
Enthus	-0.666**	*0.044*	0.03	*0.053*
Contrained Com	0.616**	*0.054*	-0.005	*0.115*
DtEMas	-0.61**	*0.054*	0.023	*0.043*
EO Climate	0.172*	*0.066*	0.087	*0.063*
Amotiv	0.677**	*0.051*	0.156	*0.111*
Intrin	-0.556**	*0.053*	0.043	*0.042*
Soc Support	-0.383**	*0.05*	-0.009	*0.035*

** = p <.01; * = p < .05

Appendix J. Additions to the Questionnaire at T5

Appendix J.1 *Additional questions relating to athletes' experiences during COVID-19-induced suspension of training and games.*

Instructions: The questions below relate to your experience during the period of time that all organised Gaelic games activity was suspended as a result of the COVID-19 outbreak (i.e. March 12th 2020 – June 29th 2020). We are interested in understanding the impact of this suspension on you, how you viewed the suspension, and your level of physical activity during that period. Please note, when asked about the impact of this suspension, we would like you to focus on the *specific impact on your life*, rather than the role of this suspension in helping to slow the spread of COVID-19. Remember, **there are no right or wrong answers**. Please select the response **option that best describes YOUR EXPERIENCE**.

	1 = Not at all	2 = to a slight extent	3 = to moderate extent	4 = to a considerable extent	5 = to a great extent
1. To what extent has the suspension of training/games had a negative impact on your life?					
1.b Please provide a short explanation for your response	[Free text box]				
2. To what extent has the suspension of training/games had a positive impact on your life?					
2.b Please provide a short explanation for your response	[Free text box]				
3. To what extent did you view the suspension of training/games as an opportunity to rest and recover away from Gaelic games?					
4. To what extent did you view the suspension of training and games as an opportunity to try different types of physical activity (i.e. without the specific aim of improving Gaelic games relevant skills)					
5. To what extent did you view the suspension of training/games as an opportunity to work on specific skills/attributes needed for Gaelic games (e.g. ball skills, stick work, fitness)					
6. To what extent did you follow a specific training plan while team training was suspended?					
7. To what extent was your training prescribed (i.e. given to you) by your Gaelic games coach(es)					
	1 = much less	2 = somewhat less	3 = about the same amount	4 = somewhat more	5 = much more
8. In comparison to the level of weekly physical activity you would engage in during a regular Gaelic games season over this period (March – June), how would you describe the amount of physical activity you completed weekly while team training and games were suspended?					

Appendix J.2 *Sport Emotion Questionnaire*

Instructions: Below you will find a list of words that describe a range of feelings that sport performers may experience. Please read each one carefully and indicate on the scale next to each item how you feel *right now, at this moment, in relation to the return to competition* following the suspension of training and games due to the COVID-19 pandemic. There are no right or wrong answers. Do not spend too much on any one item, but choose the item which best describes your feelings right now in relation to the competition.

	Not at all	A little	Moder-ately	Quite a bit	Extre-mely
Uneasy	0	1	2	3	4
Upset	0	1	2	3	4
Exhilarated	0	1	2	3	4
Irritated	0	1	2	3	4
Pleased	0	1	2	3	4
Tense	0	1	2	3	4
Sad	0	1	2	3	4
Excited	0	1	2	3	4
Furious	0	1	2	3	4
Joyful	0	1	2	3	4
Nervous	0	1	2	3	4
Unhappy	0	1	2	3	4
Enthusiastic	0	1	2	3	4
Annoyed	0	1	2	3	4
Cheerful	0	1	2	3	4
Apprehensive	0	1	2	3	4
Disappointed	0	1	2	3	4
Energetic	0	1	2	3	4
Angry	0	1	2	3	4
Happy	0	1	2	3	4
Anxious	0	1	2	3	4
Dejected	0	1	2	3	4

ScoringInstructions:

Anxiety = (uneasy + tense + nervous + apprehensive + anxious)/5

Dejection = (upset + sad + unhappy + disappointed + dejected)/5

Excitement = (exhilarated + excited + enthusiastic + energetic)/4

Anger = (irritated + furious + annoyed + angry)/4

Happiness = (pleased + joyful + happy + cheerful)/4

Appendix J3. Permission to Edit the Sport Emotion Questionnaire

Email exchange with SEQ author, Prof. Marc Jones.

Siobhan Woods <siobhan.woods24@mail.dcu.ie> 10:19 (5 hours ago)
to marc.jones

Dear Prof. Jones,

I hope this email finds you well. My name is Siobhán Woods, and I am a PhD student in Dublin City University. I am contacting you in relation to the use of your scale, the Sport Emotion Questionnaire. Specifically, I am hoping to use the scale to assess how athletes feel about the impending return to competition, as the COVID-19-induced suspension of team training and games ends here in Ireland. As such, I wanted to ask whether you feel it would be acceptable to change the preamble of the scale slightly, such that the second sentence would read 'Please read each one carefully and indicate on the scale next to each item how you feel *right now, at this moment, in relation to the return to competition* following the suspension of training and games due to the COVID-19 pandemic.' Any advice or feedback you might have would be greatly appreciated!

Kind Regards,
Siobhán

--
Siobhán Woods
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School of Psychology | H101 | Faculty of Science and Health | Dublin City University | Glasnevin Campus | Dublin 9 | Ireland

Marc Jones 15:52 (2 minutes ago)
to me

Dear Siobhan,

Thank you very much for the email. The research sounds really interesting. The suggested change to the scale makes sense. I don't really have anything to add to that. Best of luck with the research and be interesting to hear how it turns out.

