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Development and Initial Validation of the

Perfectionistic Climate Questionnaire-Sport (PCQ-S)

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The candidate confirms that the work submitted is his own, except where work which has formed part of jointly authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

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Abstract

Perfectionism has traditionally been conceptualised as a personality trait (i.e., a personal quality of the individual). However, researchers have recently proposed a new construct: *perfectionistic climate*. Rather than focussing on the personal qualities of an individual that are perfectionistic, perfectionistic climate focusses on the behaviours, practices, and relational styles of key social agents that make specific social environments perfectionistic. The aim of the current thesis is to apply this construct to sport and develop the first psychometric scale to measure athlete perceptions of the perfectionistic climate. The development of the Perfectionistic Climate Questionnaire-Sport (PCQ-S) involves four interrelated empirical studies, data from 1,155 young athletes, and a range of advanced psychometric analyses. In study one, outlined in chapter two, PCQ-S items capturing perceptions of the coach-created perfectionistic climate are developed, refined, and tested in relation to factor structure. In study two, outlined in chapter three, a nomological network of relations between test scores on the PCQ-S and established coach climate measures is assessed. In study three, outlined in chapter four, perfectionistic climate is assessed in relation to athlete burnout and athlete engagement. In study four, outlined in chapter five, perfectionistic climate is assessed in relation to the development of sport-specific perfectionism over a three-month period. The results of these studies provide support for the reliability, factorial validity, and measurement invariance of a five-factor 20-item PCQ-S. In addition, the PCQ-S can be differentiated from well-established coach-climate measures and has the potential to predict important outcomes in youth athletes. To gain further validity information, develop our understanding of the consequences of perfectionistic climates in sport, and design climate-based programmes for reducing perfectionism among young athletes, researchers need to build on the initial evidence in this thesis by using the PCQ-S in a systematic line of research that prioritises longitudinal and multi-level research designs.

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Chapter 1 – Introducing Perfectionistic Climate

"Youth athletes are increasingly being exposed to inappropriate and unrealistic demands and expectations" (Beregon et al., 2015).

Sport is a context in which pressure to be perfect is ubiquitous. That is, in many sporting environments, the pursuit of perfection is revered, actively encouraged, and considered necessary for athletes to be successful (Hill et al., 2020a). This is particularly apparent in elite sport where athletes are expected to work excessively hard in training and competition, adopt a single-minded commitment to sport performance, comply with all coach instructions, and accept nothing less than perfection (R. A. Thompson & Sherman, 1999). Over time, athletes learn from important others that this is the way elite sport is and that confirming to such norms is critical for success. This often stems from key social agents in sport creating a 'winning is everything' climate (Carless & Douglass, 2013). One potential issue is that the requirement to sacrifice everything in the pursuit of perfection has become deeply embedded in sport at an institutional level. This is problematic as it means that many athletes will experience extreme pressure to conform (or overconform) to extreme standards (Hughes & Coakley, 1991). When this is the case, athletes may feel compelled into pursuing unrealistic demands and expectations, make huge sacrifices in their personal and social lives, and put performance ahead of physical and mental wellbeing.

While these perfectionistic requirements are well engrained in elite sport, the same emphasis on competitive success, intense training, and pressure to meet unrealistically high standards are also characteristic features of many youth sport environments (Gould & Mignano, 2021). That is, in some youth sport settings, the requirement to win takes precedence over talent development and athlete wellbeing (Gould, 2019). The levels of pressure that youth sport athletes experience in such settings can often be extreme and potentially problematic. This issue is acknowledged by the International Olympic Committee (IOC) in a recent consensus statement on youth athletic

development (Beregon et al., 2015). In this statement, the IOC acknowledge that "youth athletes are increasingly being exposed to inappropriate and unrealistic demands and expectations" (p. 4). This is an important point that emphasises the potential for a more perfectionistic side of the youth sport experience.

The emphasis placed on perfecting performances and attaining unrealistically high standards in youth sport is often considered to come from the top-down. This is emphasised by Gould and Mignano (2021) who highlight how adults in youth sport often (perhaps implicitly) engage in behaviours that place extreme pressure on children. This includes practices such as focussing attention on only the most skilled performers, criticising children for not playing well, encouraging intense training practices, placing pressure on the attainment of extrinsic rewards, and engaging in antisocial behaviour toward other key social agents. This level of external pressure is also recognised by others. For example, Dorsch et al. (2019) found that the experience of some young athletes is characterised by an extreme level of involvement from adults in sport. That is, in some cases, children become accustomed to adults yelling at them, devoting significant resources to performance outcomes, and controlling all aspects of their sporting participation. The participants interviewed in this study recognised that this pattern of involvement is typically characterised by an expectation for perfection and overzealous focus on competitiveness.

Whether the perfectionistic behaviour of adults in youth sport is deliberate or involuntary, it represents a viable threat to athletic talent development, continued participation in sport, and broader areas of child development (Gould, 2019; Gould et al., 2020; Westfall & Gould, 2016). Specifically, an environment characterised by unrealistic expectations, criticism for not playing well, and psychologically controlling behaviour from adults is likely to undermine the experiences of support and approval that young athletes need from adults in sport (Bloom, 1985; Fraser-Thomas & Côté, 2006). This means that rather than feeling accepted, young athletes are more likely to feel rejected. For many young athletes, this experience could interfere with the development of resources required to maintain participation in sport and graduate to more elite levels of

participation (Westfall & Gould, 2016). In this sense, the win-at-all costs mentality that characterises many youth sport environments is a potential risk factor when it comes to young children feeling unwelcome, rejected, and compelled to exit sport during their childhood or adolescence.

In addition to experiences of rejection, youth sport experiences dominated by unrealistic demands may also confer vulnerability to excessive stress and illbeing (Beregon et al., 2015). There are several reasons to think that there could be a link between external pressure to be perfect and mental health difficulties in young athletes. This includes: (a) evidence that mental health issues such as depressive symptomology, anxiety, and suicide ideation in young people are increasing over time (Bor et al., 2014; Duffy et al., 2019; Twenge et al., 2019); (b) evidence that the onset of many mental health difficulties begins before the age of 14 years (Kessler et al., 2007); and (c) evidence that perfectionistic pressure is a key risk factor for mental health difficulties among athletes (Reardon et al., 2019). In these regards, if youth athletes are increasingly being exposed to demands and expectations that are unrealistic and inappropriate, athlete distress in the form of mental health problems is a key area of concern.

There are several stress-related outcomes that may be relevant to experiences of external pressure to be perfect. This includes increased likelihood of overuse injuries, potential dropout from sport, and several mental health-related issues (e.g., depression, anxiety, and substance abuse; Crane & Temple, 2014; DiFiori, 2010; Gould & Mignano, 2021; Robinson & Carron, 1982). However, one form of illbeing that is highly relevant to experiences of excessive stress and pressure to be perfect is athlete burnout. This is a consistent finding in research exploring the antecedents of burnout in young athletes. For example, based on early qualitative studies, there is evidence that sporting environments in which key social agents are overly demanding, highly critical, and unsupportive may contribute to experiences of excessive stress and burnout (Gould et al., 1996; Udry et al., 1997). This finding is also reflected in quantitative research with evidence that perceptions of coach pressure to be perfect is a consistent predictor of athlete burnout (Gotwals,

2011; Pacewicz et al., 2018; Skwiot et al., 2020). In this regard, athlete burnout offers one of several forms of illbeing that may be influenced by extremely perfectionistic sporting environments.

While the experience of pressure to be perfect is clearly an important issue in youth sport, researchers have focused on this experience almost exclusively at an individual level. That is, researchers have typically conceptualised this form of extreme pressure as a reflection or extension of an athlete's perfectionistic personality. While this way of conceptualising and studying experiences of pressure to be perfect is important, relying on it means we miss out on the idea that the need to perfect is often more than an individual issue. As the preceding paragraphs show, there is something about sport itself that is perfectionistic. In the same way that people differ in terms of how perfectionistic they are as an individual, the sporting environments they encounter are also likely to be more (or less) perfectionistic. With this idea in mind, the purpose of the current thesis is to make the first attempt to integrate this new idea into sport. In the following sections of this chapter, the ways in which perfectionism has traditionally been conceptualised are reviewed. The information presented will be used to support the need to focus on a new way of conceptualising pressure to be perfect.

Multidimensional Perfectionism

Perfectionism is a construct that has long been the subject of academic and clinical enquiry. Over a period stretching more than half a century, theorists, clinicians, and researchers interested in perfectionism have provided personal accounts and empirical evidence that have helped to advance our understanding of the psychological construct of perfectionism (Hewitt et al., 2017). It is now, for the most part, accepted that perfectionism is a multidimensional personality trait involving the compulsive pursuit of unrealistically high standards and harsh critical evaluations (Flett & Hewitt, 2002; Frost et al., 1990). This conceptualisation of perfectionism as a complex multidimensional construct first gained traction following the seminal work of two separate research groups in the early 1990's (Frost et al., 1990; Hewitt & Flett, 1991). In both cases, the research groups forwarded

models of perfectionism that incorporate multiple dimensions of perfectionism that represent what they considered to reflect its core definitional features.

Before reviewing the most comprehensive model of multidimensional perfectionism, it is important to acknowledge that perfectionism was initially regarded as a unidimensional construct. This conceptualisation is evident in the early descriptions of perfectionism provided by classical and contemporary theorists (Hill, 2016). In most cases, such accounts of perfectionism were consistent in presenting a focus on features that reflect the self-imposed importance of pursuing and attaining exceedingly high personal standards (Hill, 2016; Hewitt & Flett, 1991). For example, Burns (1980) described highly perfectionistic individuals as "people who strain compulsively and unremittingly toward impossible goals and who measure their worth entirely in terms of productivity and accomplishment" (p. 34). One of the issues with this account (and other similar accounts) is that it presents a restricted focus on perfectionism. On this issue, Hewitt and Flett (1991) argued that the emerging perspectives on perfectionism from this period failed to adequately consider the multidimensional nature and complexity of the perfectionism personality construct.

While Hewitt and Flett (1991) recognised the self-imposed pursuit of perfectionism as a core definitional feature of the construct, they argued that interpersonal components were also crucial in defining perfectionism. The idea that perfectionism incorporates salient interpersonal features is in accordance with the accounts of certain theorists and clinicians. For example, Horney (1972) advanced the notion that perfectionism involves an extreme sensitivity to external demands and forms of pressure placed upon the self by others. Moreover, Hollender (1965) maintained that perfectionists relied on performance as a means of satisfying their need for feelings of acceptance and approval from others. These accounts support the idea that perfectionism involves beliefs that others are perfectionistic in their demands and that self-worth is dependent on gaining acceptance from others through achieving perfect performance (Hewitt et al., 2003).

While the idea that perfectionism involves an experience of perfectionistic pressure from others is important, Horney (1950) and Hollender (1965) also described other unique interpersonal

components of perfectionism. One interpersonal feature that is apparent in their writing relates to the idea that perfectionism involves a requirement for others to be perfect. Horney, for instance, described how a highly perfectionistic individual "may primarily impose his [or her] standards upon others and make relentless demands as to their perfection" (p. 78). Similarly, Hollender argued "some persons who do not demand perfection of themselves, demand it of others" (p. 100). These accounts support the idea that perfectionism often involves an externally directed need for others to be perfect.

According to the accounts outlined above, perfectionism incorporates interpersonal components that are central to the construct's conceptualisation. Hewitt et al. (2003, 2017) have acknowledged that these accounts had a profound impact on their conceptualisation of perfectionism as a multifaceted construct. Specifically, Hewitt et al. (2017) propose that perfectionism is a broad personality style that functions at various behavioural levels for an individual. To formalise the various facets and levels of perfectionism in a conceptual framework, Hewitt and colleagues have described a Comprehensive Model of Perfectionistic Behaviour (CMPB). In the following section of the introduction, the CMPB will be outlined with the aim of highlighting the most comprehensive account of what perfectionism is and how it is best conceptualised.

The Comprehensive Model of Perfectionistic Behaviour

In terms of perfectionism models, the CMPB provides the most comprehensive account of what perfectionism is, the different levels and components of perfectionism, and how each component manifests and functions in individuals (Hewitt et al., 2017). One of the major influences in the development of the CMPB is clinical experience. Through extensive consultancy work with highly perfectionistic individuals, Hewitt et al. (2017) have developed an expert understanding of the nature and complexity of perfectionism. In carrying out prolonged and in-depth psychotherapy with people who experience perfectionism, it became apparent to Hewitt and colleagues that: (a) there is significant heterogeneity in how highly perfectionistic individuals experience perfectionism;

and (b) many of the perfectionistic problems experienced by these individuals were not adequately accounted for in existing models of perfectionism. The major argument was that there is a difference between trait components of perfectionism (i.e., components that reflect '*what*' perfectionism is) and process components of perfectionism (i.e., components that reflect '*how*' perfectionism is expressed). The CMPB helps to delineate between these components through conceptualising three perfectionism constructs: *trait perfectionism*, *perfectionistic self-presentation*, and *perfectionistic cognitions*.

Trait perfectionism

The first perfectionism construct, outlined by Hewitt and Flett (1991), is trait perfectionism. This model conceptualises perfectionism as involving several stable and enduring personality dimensions. In each case, these trait dimensions reflect a persistent and extreme requirement for perfection. As per early accounts of perfectionism, the first dimension (i.e., *self-oriented perfectionism*) reflects self-imposed expectations and requirements for perfection. The next two dimensions (i.e., *socially prescribed perfectionism* and *other-oriented perfectionism*) were included to emphasise that perfectionism is much more than striving to meet unrealistically high or extremely difficult to attain standard set by the self. It also involves perceptions that others require perfection from the self (in the case of socially prescribed perfectionism) and an outwardly directed requirement for others to be perfect (in the case of other-oriented perfectionism). This trait conceptualisation of perfectionism therefore accounts for important intrapersonal and interpersonal characteristics of perfectionism. The three dimensions are relatively independent of one another. This is evident in that: (a) each dimension is associated with a unique pattern of outcomes; and (b) individuals often differ in their levels of each dimension.

The first dimension, self-oriented perfectionism, reflects internally motivated beliefs that pursuing exceptionally demanding standards and achieving perfection are essential (Stoeber & Madigan, 2016). In this dimension, the requirement for perfection is *derived from the self* and *directed toward the self* (Hewitt et al., 2017). While this dimension can energise behaviours that

reflect the pursuit of perfection (e.g., extremely hard work, excessive dedication, and unwavering goal commitment), the core feature of this dimension is not necessarily the setting or pursuit of high standards. Instead, at the core of self-oriented perfectionism is a salient motivational component that makes people obsessed by *the idea* of being perfect and avoiding imperfection at all costs (Hewitt et al., 2017). This irrational and extreme way of thinking means that individuals high in self-oriented perfectionism *must be perfect*. Even in situations when objectively successful standards are attained, individuals high in self-oriented perfectionism are extremely quick to pick faults in their behaviour and turn their success into an abject failure (Hewitt et al., 2017). This tendency to be self-critical is another core feature of this dimension and reflects the fact that many individuals high in self-oriented perfectionism have a characteristically negative view of their self and tie all sense of self-worth to being perfect (Hewitt et al., 2017).

The findings of research on self-oriented perfectionism may be best described as being complex and ambiguous (Hill et al., 2018). The reason for this is that self-oriented perfectionism (and other dimensions capturing self-oriented pressure for perfection) is associated with a mixed pattern of positive and negative outcomes. For example, meta-analytical evidence shows that self-oriented perfectionism shares positive relationships with outcomes including depressive symptoms, worry and rumination, and suicide ideation (M. M. Smith et al., 2018, 2021; Xie et al., 2019). The opposing point is that self-oriented perfectionism also shares positive relationships with adaptive outcomes such as performance. This is evident in two meta-analytical reviews focussing on perfectionism in relation to (amongst other outcomes) sport performance (Hill et al., 2018) and academic achievement (Madigan, 2019). While these findings show a potentially 'adaptive' side of self-oriented perfectionism, it is important to consider such potential in context of the distress and psychological maladjustment often linked with this dimension.

The second dimension, socially prescribed perfectionism, reflects externally motivated beliefs that pursuing exceptionally demanding standards and achieving perfection are essential to others (Stoeber & Madigan, 2016). In this dimension, the requirement for perfection is *derived from*

others and *directed toward the self* (Hewitt et al., 2017). This sense of intense pressure to meet extreme demands is perceived to come from generalised others (rather than a specific person) and generalises across contexts. Thus, individuals high in socially prescribed perfectionism often experience powerful external demands from family members, friends, acquaintances, and society itself (Hewitt et al., 2020a). One of the core features of this dimension is that the requirement to be perfect is attached to gaining acceptance and avoiding rejection from others. The individual high in socially prescribed perfection feels like nothing they ever do or achieve is worthy of acceptance or love from others and is bound to feelings of despair (Hewitt et al., 2017).

In contrast to self-oriented perfectionism, the findings of research on socially prescribed perfectionism are clear and consistent. That is, socially prescribed perfectionism shares a uniformly debilitating pattern of relationships with outcome variables. This is again evident in meta-analytical evidence showing that socially prescribed perfectionism is positively associated with issues including burnout, procrastination, worry and rumination, depressive symptoms, and suicidality (Hill & Curran, 2016; Sirois et al., 2017; M. M. Smith et al., 2018, 2021; Xie et al., 2019). In comparison to self-oriented perfectionism, socially prescribed perfectionism shares both a broader and stronger pattern of relationships with distress, illness, dysfunction, and impairment. This is one of the major reasons why socially prescribed perfectionism has recently been described as 'destructive' and of 'key public health significance' (Flett et al., 2022).

The final dimension, other-oriented perfectionism, reflects internally motivated beliefs that it is essential for others to pursue exceptionally demanding standards and achieve perfection (Stoeber & Madigan, 2016). In this dimension, the requirement for perfection is *derived from the self* and *directed toward others* (Hewitt et al., 2017). The core feature of this dimension is the tendency to demand of others an extreme requirement for perfection. This requirement is rigid and displayed in a way that is authoritative, controlling, and, in some cases, highly intimidating (Hewitt et al., 2017). As with the other dimensions of perfectionism, falling short of perfection results in harsh criticism. The key distinction with other-oriented perfectionism is that this criticism is

directed toward others (rather than the self). If others fall short of the imposed demands for perfection, the individual high in other-oriented perfectionism responds with contempt, anger, and harsh criticism (Hewitt et al., 2017). Given that the demands are unrealistically high, the individual high in other-oriented perfectionism is perpetually disappointed with and disproving of others around them.