Best wishes,

Marc

Professor Marc Jones *BSc, PhD, C.Psychol*,
Department of Psychology I Manchester Metropolitan University I Manchester I M15 6GX.
Tel: 0161 247 2364 I Email: marc.jones@mmu.ac.uk I Twitter @ProfMarcJones

Research Cluster: **Stress, Health and Performance**

J4. Updated Ethical Approval

DCUREC2019/028 Inbox ×

rec dcu <rec@dcu.ie>
to me, Simon, Pamela

Tue, 30 Jun 2020, 14:04

Dear Siobhan,

Thank you for submitting the amendment for your research project DCUREC/2019/028. I can confirm that the REC Chair has completed their review and issued approval for the amendment and all associated documentation. Please accept this email as formal approval.

Wishing you the very best for your research.

Best wishes,
Adam Platt

Appendix K. Correlation Matrix for the Data Reported in Chapter 8

Table K.

Correlation Matrix for BC-19 and AC-19S Data

Variable	PEE BC19	RSA BC19	SD BC19	PSS BC19	THr BC19	OHr BC19	PEE AC19	RSA AC19	SD AC19	PSS AC19	THr AC19	OHr AC19	Plea-sant	Unple-asnt	Neg. Impct	Pos. Impct	Rest/ recov	Try New	GAA Skill	train plan	Co-mp
PEE-BC19	1																				
RSA-BC19	0.40[c]	1																			
SD-BC19	0.39[c]	0.71[c]	1																		
PSS-BC19	0.35[b]	0.35[b]	0.12	1																	
THr-BC19	0.14	-0.21[a]	-0.21[a]	-0.06	1																
OHr-BC19	0.18	-0.16[a]	-0.18	0.09	0.38[c]	1															
PEE-AC19	0.55[c]	0.27[a]	0.25[a]	0.33[b]	0.16	0.26[a]	1														
RSA-AC19	0.31[b]	0.67[c]	0.46[c]	0.35[c]	-0.05	-0.01	0.38[c]	1													
SD-AC19	0.36[b]	0.53[c]	0.67[c]	0.21[a]	-0.13	0.02	0.48[c]	0.70[c]	1												
PSS-AC19	0.35[b]	0.40[c]	0.24[a]	0.67[c]	0.05	0.01	0.42[c]	0.47[c]	0.29[b]	1											
THr-AC19	0.25[a]	-0.01	-0.10	0.04	0.51[c]	0.34[b]	0.10	-0.05	-0.19	-0.08	1										
OHr-AC19	0.06	-0.07	-0.23[a]	0.08	0.32[b]	0.37[c]	0.04	-0.16	-0.22[a]	-0.06	0.47[c]	1									
Pleasant	-0.10	-0.17	-0.22[a]	-0.06	-0.07	-0.13	-0.28[b]	-0.36[c]	-0.48[c]	-0.20	0.14	-0.03	1								
Unpleasnt	0.30[b]	0.21[a]	0.25[a]	0.31[b]	0.02	0.04	0.50[c]	0.20	0.34[b]	0.33[b]	-0.02	0.01	-0.47[c]	1							
Neg.Impct	0.18	-0.05	-0.02	0.05	0.03	0.18	0.05	0.04	-0.04	0.21[a]	-0.04	-0.10	0.12	0.02	1						
PosImpct	0.18	-0.02	-0.05	0.12	0.16	-0.04	0.24[a]	-0.11	0.02	0.04	0.04	-0.05	0.00	0.06	-0.15	1					
Rest/Recov	0.29[b]	0.15	0.14	0.19	0.10	0.04	0.36[b]	0.08	0.28[b]	0.18	0.06	-0.11	-0.12	0.28[b]	0.16	0.14	1				
Try New	0.20	-0.02	0.06	0.01	0.02	0.11	0.12	-0.25[a]	-0.10	-0.11	-0.01	0.03	0.03	0.06	-0.14	0.25[a]	-0.01	1			
GAASkills	-0.02	-0.20	-0.21[a]	0.00	0.19	0.01	0.11	-0.30[b]	-0.39[c]	-0.02	0.37[c]	0.23[a]	0.32[b]	-0.17	0.04	0.13	-0.04	0.10	1		
TrainPlan	-0.02	-0.09	-0.01	0.02	0.18	-0.01	0.03	-0.10	-0.16	0.04	0.24[a]	0.11	0.20	-0.06	-0.19	0.21[a]	-0.18	0.03	.41[c]	1	
Compar.	-0.08	0.00	0.08	-0.19	0.06	-0.12	0.03	-0.07	-0.10	-0.10	0.19	0.12	-0.04	-0.12	-0.31[b]	0.01	-0.27[b]	0.29[b]	.35[b]	.42[c]	1

Notes. [a] = two-tailed correlation $p < 0.05$ level; [b] = two-tailed correlation $p \leq 0.01$ level; [c] = two-tailed correlation $p \leq 0.001$ level; *BC-19* = Before COVID-19, *AC-19* = After the suspension of the season due to COVID-19, *THr* = Training Hours, *OHr* = Other hours, *Pleasant* = SEQ Pleasant emotions, *Unpleasnt* = SEQ Unpleasant emotions, *Rest/Recov* = extent to which the suspension period was viewed as a chance to rest, *Try New* = extent to which the suspension period was viewed as a chance to try new/different types of physical activity, *GAA Skills* = extent to which the suspension period was viewed as a chance to work on Gaelic games-specific skills, *TrainPlan* = extent to which players followed a training plan during the suspension period, *Compar* = Comparison of level of physical activity to the same period in a regular season