In comparison to self-oriented and socially prescribed perfectionism, other-oriented perfectionism has received less research attention (Stoeber, 2014). However, the available evidence is clear in showing that other-oriented perfectionism is interpersonally problematic. This is evident in early research linking other-oriented perfectionism with tendencies toward authoritarianism, dominance toward others, and other-directed blame (Hewitt & Flett, 1991). In a more recent study, researchers have also found that other-oriented perfectionism is positively associated with assured-dominant, arrogant-calculating, and cold-hearted interpersonal characteristics, as well vindictive and domineering interpersonal problems (Stoeber et al., 2021). Based on this evidence, it is unsurprising that other-oriented perfectionism is associated with interpersonally problematic behaviours in romantic dyads (e.g., partner-directed conflict; Lafontaine et al., 2019), group clinical therapy (e.g., patient hostility; Hewitt et al., 2020b), and sport (e.g., antisocial teammate behaviour; Grugan et al., 2019).

Perfectionistic self-presentation

An important extension to the conceptualisation of perfectionism in the CMPB was provided when researchers emphasised the need to consider more than just "what people have in terms of perfectionism" (Hewitt et al., 2017, p. 47). Specifically, Hewitt et al. (2003) argued that it was important to consider *how* people often express or display their perfectionism in an interpersonal context. They emphasised this idea when introducing the construct of perfectionistic self-presentation (Hewitt et al., 2003). This construct represents a dynamic interpersonal style that directly reflects the drive to appear perfect and conceal imperfections in public situations (Hewitt et al., 2003, 2017). The need for this additional construct comes from the fact that some individuals

are motivated by *a drive to appear perfect to others* rather than a *drive to be perfect* (Hewitt et al., 2003). This striving to create an outward image of perfection is considered distinct from the need to be perfect that characterises trait perfectionism.

In line with the conceptualisation of trait perfectionism, Hewitt et al. (2003) considered perfectionistic self-presentation to be a multidimensional construct reflected by three key dimensions: *perfectionistic self-promotion*, *non-display of imperfection*, and *nondisclosure of imperfection*. The first dimension, perfectionistic self-promotion, involves actively proclaiming and displaying an outward image of perfection to others (Hewitt et al., 2017). The aim is to try and promote an outward image in which the self comes across to others as exceptionally capable, highly successful, and perfectly competent. This often involves looking for opportunities to impress others, proclaiming positive aspects of the self in social interactions, and making claims about attained perfection (Hewitt et al., 2017). The motivational forces driving these behaviours are assumptions that appearing perfect will: (a) result in admiration, respect, and approval from others; and (b) avoid any sense of shame or embarrassment associated with not being able to appear perfect (Hewitt et al., 2017).

One of the key findings of research on perfectionistic self-promotion is the relationship it shares with narcissism. Evidence from a recent meta-analytical summary of eight studies ($N = 2,307$) shows that, in comparison to the other dimensions of perfectionistic self-presentation, perfectionistic self-promotion shares the strongest and most consistent relationship with narcissistic grandiosity (M. M. Smith et al., 2016). This dimension of narcissism is characterised by arrogant, conceited, and domineering attitudes and behaviours. In this regard, the meta-analytical finding suggests that, in comparison to the other dimensions of perfectionistic self-presentation, perfectionistic self-promotion is a more assertive and domineering way of presenting a public image of flawlessness. This interpretation makes sense as the next two dimensions of perfectionistic-self-presentation are conceptualised as more passive and concealing interpersonal behavioural styles.

The first of these two dimensions, non-display of imperfection, involves avoiding or excluding the demonstration of behaviours that could be judged by others as imperfect (Hewitt et al., 2017). Rather than promoting an outward image of perfection to others (as per perfectionistic self-promotion), non-display of imperfection involves trying to avoid behaviours that may be viewed by others as less than perfect. This often involves actively avoiding situations in which one's behaviour and performance could be viewed as less than perfect (e.g., public performances and evaluations). The motivational force driving this behaviour is the assumption that a non-perfect identify is an undesired identify. Individuals high in non-display of imperfection believe that they can protect their image and avoid being identified as flawed by ensuring their imperfections go undetected (Hewitt et al., 2017).

The second passive and concealing dimension of perfectionistic self-presentation, nondisclosure of imperfection, involves avoiding any admission of personal imperfections to others (Hewitt et al., 2017). In line with non-display of imperfection, nondisclosure of imperfection involves trying to protect an outward image of perfectionism through suppression and concealment. The key distinction is that rather than avoiding behaviours or performances that could be evaluated negatively by others, the focus in this dimension is on not disclosing or admitting verbally any imperfections to others. This includes choosing to conceal any thoughts, emotions, and other personal information that could be judged negatively by others (Hewitt et al., 2003). Individuals high in this dimension would try and actively avoid any situation in which they might be asked to discuss their perceived shortcomings. Where such an event was unavoidable, these individuals would be unlikely to fully engage and may come across as unapproachable and even hostile (Hewitt et al., 2017). This is because, as per the previous dimension, any admission of imperfection is associated with the assumption that a non-perfect identify is an undesirable identify.

While perfectionistic self-promotion differs from the non-display and non-disclosure of imperfection dimensions in relation to narcissistic grandiosity, the three dimensions share a consistent pattern of relationships with social disconnection and psychological distress. For

example, all three dimensions share positive relationships with experiences of interpersonal hopelessness, loneliness, depressive symptoms, and suicide ideation (Rnic et al., 2021; Robinson et al., 2021). While these relationships are consistent in terms of direction and significance, it is important to note that the magnitude of relationships often differs between the three dimensions. That is, in most cases, non-display of imperfection or non-disclosure of imperfection share the strongest relationship with markers of social disconnection and associated forms of psychological distress. This finding indicates that these more passive and concealing interpersonal styles may confer the greatest risk to psychosocial and emotional difficulties.

Perfectionistic cognitions

In addition to focussing on the interpersonal expression of perfectionism, the CMPB focusses on the intrapersonal expression of perfectionism. Specifically, Hewitt et al. (2017) emphasise that it is important to consider that perfectionism involves important cognitive and information-processing elements. These processing elements involve both internal and external working models of the 'ideal-self' (Hewitt et al., 2017). In response to everyday life situations, these processing mechanisms indicate to highly perfectionistic individuals that they have failed at perfection and are a failure in the eyes of others. This way of interpreting the world means that highly perfectionistic individuals often experience irrational attitudes about their behaviour and engage in harsh self-criticism. One way in which this self-censure manifests is through an internal dialogue with the self (Hewitt et al., 2017). That is, highly perfectionistic individuals often express their requirement for perfection in the form of automatic ruminative self-statements regarding the attainment of perfection (e.g., "I should be perfect"; Flett et al., 1998).

This focus on the inner expression of perfectionism was formally introduced in the form of the perfectionistic cognitions construct (Flett et al., 1998). Perfectionistic cognitions were defined as the automatic thoughts, ruminations, and self-recriminations that stem from an individuals' preoccupation with being perfect (Hewitt et al., 2017). Flett et al. (1998) considered that this self-blaming internal dialogue would arise in situations when highly perfectionistic people experience a

discrepancy between the actual self and the perfectionistic ideal self (Hewitt et al., 2017). That is, when the goal of perfection has not been realised, highly perfectionistic people are likely to experience negative perfectionism-themed ruminations (e.g., "I should be perfect", "Why can't I be perfect?", and "No matter how much I do, it's never enough"; Flett et al., 1998, p. 1366). Given that the standard of perfection is too often unrealistic, highly perfectionistic people are plagued by their failures to attain perfection and experience counterfactual thoughts about what should have been (Flett et al., 1998).

The findings of research on perfectionistic cognitions show that this component of the CMPB is robustly associated with emotional distress and negative automatic thoughts (Flett et al., 2018). For example, in a recent study, Casale et al. (2022) found that a combination of perfectionistic cognitions and the three perfectionistic self-presentation dimensions accounted for additional variance in social interaction anxiety, social phobia, and depressive symptomology. Of import, perfectionistic cognitions positively predicted both social phobia and depressive symptomology. In addition to this research, perfectionistic cognitions have been found to predict experiences of burnout (Hill et al., 2011), bulimic thoughts (Flett et al., 2011), and pathological worry (Lakey & Tanner, 2013). In many of these studies, perfectionistic cognitions demonstrate unique predictive ability above and beyond trait perfectionism. This is one of the reasons that perfectionistic cognitions have been added as a unique component in the CMPB (Flett et al., 2018).

The CMPB is important as it emphasises that the experience of pressure to perfect operates at various levels and is best operationalised using a variety of unique constructs (i.e., perfectionistic traits, perfectionistic self-presentation, and perfectionistic cognitions). In this regard, the model also reflects the notion that perfectionism has many guises or faces (Benson, 2003). However, an important issue to highlight regarding the CMPB is that it considers perfectionism exclusively as a characteristic or quality of the individual. That is, the CMPB outlines what aspects of perfectionism may characterise *an individual's personality* and how they may typically express perfectionism at *an individual level*. The idea that perfectionism researchers should extend their focus beyond the

individual has recently been emphasised. For example, Hewitt et al. (2017) argued that, in addition to studying the pressure to be perfect from an individual perspective, researchers should begin to adopt a situational perspective and find out more about chronic exposure to perfectionistic environments. Similarly, in reviewing three decades of research on multidimensional perfectionism, researchers have highlighted a requirement to move beyond examining perfectionism from the predominant "*self-in-relation to others*" vantage point (M. M. Smith et al., 2022a, p. 9).

Conceptualising Perfectionistic Climate

In a recent special issue paper on perfectionism in early childhood, Hill and Grugan (2019) made the argument that the study of perfectionism would benefit from extending the focus of pressure to be perfect beyond the individual. To this end, Hill and Grugan introduced a new construct labelled *perfectionistic climate*. Rather than focussing on the personal qualities or behaviour of an individual that are perfectionistic (as per existing constructs in the CMPB), perfectionistic climate focusses on the degree to which the social environment can be considered perfectionistic. The conceptual basis of this construct, which is outlined in the next section of the thesis, is provided by Flett et al.'s (2002) model of perfectionism development and defined using motivational climate work grounded in Achievement Goal Theory (AGT; Ames, 1992; Nicholls, 1984). One of the central themes underpinning perfectionistic climate is that all individuals–regardless of their own levels of perfectionism–can experience the consequences of pressure to be perfect in the social environments they encounter. This new construct, which is outlined in detail in the following sections of this chapter, is proposed as an additional guise or face of perfectionism that compliments, extends, and potentially underpins existing constructs in the CMPB.

There are two major theoretical frameworks that underpin the construct of perfectionistic climate. The first framework is based on classical motivational climate work grounded in AGT (Ames, 1992; Nicholls, 1984) and Self-determination Theory (SDT; Ryan and Deci, 2017), while the second framework is based on models of perfectionism development (Flett et al., 2002; Hewitt et al., 2017). While these two frameworks share the same overall goal of providing clarity to the

perfectionistic climate construct, they address slightly different areas of conceptualisation. The motivational climate framework, which is outlined in detail below, serves as a useful heuristic for conceptualising the level at which the perfectionistic climate construct should be defined. By contrast, the perfectionism development framework, which is also outlined in detail below, serves as a theoretical lens for understanding the content and scope of the perfectionistic climate phenomenon.

Motivational climate framework

The aim in the present section of the thesis is twofold. The initial aim is to outline the origins of *motivational climate* as an AGT-based construct, while second aim is to provide examples that demonstrate how the construct of motivational climate has paved the way for SDT-based climate constructs in sport and physical education. This section will help to provide clarity on: (a) how climate-based constructs are conceptualised; and (b) the different theories, behaviours, and experiences that underpin existing climate constructs. This content will be used to help define perfectionistic climate as an additional and unique climate-based construct.

AGT and Motivational Climate. The construct of motivational climate originated from early research examining the role of situational demands on motivational processes among young children (Ames et al., 1977; Ames, 1981; Ames, 1984). These experimental studies were designed to explore how children respond to different achievement scenarios (e.g., competitive *versus* non-competitive tasks and success *versus* failure). The results of these experiments were highly revealing in terms of predicting how young children evaluate their own ability and respond to success and failure. For example, Ames et al. (1977) found that success in a competitive task positively predicted ego-enhancing evaluations of performance (e.g., viewing the self as more satisfied and worthy of reward *compared* to a losing competitor). By contrast, failure in the competitive task positively predicted self-punitive evaluations of performance (e.g., viewing the self as less satisfied and worthy of reward *compared* to a winning competitor). In a later study, Ames (1984) found that children engaging in a competitive classroom task were likely to link their ability

to the outcome of the task (i.e., success attributed to high ability and failure attributed to low ability). By contrast, children engaging in a non-competitive classroom task were likely to link their effort to the outcome of the task (i.e., success attributed to high effort and failure attributed to low effort).

The responses of children in the experiments outlined above closely resemble the behaviours reflected in AGT-based motivational variables. This synergy was recognised by Ames (1984) when discussing the link between task instructions (delivered by adults) and children's achievement-related cognitions. Ames identified that children who worked alone on a competitive task and were told to try their best and focus on improvement endorsed adaptive self-instructions following performance. In discussing this finding, Ames drew similarities between the responses of children and the concepts of *mastery orientation* (involving tendencies to seek challenging tasks and generate effective strategies to overcome failure; Diener & Dweck, 1980) and *task-involvement* (involving a focus on developing mastery, personal improvement, and learning; Nicholls, 1984). This link was extremely important as it sparked the emergence of a dedicated strand of AGT research focussed on situational factors that influence the achievement goals and behaviour of young children (Keegan et al., 2011). The key tenet of this strand of research was that different goal structures exist in the classroom environment that influence how young children are likely to construe their competence and behave in achievement settings (Duda, 1992).

In this dedicated strand of research, Ames (1992) identified three goal structures that hold motivational salience. The first structure was the *design of tasks and learning activities*. This structure is important as tasks often include information that signal to students how to approach learning, how success should be defined, and what outcomes underpin reasons for satisfaction. For example, tasks that are designed to facilitate the learning of a new skill and provide a reasonable level of challenge may make students more likely to judge their competence in relation to self-referenced criteria and view personal improvement as a sign of success and source of satisfaction. The next structure was related to *evaluation and recognition*. This structure is important as student

evaluation is loaded with information that can affect student motivation. For example, students who receive feedback in which they compare negatively to others (e.g., low class ranking) may be more likely to judge their competence in relation to others, make negative appraisals of their ability, and withdraw effort from subsequent learning tasks. The final structure was *authority*. This structure is important as key figures of authority engage in behaviours that can influence the motivational patterns of students. For example, teachers who recognise student effort may promote effort-based strategies among their students and foster feelings of belongingness (Ames, 1992).

The structures that characterise classroom climates are ultimately shaped by the behaviours, practices, and relational styles of teachers. This includes how teachers design and deliver learning activities, group children, and evaluate performance standards (Ames, 1992). However, one important consideration is that the behaviours and interactions teachers engage in are varied, differ from person to person, and can shape very different environmental experiences. In the AGT framework, the overriding motivational climate that is experienced is typically described as being either more task-involving (i.e., a *mastery goal classroom*) or more ego-involving (i.e., a *performance goal classroom*; Ames & Archer, 1988). In a more task-involving classroom climate, teachers typically engage in practices that place value on effort, personal improvement, and task mastery, view mistakes as part of the learning process, and focus their attention on facilitating the acquisition of new skills and knowledge (Ames & Archer, 1988). By contrast, in a more ego-involving classroom climate, teachers typically engage in practices that place value on normatively high ability and superior grades, view mistakes as occurrences that should be avoided, and focus their attention on encouraging peer rivalry (Ames & Archer, 1988).

This conceptualisation of motivational climate was initially specific to the educational context (i.e., classrooms and other learning environments). However, researchers soon started drawing from classical AGT research to study motivational constructs in other contexts. In sport, this started off with researchers studying individual differences in motivational constructs such as task- and ego-involvement (e.g., Duda et al., 1991; Duda, 1987; Duda, 1989). However, this

research was soon followed by research examining the construct of motivational climate. The first systematic attempt to apply motivational climate to sport was carried out in a study of high-school basketball athletes. In this study, Seifriz et al. (1992) developed the Perceived Motivational Climate in Sport Questionnaire (PMCSQ). The PMCSQ is a sport-specific measure designed to measure the two major motivational climate dimensions: task-involving climate and ego-involving climate. The task-involving climate dimension included items emphasising effort, personal improvement, and learning new skills, whereas the ego-involving climate dimension included items emphasising intra-team rivalry, punishment for mistakes, and preferential treatment for the best performers. This measure was significant as it served as the basis of future AGT-based measures of coach-created motivational climate in sport (Newton et al., 2000; R. E. Smith et al., 2008).

The initial application of motivational climate to sport by Seifriz et al. (1992) sparked even more research on social psychological environments in sport. For example, at a similar time, White et al. (1992) developed the Parent-initiated Motivational Climate Questionnaire (PIMCQ). This scale was designed to measure the influence parents have in shaping motivational climate experiences among young athletes. The PIMCQ included three climate dimensions: learning-oriented climate, worry-conducive climate, and success without effort climate. The first dimension (i.e., learning-oriented climate) represents an important aspect of a task-involving climate (i.e., parents emphasising effort, personal improvement, and mistakes for learning), whereas the second and third dimensions (i.e., worry-conducive climate and success without effort climate) represent important aspects of an ego-involving climate (i.e., parents emphasising concern with mistakes, worries regarding failure, and winning without exerting too much effort). The initial PIMCQ was later expanded to include items measuring perceptions of parents emphasising enjoyment when learning new physical skills (White, 1996, 1998). Based on factor-analytical evidence, these new items were collapsed together with the learning-oriented items to capture a learning and enjoyment climate subscale.

The study of motivational climate in sport was advanced again by researchers who sought to understand the role that peers play in shaping climate experiences among young athletes. Specifically, Vazou et al. (2005) conducted a qualitative enquiry into factors that underpin the motivational climate initiated by peers in youth sport. This research helped to identify different informational cues that peers emphasise via their social interactions in sport. This included both task-involving (e.g., emphasising individual improvement, equal treatment of teammates, and maximum effort) and ego-involving cues (e.g., emphasising intra-team competition, intra-team conflict, and preference for normative ability). These qualitative findings provided the foundation for the development of the Peer Motivational Climate in Youth Sport Questionnaire (PeerMCYSQ; Ntoumanis & Vazou, 2005). The PeerMCYSQ included five climate dimensions: improvement, relatedness support, effort, intra-team competition/ability, and intra-team conflict. The first three dimensions represent important aspects of a task-involving climate (i.e., peers emphasising personal skill improvement, the importance of exerting effort, and a sense of group belonging), whereas the final two dimensions represent important aspects of an ego-involving climate (i.e., peers emphasising doing better than others and engaging in negative behaviours toward teammates).

In addition to the applications outlined above, the study of motivational climate has also been applied within a physical education context. While there were a few initial attempts at capturing perceptions of the motivational climate in physical education (Goudas & Biddle, 1994), Papaioannou (1998) is credited with creating one of the first AGT-based scales focussing on the influence of physical education teachers in shaping the motivation climate: Teacher-initiated Motivational Climate in Physical Education Questionnaire (TIMCPEQ). The TIMCPEQ included task-involving and ego-involving climate dimensions. In line with classical AGT-based literature, the task-involving dimension captured perceptions that the teacher pays special attention to skill improvement, views mistakes as part of learning, and is satisfied when all students exert effort and learn new skills. By contrast, the ego-involving dimension captured perceptions that the teacher encourages students to outperform each other, only rewards and attends to the best students, and

encourages competition among pupils. While other measures of motivational climate have since been developed, the TIMCPEQ remains a popular measure for capturing climate perceptions in physical education students (e.g., Chin et al., 2021; Warburton, 2017).

The examples outlined above showcase how influential AGT has been across the contexts of education, sport, and physical education. In each of these contexts, researchers have created motivational climate measures that capture how key social agents (e.g., teachers, coaches, parents, and peers) shape motivational climates. There has been considerable interest in using such measures to study motivational climate in sport and physical education. For example, an early review into the study of motivational climate in these domains identified 48 studies examining motivational climate in relation to motivational, behavioural, and affective outcomes (Harwood et al., 2008). This review helped to identify that motivational climate perceptions are associated with: (a) beliefs about causes of sporting success; (b) beliefs about the purpose of sport; (c) positive affect; (d) negative affect; (e) perceived competence; (f) learning versus competitive strategies; (g) goal orientations; (h) moral development; (i) motor learning and development; and (j) the experience of flow.

In summarising the findings across these studies, Harwood et al. (2008) proposed that perceived task-involving climates in sport and physical education are likely to promote more adaptive and desirable outcomes, whereas perceived ego-involving climates are likely to confer vulnerability to more maladaptive and undesirable outcomes. In support of this summary, perceptions of a task-involving climate were positively related with adaptive outcomes (e.g., enjoyment, perceived competence, and persistence) and inversely related with negative outcomes (e.g., performance worry, immoral behaviour, and tension). By contrast, perceptions of an ego-involving climate were positively related with negative outcomes (e.g., distress, rough play, and pro-gamesmanship beliefs) and inversely related with adaptive outcomes (e.g., satisfaction, intrinsic motivation, and enjoyment). This review was important as it updated an earlier review and contributed to our understanding of the motivational climate in sport and physical education.

To build on this review and provide a more comprehensive, systematic, and reliable account of research in this area of study, Harwood et al. (2015) provided the first systematic review of outcomes associated with motivational climate perceptions in sport and physical education. In addition to accounting for new research, this review built on previous accounts by: (a) using a systematic search method; (b) extracting important design and sample characteristics from each study; and (c) meta-analysing the extracted correlations for specific relationships. In reviewing the findings from over 100 studies, Harwood and colleagues found that, in-keeping with previous reviews, perceptions of a task-involving climate were positively related with adaptive outcomes (e.g., positive affect, confidence, and self-esteem) and inversely related with negative outcomes (e.g., negative affect, worry, and antisocial beliefs). Similarly, perceptions of an ego-involving climate were positively related with negative outcomes (e.g., amotivation, negative affect, and maladaptive coping strategies) and inversely related with adaptive outcomes (e.g., positive affect, perceived autonomy, and perceived relatedness). This evidence again serves to emphasise the benefits of more task-involving (versus more ego-involving) climates for young people.

SDT and Motivational Climate While the construct of motivational climate is grounded in AGT, researchers have adopted the term to describe key features of the psychological environment that are emphasised in other theories of motivation. This is perhaps most evident in Cognitive Evaluation Theory (an SDT mini theory; Ryan & Deci, 2017). In this framework, a key proposition is that "interpersonal contexts can be characterised in terms of the degree to which the motivational climate tends to be controlling, autonomy supportive, or amotivating" (Ryan and Deci, 2017, p. 160). In several ways, the use of the term motivational climate in this proposition is synonymous with AGT-based conceptions. For example, the term: (a) is used to refer to characteristics of the social environment that hold motivational significance; and (b) presents a focus on the behaviours, practices, and relational styles of key social agents (e.g., teachers, parents, or coaches) that shape different climate perceptions. The key distinction from AGT is that motivational climate emphasises behaviours that directly influence the fulfilment (or thwarting) of a young person's

basic psychological needs (i.e., the need for autonomy, competence, and relatedness; Ryan & Deci, 2017). These outcomes are important as they are believed to underpin healthy human development and functioning (Deci & Ryan, 2000).

In the SDT-based framework, the overriding motivational climate that is experienced is predominantly described as being more autonomy-supportive or more controlling (Vallerand & Losier, 1999). In a more autonomy-supportive climate, key social agents provide choice, acknowledge children's perspectives, and supply meaningful rationales to underpin the tasks they put into action. By contrast, in a more controlling climate, key social agents pressure individuals to think, behave, or feel in particular ways (Duda et al., 2014). This style of socialisation ultimately undermines an individual's volitional functioning (Soenens & Vansteenkiste, 2010). When the interpersonal context is experienced as being more autonomy-supportive, young people typically report higher levels of autonomous self-regulation and experience outcomes including increased well-being and performance (Niemiec & Ryan, 2009). By contrast, when the interpersonal context is experienced as being more controlling, young people are likely to report higher levels of extrinsic motivation and experience outcomes including burnout and disaffection (Barcza-Renner et al., 2016; Curran et al., 2016; Stenling et al., 2017a).

Research on these SDT-based climate dimensions has advanced on a similar trajectory to AGT-based motivational climate research. That is, prior to the emergence of dedicated climate measures, researchers focussed on teacher behaviour and motivational outcomes among young children (Deci et al., 1981; Grolnick & Ryan, 1987; Ryan & Grolnick, 1986). For example, Deci et al. (1981) examined the motivational orientations of public-school classroom teachers prior to the academic term. This involved presenting teachers with a series of hypothetical student-based problems (e.g., a child falling behind and failing to turn in assignments) and asking them to rate their endorsements of various strategies. The strategies provided were classified as being more autonomy-supportive (e.g., trying to understand the problem from the student's perspective and work with them to help solve the problem) or more controlling (e.g., using external rewards or

threat of punishment to solve the problem). In the follow-up stages of this study (two months and then eight months into the academic term), students of teachers who endorsed more controlling strategies reported lower levels of intrinsic motivation, perceived cognitive competence, and self-esteem than students of teachers who endorsed more autonomy-supportive strategies. This initial research in education served to emphasise the need for dedicated measures focussing on young people and their perceptions of autonomy-supportive and controlling motivational climates.

While there were a few initial attempts to measure perceived autonomy support, the first climate-based measure dedicated to measuring perceived autonomy support from a key social agent was developed by Williams et al. (1996). In this study, Williams and colleagues developed a measure for patients to report on the degree of autonomy support provided by their professional health-care provider: Health Care Climate Questionnaire (HCCQ). The HCCQ measures the extent to which patients feel their health care professional provides choices and options, is receptive to questions and queries, and creates an open and welcoming environment. The HCCQ is significant as it has been used as the basis on which other measures of perceived autonomy support have been developed. This includes measures of perceived autonomy support in educational (i.e., Learning Climate Questionnaire; Williams & Deci, 1996) and sporting contexts (i.e., Sport Climate Questionnaire; Felton & Jowett, 2012). In all, the HCCQ has been modified to focus on autonomy support from different social agents (e.g., teachers, parents, and coaches) across several contexts (e.g., education, sport, and physical education).

In addition to studying the extent to which key social agents engage in behaviours that are *autonomy-supportive*, it is also important to study the degree to which key social agents engage in behaviours that are *autonomy-thwarting* (Ryan & Deci, 2017). In SDT-based studies, researchers have addressed this requirement by examining perceptions of controlling behaviour from key social agents. The first measure dedicated to assessing controlling behaviours grounded in SDT was developed by Bartholomew et al. (2010). Borrowing from the parental, educational, and available sporting literature on controlling behaviour, Bartholomew and colleagues developed the Controlling

Coach Behaviour Scale (CCBS). The CCBS measures four dimensions of control emphasised in the SDT framework. This includes the controlling use of rewards (e.g., using praise to induce athlete engagement), negative conditional regard (e.g., withholding attention from athletes who do not display desired behaviours), intimidation (e.g., scaring athletes into producing desired behaviours), and excessive personal control (e.g., interfering with an athlete's life outside of sport). As with the HCCQ, the CCBS is significant as it has been used as the basis on which other controlling climate scales have been developed (e.g., Controlling Teacher Behaviour Scale, Hein et al., 2018).

In line with research using AGT to guide climate-based studies, researchers using SDT as a theoretical foundation have used the measures outlined above to study motivational climates in sport and physical education. While there have not been any published systematic reviews of research in this area of study, researchers have provided broad overviews of the correlates of autonomy-supportive and controlling climates in sport and physical education (e.g., Duda et al., 2014; Ntoumanis, 2012). The summaries provided from these reviews show that perceptions of an autonomy-supportive climate are positively related with a range of adaptive outcomes. This includes greater intrinsic motivation and satisfaction, higher levels of subjective vitality and positive emotions, better quality relationships with others, prosocial attitudes and behaviours, and increased intentions to continue participation in sport and physical activity. The reviews also show that perceptions of an autonomy-supportive climate are inversely related with negative outcomes such as depression and symptoms of athlete burnout (Duda et al., 2014). In both reviews, perceptions of autonomy (i.e., experiences of self-endorsement and ownership of actions), competence (i.e., experiences of effectiveness in the social environment), and relatedness (i.e., experiences of others as responsive and sensitive to the self, and vice versa) are emphasised as key mechanisms linking autonomy-supportive climates to this positive pattern of observed outcomes (Duda et al., 2014, Ntoumanis et al., 2012).

In reviewing the research on SDT-based climate constructs, both reviews emphasise that comparatively less is known about the correlates of controlling climates in sport and physical

education. While this was the case at the time each of these reviews were published, the CCBS is now over ten years old and has been used extensively in research in these contexts. This means that we now know considerably more about the potential consequences of controlling coach climates for young athletes and students. The research using this measure shows that perceptions of controlling coach behaviour are positively related with a range of negative outcomes. This includes controlled forms of motivation, antisocial outcomes (e.g., moral disengagement and pro-doping attitudes), and various forms of illbeing (e.g., athlete burnout, anxiety, and depression; Barcza-Renner et al., 2016; Bartholomew et al., 2011; Stenling et al., 2017a). The available evidence also shows that perceptions of controlling behaviour are unrelated or inversely associated with positive outcomes (e.g., mental toughness, subjective vitality, and friendship quality; Gucciardi et al., 2017; Felton & Jowett, 2012; Kipp & Weiss, 2013). There is also evidence that this negative pattern of observed outcomes is explained by the thwarting of autonomy, competence, and relatedness (e.g., Curran et al., 2014).

This section of the thesis has demonstrated that there are several climate-based constructs. In each of these different climate-based approaches, key social agents (i.e., teachers, parents, and coaches) can influence how young people perceive their social environment through the behaviours they are believed to engage in. In the AGT framework, young people may experience their immediate social environment as being more task-involving or more ego-involving (Newton et al., 2000; Ntoumanis & Vazou, 2005; Papaioannou, 1998; Seifriz et al., 1992; R. E. Smith et al., 2008; White et al., 1992). By contrast, in the SDT framework, young people may experience their immediate social environment as being more autonomy-supportive or more controlling (Bartholomew et al., 2010; Felton & Jowett, 2012; Hein et al., 2018; Williams & Deci, 1996; Williams et al., 1996). In the present thesis, an argument is forwarded that young people may also experience their immediate social environment as being more (or less) perfectionistic. That is, a perfectionistic climate construct exists and should be studied alongside existing climate constructs. To understand the behaviours that shape and are unique to the perfectionistic climate construct, it is

important to understand models of perfectionism development. These models, which are outlined in more detail below, are essential for understanding the content and scope of the perfectionistic climate phenomenon.

Models of perfectionism development

The second major theoretical framework underpinning the construct of perfectionistic climate is based on models of perfectionism development. In their conceptual model of perfectionism development, Flett et al. (2002) proposed a developmental pathway that focussed on the role parents play in creating family environments laden with messages that young children must be perfect. This pathway emphasises the role of several different parental factors (e.g., goals, practices, styles of parenting, and personality) that shape family environments with the potential to maintain, reinforce, or exacerbate the development of perfectionism in young people. In this regard, this pathway is essential for understanding the content and scope of the perfectionistic climate phenomenon. In this section of the thesis, an overview of the individual models of perfectionism development that inform this developmental pathway are provided. The aim is to: (a) highlight the range of behaviours, practices, and relational styles that contribute to experiences of highly perfectionistic climates; and (b) provide an insight into the experiences of young children who experience highly perfectionistic climates.

Social Expectations Model. The *social expectations model* is the first developmental model that feeds into the parental pathway to perfectionism development. The major premise of this model is that the requirement for young people to be perfect is reinforced in family environments where parental acceptance is conditional on meeting unrealistically high parental expectations (Flett et al., 2002). This developmental framework is informed by the work of past theorists who have identified family environments in which perfectionism is likely to develop. For example, Missildine (1963) proposed that perfectionism often develops in children whose parents are demanding and reluctant to provide approval or rewards. Rather than setting expectations for their children to exert effort and strive for personal improvement, parents of perfectionistic children often demand unrealistic

performance standards and reserve any sign of approval for the rare occasions when such standards are attained. In such a highly demanding family environment, children learn to belittle and condemn their own accomplishments as unworthy as nothing they do or achieve is every worthy of full parental acceptance (Missildine, 1963). To avoid this sense of personal inadequacy, the compulsive pursuit of perfection may become the only method by which children feel they can attain the allusive approval of their parents.

In addition to Missildine (1963), Hollender (1965) and Hamachek (1978) also emphasised the importance of unrealistically high parental expectations and conditional parental regard in the development of perfectionism. In describing how perfectionism is typically learned during childhood, Hollender emphasised how perfectionistic parents tend to withhold acceptance of their child until extremely high standards of performance are attained. When such standards are not satisfied, parents respond to their child in ways that signify disapproval, rejection, and displeasure. Under these circumstances, children often engage in extreme forms of achievement striving in the belief that being perfect will facilitate their pursuit of obtaining parental acceptance. In this sense, Hollender argued that, in addition to self-belittlement, the need for parental acceptance is one of the central driving forces behind the development of perfectionism. This theme of parental acceptance was also central in Hamachek's proposal that perfectionism develops in: (a) an environment of non-approval or inconsistent approval; or (b) an environment of conditional positive approval. In the first environment, children find it extremely difficult to please their parents and adopt perfectionistic tendencies in a bid to secure parental approval. In the second environment, children learn that securing parental love and acceptance is possible, but only when extremely high parental expectations of success and productivity are attained. This type of environment leads children to over-value performance, under-value themselves, and feel like parental demands always need to be fulfilled.

The key premise of the social expectations model has also been emphasised in more contemporary accounts of perfectionism. For example, Burns (1980) and Sorotzkin (1998)

highlighted how the conditional reward of love and approval is a central feature of perfectionism development. In a similar vein to the accounts outlined above, Burns and Sorotzkin believed that parents of perfectionistic children provide acceptance in response to outstanding performance (i.e., conditional positive approval), but respond with disappointment and despondency to non-prefect performances (i.e., conditional negative regard). Both theorists described the significant impact that this combination of parental practices could have on young children. For example, Burns proposed that children would learn to associate mistakes with a loss of parental approval and fear the potential for non-perfect performances. By contrast, Sorotzkin proposed that an inevitable sense of parental disapproval would trigger deep-seated feelings of inferiority in young children. In both cases, the outcomes outlined are central features of the perfectionism personality trait.

Social Reaction Model. The *social reaction model* is the second developmental model that feeds into the parental pathway to perfectionism development. The major premise of this model is that the requirement for young people to be perfect develops from experiences of harsh parenting and growing up in a hostile family environment (Flett et al., 2002). This includes environments in which children experience physical abuse, psychological maltreatment (e.g., love withdrawal and exposure to shame), and unpredictable or chaotic parenting. In such challenging home environments, children feel pressure to avoid abuse, criticism, or neglect from unforgiving and overly critical parents (Flett et al., 2002). One of the themes in the social reaction model that is central to most accounts of where perfectionism develops is parental criticism. For example, parents of perfectionistic children are often described using terms such as 'judgemental', 'harsh', and 'hypercritical' (e.g., Blatt & Shichman, 1983; Frost et al., 1990; Sorotzkin, 1998). The only way children feel that they can avoid or minimise this punitive form of parental condemnation and associated sense of humiliation is to strive for perfection.

In introducing the social reaction model, Flett et al. (2002) acknowledged that the developmental model shared a substantial level of overlap with the social expectations model previously outlined. That is, in both models, parental behaviours that reinforce the requirement for

unrealistically high standards of performance are emphasised. In the social expectations model, demanding expectations are reinforced via the conditional reward of parental acceptance. However, in the social reaction model, demanding expectations are reinforced via harsh, critical, and hostile parental practices. In this regard, the social expectations model captures parental practices characterised by exceedingly high expectations and psychologically controlling behaviour. By contrast, the social reaction model captures parental practices characterised by extreme parental harshness. The major argument forwarded by Flett and colleagues was that these two styles of parenting correspond to two different (and perhaps orthogonal) parenting dimensions (i.e., parental expectations *versus* parental harshness).

The parental expectations dimension was proposed to range on a continuum from exceedingly low expectations and a lack of control or involvement (at one extreme) to unrealistically high standards and high levels of psychological control (at the other extreme). The parental harshness dimension was proposed to range from extreme warmth and positive evaluations (at one extreme) to extreme harshness and negative evaluations (at the other extreme). In this regard, Flett et al. (2002) argued that there is a requirement to distinguish high parental expectations (emphasised in the social expectations model) from parental criticism (emphasised in the social reaction model). This can be done by examining the unique influence of high parental expectations and high parental criticism on perfectionism development. However, it can also be done by examining within-parent combinations of the two identified dimensions. Specifically, Flett and colleagues argued that various combinations of parental expectations and parental harshness may contribute to subtle, yet potentially significant differences in perfectionism development. The potential interplay between these two parenting dimensions is discussed in further detail in the following chapter.

Anxious Rearing Model. The *anxious rearing model* is the third developmental model that feeds into the parental pathway to perfectionism development. The major premise of this model is that the requirement for young people to be perfect is reinforced in family environments that

promote an excessive focus on mistakes and the negative implications of their children not performing perfectly (Flett et al., 2002). In this developmental framework, parents of perfectionistic children are regarded as being overly anxious and overprotective. This extreme focus on mistakes may manifest in behaviours such as overprotection from errors, incessant reminders about risks of negative evaluation by others caused by making mistakes, and hypervigilance toward potential future threats (Flett et al., 2002; Mitchell et al., 2013). This anxious style of parental rearing is proposed to make children preoccupied with mistakes and fearful of the negative implications they have learned to associate with imperfection (e.g., negative evaluations from others).

The role of anxious parents and behaviours reflecting an extreme occupation with others making mistakes is well established in past accounts of perfectionism development. For example, Burns (1980) highlighted how children can learn to be perfectionistic through experiences of parents responding to mistakes and failures with anxiety. In circumstances when failure occurs, children may ultimately interpret any stress, worry, or agitation that their parent responds with as a sign of punishment or rejection. This type of reaction may stem, at least in part, from the parents' own perfectionistic personality. For instance, Burns acknowledged that many perfectionistic parents are unrealistically self-critical and evaluate their own ability as a parent based on the behaviours and accomplishments of their children. The self-esteem of these parents is highly contingent on the ability of their children to attain high standards and success. Thus, when one of their children experiences difficulties in their everyday life, rather than providing them with the reassurance or guidance that they need, perfectionistic parents may be more likely to respond with irritation and distress, fuelling perfectionism development.

The notion that perfectionistic adults can be hypervigilant to mistakes and worried about the potential for others to perform poorly is also acknowledged in more recent accounts of perfectionism. For example, Hewitt et al. (2017) highlighted the hypothetical example of a highly perfectionistic coach who understands that the performance of his or her players is ultimately a reflection of their ability as a coach. In this example, the coach is assumed to make relentless

demands of their players and be highly alert to potential events that threaten perfect performance. While this account does not mention anxiousness specifically, it does provide an insight into the potential for perfectionistic adults (e.g., parents or sport coaches) to engage in behaviours that reflect an extreme aversion to others making mistakes and failing to achieve perfection. In line with the anxious rearing model, these behaviours are central in shaping environments in which young people experience considerable pressure to be perfect.

Social Learning Model. The *social learning model* is the fourth developmental model that feeds into the parental pathway to perfectionism development. While the previous models identified (i.e., social expectations, social reaction, and anxious rearing models) focus on parenting styles and practices (i.e., *what parents do*) that shape the immediate family environment in which perfectionism develops, the social learning model focusses on the personality of parents (i.e., *who parents are*) and the tendency for young children to model of imitate perfectionism from their parents (Flett et al., 2002). This form of social learning may reflect either: (a) a tendency to directly imitate perfectionistic tendencies observed in their parents; or (b) a tendency to imitate an idealised image of their seemingly perfect parents. In both these cases, the underlying mechanism behind the acquisition of perfectionism is grounded in Bandura's (1997) classical work on social learning. This work is fundamental to this model of perfectionism development in that it provides support for the idea that children can develop unrealistic standards and tendencies for stringent self-evaluation from adult models.

The proposition that children may imitate or embrace the evaluative standards modelled by adults is evident in early experiments testing social learning theory. For example, Bandura and Kupers (1964) conducted an experiment in which children were exposed to an adult model who engaged in a point-based bowling game. The experiment involved two experimental conditions: *high criterion for self-reinforcement* and *low criterion for self-reinforcement*. In the first condition, children were exposed to a model that rewarded themselves on trials in which they attained or exceeded a high score criterion (20 points) but berated themselves on trials when they failed to meet

the high score criterion. By contrast, in the second condition, children were exposed to a model that exhibited the same pattern of self-reward and self-criticism, but in response to a lower score criterion (10 points). Bandura and Kupers found that children exposed to the high criterion for self-reinforcement condition were unlikely to reward themselves unless they also met the high standards set by the adult model. By contrast, children exposed to the low criterion for self-reinforcement condition rewarded themselves for meeting the lower standards set by the adult model.

In a follow-up study, Bandura et al. (1967) conducted a similar experiment and observed very similar findings. Specifically, in a point-based bowling game, children imitated the behaviour of an adult model who they had previously observed rewarding themselves only on occasions in which they achieved superior performance scores. However, in this experiment, Bandura and colleagues also examined how the degree of nurturance displayed by the model (high nurturance *versus* low nurturance) and presence (*versus* absence) of a peer model adopting a low criterion for self-reinforcement influenced social learning. The findings indicated that children were most likely to adopt a stringent pattern of self-reward when they also experienced an adult model who was socially withdrawn and did not have a peer more accepting of lower standards to observe. This study is important as it reinforces the notion that the setting of high standards and tendency to stringently evaluate performance can be learned from adults via observation.

In addition to the studies conducted by Bandura and his colleagues (Bandura & Kupers, 1964; Bandura et al., 1967), a body of evidence that provides additional support for the social learning model of perfectionism development comes from research including measures of perfectionism in parents and their children (Flett et al., 2002). In a recent study, researchers reviewed eight studies including measures of self-oriented perfectionism and/or socially prescribed perfectionism in parent-child dyads (M. M. Smith et al., 2022b). The findings of the meta-analytic structural equation modelling procedure employed revealed that levels of parental self-oriented perfectionism explained a significant portion of variance in levels of child self-oriented perfectionism, even after controlling for levels of parental socially prescribed perfectionism. The

same pattern of findings was also the case for socially prescribed perfectionism. On this basis, the authors suggested that children may develop tendencies characteristic of self-oriented perfectionism and socially prescribed perfectionism via direct parental observation and imitation of corresponding tendencies in their parents. While these findings provide support for the social learning model of perfectionism development, the authors highlighted that the small amounts of variance explained in levels of child perfectionism suggest that there are perhaps more crucial factors underpinning perfectionism development (i.e., beyond genetics and social learning). This is a point that reinforces the potential importance of the parental practices captured in the three previously identified models.

The models of perfectionism development outlined above provide an extremely useful framework for understanding the types of family environment and behaviours that contribute to the expression of perfectionistic behaviour during childhood and adolescence (Hewitt et al., 2017). While there are other factors that are important in terms of the development of perfectionism such as genetics (Tozzi et al., 2004) and developmental issues such as asynchrony (which is discussed in more detail in chapter five; Hewitt et al., 2017), the models outlined are useful in that they serve as a theoretical lens for understanding the content and scope of the perfectionistic climate phenomenon. For example, in these models, it is apparent that high parental expectations, harsh parental criticism, parental psychological control, and anxiousness are all key component behaviours of perfectionistic family environments. The other reason that these models are useful is that they provide an insight into some of the experiential states that may be common among young children who experience highly perfectionistic environments (e.g., fear of failure, autonomy thwarting, aloneness, shame, and lack of satisfaction; Hewitt et al., 2017).

The above section on the theoretical frameworks underpinning perfectionistic climate help to provide clarity to the perfectionistic climate construct. The motivational-climate based framework serves to emphasise the level at which perfectionistic climate should be conceptualised and defined. In line with existing climate-based constructs informed by AGT and SDT, perfectionistic climate reflects the goal structures and informational cues (i.e., behaviours, practices,

and relational styles of a key social agent) that create a particular social psychological climate experience for young people. The key factor distinguishing how young people experience a perfectionistic climate (versus an ego-involving or controlling climate) comes from the second theoretical framework. Specifically, based on the models of perfectionism development reviewed, a highly perfectionistic climate is one in which young people view key social agents as *excessively demanding*, *impossible to please*, *psychologically controlling*, and *irrational when it comes to worrying about mistakes*. In grounding perfectionistic climate in this theoretical framework, it is possible to identify the specific behaviours, practices, and relational styles that are most likely to shape highly perfectionistic climates. In the following section, these different component behaviours of perfectionistic climate will be identified and discussed.

The Conceptual Model of Perfectionistic Climate

Drawing upon the classical motivational climate research outlined above, perfectionistic climate is defined as *the goal structures and informational cues* (i.e., components of the environment that emphasise what people are expected to accomplish and how they are to be evaluated) *that align with the view that performances must be perfect and less than perfect performances are unacceptable* (Hill & Grugan, 2019). In the following section of the thesis, drawing from the key models of perfectionism development outlined above, five components of perfectionistic climate are introduced and defined. These components reflect the key behaviours, practices, and relational styles that Hill and Grugan (2019) outlined when first introducing the perfectionistic climate construct. In the section below, each of the component behaviours proposed to shape perfectionistic climates in this model are introduced, defined, and discussed in relation to relevant theory and research.

Expectations. The first component of perfectionistic climate proposed by Hill and Grugan (2019) is *expectations*. In context of perfectionistic climate, the expectations component reflects *the perception that key social agents hold and demand unrealistically high performance expectations of others*. This component is drawn from Frost et al.'s (1990) model of trait perfectionism. In line with

the *parental expectations* dimension of this model, the expectations component of perfectionistic climate is focussed on the extent to which young people believe a key social agent sets and demands unrealistically high goals. In defining this component, it was important to distinguish between high standards and impossibly high standards. As Flett and Hewitt (2006) emphasise, there is a difference between someone who says, "My parents demand absolute perfection, and nothing else will do," *versus* someone who says, "My parents have high expectations of me" (p. 476). In this regard, it was important to specify *unrealistically high performance expectations* as opposed to just *high performance expectations*.

In terms of a theoretical grounding, the expectations component is heavily emphasised in the social expectations model of perfectionism development. As outlined earlier in the chapter, this model describes an environment in which children view others as expectant of outstanding, excessively high, and upper levels of performance. The key message in many accounts that feed into this pathway is the rigidity involved in these expectations. That is, key social agents in highly perfectionistic climates are persistent in the excessive demands and expectations they hold for children. This includes demanding unrealistically high performance standards even in situations that do not call for perfection (Flett & Hewitt, 2006). In response to this rigid and demanding interpersonal style, children learn that they must perform at ever increasing standards of performance. This relentless experience can lead young children to develop a perfectionistic mind-set in which they demand unrealistic expectations of themselves (Burns, 1980).

There are numerous studies that provide empirical support for expectations as a key component of perfectionistic climate. This support is perhaps most apparent in a recent study which examined whether excessive parental expectations and harsh parental criticism are correlated with perfectionism (Curran & Hill, 2022). In this study, the authors meta-analysed effect sizes ($k = 114$) from 21 studies ($N = 7,060$). The authors found that parental expectations shared positive relationships with self-oriented perfectionism ($r = .33$), socially prescribed perfectionism ($r = .57$), and other-oriented perfectionism ($r = .22$). These findings support the idea that perfectionism

development may stem, at least in part, from excessively high parental expectations. Beyond this broad point, the findings emphasise that excessively demanding parenting may give rise to multiple forms of perfectionistic pressure (i.e., self-imposed, externally imposed, and other-imposed requirements for perfection). This is apparent in the positive relationships with all three dimensions of perfectionism.

Criticism. The second component of perfectionistic climate proposed by Hill and Grugan (2019) is *criticism*. In context of perfectionistic climate, the criticism component reflects *the perception that key social agents engage in harsh criticism whenever the performance of others is not perfct*. As with the expectations component, criticism is drawn from Frost et al.'s (1990) model of trait perfectionism. In line with the parental criticism dimension of this model, criticism is focussed on the extent to which young people believe a key social agent is overly critical. In defining this component, it was important to distinguish between perfectionistic criticism and criticism that is more constructive. The defining characteristics important in this regard are that perfectionistic criticism is harsh, unreasonable, and follows all mistakes (no matter how small or inconsequential). This includes being criticised despite best effort, personal improvement, or task difficulty.

In terms of a theoretical grounding, the criticism component is heavily emphasised in the social reaction model of perfectionism development. As outlined earlier in the chapter, this model describes an environment in which children view others as harsh, judgemental, and hypercritical of their accomplishments (Blatt & Shichman, 1983; Frost et al., 1990; Sorotzkin, 1998). The problem in this environment is that children are unable to evade a sense of criticism. This is because poor, mediocre, and even objectively good performances are met with harsh criticism. Thus, even when children attain what would be considered by most as a successful accomplishment, perfectionistic others can respond with cruelty and rejection. This style of criticism is therefore best conceptualised as an all-or-nothing response from key social agents (i.e., criticism in response to all but perfection; Burns, 1980). This extreme response from others can give rise to deep-seated feelings of inferiority

and a sense of hopelessness. The only escape from such pain is for children to strive for perfection. The hope is that attaining exceptionally high standards will provide respite from the persistent and harsh criticism to which they have become accustomed (Flett et al., 2002).

There are numerous studies that provide empirical support for criticism as a key component of perfectionistic climate. This is most apparent, again, in Curran and Hill's (2022) meta-analysis focussing on perfectionistic styles of parenting and perfectionism in young people. The authors found that parental criticism shared positive relationships with self-oriented perfectionism ($r = .20$), socially prescribed perfectionism ($r = .53$), and other-oriented perfectionism ($r = .14$). These findings support the idea that perfectionism development may stem from extreme parental criticism. However, as per the relationships identified between parental expectations and perfectionism, the findings emphasise that excessively critical parenting may give rise to multiple forms of perfectionistic pressure (i.e., self-imposed, externally imposed, and other-imposed requirements for perfection). This was once again evident in the positive relationships identified with all three dimensions of perfectionism.

A Brief Note on 'Expectations' and 'Criticism'. As outlined above, the components of expectations and criticism have been drawn from Frost et al.'s (1990) model of trait perfectionism. The dimensions of parental expectations and parental criticism have been re-defined and incorporated within the model of perfectionistic climate. There are two major reasons why this change is required. The first point relates to the argument that expectations and criticism from a specific significant other are developmental aspects of perfectionism (Damian et al., 2013; Sirois & Molnar, 2016; Rice et al., 2005). The inclusion of these dimensions within and alongside measures of trait perfectionism confounds the distinction between core characteristics of trait perfectionism and factors that underpin its development (Sirois & Molnar, 2016). A good example of this issue is relevant in research using parental expectations and criticism in the computation of higher-order trait perfectionism dimensions (e.g., Pacewicz et al., 2018). The inclusion of these indicators makes the interpretation of the variables difficult to interpret and has the potential to cause confusion about

the perfectionism personality trait. The model of perfectionistic climate helps to re-affirm that developmental aspects of perfectionism should be considered separately.

The second reason why the change is required is that parental expectations and criticism are specific to the family context. While the family environment shaped by parents is extremely important in the development of perfectionism, there are other social settings and key agents that should not be ignored. This is because young people often experience unrealistically high expectations and harsh criticism in sporting and educational contexts (Appleton & Curran, 2016; Flett et al., 2002; Hewitt et al., 2017). Thus, key social agents including coaches (in sport) and teachers (in contexts such as education and dance) should not be ignored. The integration of expectations and criticism as key components of perfectionistic climate helps to emphasise this point. This is achieved by providing components unattached to a specific social agent or context. In doing so, it is possible to apply the model of perfectionistic climate to study the unrealistic demands and unrelenting criticism that young people experience across different contexts (e.g., at home, in school, and at work).

Control. The third component of perfectionistic climate proposed by Hill and Grugan (2019) is *control.* In context of perfectionistic climate, the control component reflects *the perception that key social agents employ externally controlling strategies that place pressure on others to perform perfectly*. In line with the externally controlling socialisation strategies emphasised in SDT, the focus in this component is on tangible, external, and overt contingencies that put pressure on children to behave in a particular way (Soenens & Vansteekiste, 2010). This includes communications such as shouting at, punishing, or rewarding children to encourage a particular goal or behaviour. These practices are relevant as they elicit an experience of pressure to meet requirements that exist outside of the person (Soenens & Vansteekiste, 2010). The key point to emphasise is that, in context of perfectionistic climate, the component of control focusses on externally controlling contingencies used to make young people feel like they must be perfect to avoid punishment and attain rewards.

In terms of a theoretical grounding, the control component, much like the criticism component, is best located in the social reactions model of perfectionism development. It is therefore important to distinguish between these two components. While the criticism component is conceptualised as an extreme response to mistakes and non-perfect performances, the control component is conceptualised as an extreme motivational strategy to deter future mistakes and place pressure on attaining unrealistically high future standards. To exert this pressure, key social agents may use many of the power-assertive behaviours identified in SDT-based models of controlling behaviour (e.g., verbal abuse, yelling, threat of punishment, and promise of reward; Bartholomew et al., 2009). In response to these controlling behaviours, young children are likely to experience intense pressure to meet the demands attached to these externally controlling contingencies. The key point that ties this form of pressure with the social reaction model is that it is a reaction to an intimidating and hostile environment.

One important source of evidence for the role of control as a key component of perfectionistic climate comes from investigations into the development of perfectionism. For example, Speirs Neumesiter (2004) interviewed college students who were identified as being academically gifted and highly perfectionistic. The aim of this study was to identify potentially influential factors in the development of self-oriented and socially prescribed perfectionism. One finding to come out of this study was that most participants high in socially prescribed perfectionism shared family contexts characterised by authoritarian and rigid parenting. In relation to the component of control outlined above, this included parents demanding obedience and using punitive threats to control their children's behaviour. For example, one participant described how her mother was quick to punish her and never willing to listen her whenever she achieved anything less than an A grade. This punishment included having privileges denied until her grades had improved. This punitive and intimidating style of psychological control was also emphasised by another participant who recalled being shouted and physically punished by his father for

misbehaving. This study therefore provides some evidence that controlling behaviour is another important socialisation strategy in the development of pressure to be perfect.

Conditional Regard. The fourth component of perfectionistic climate proposed by Hill and Grugan (2019) is *conditional regard*. In context of perfectionistic climate, the conditional regard component reflects *the perception that key social agents employ internally controlling strategies that place pressure on others to perform perfectly* (e.g., providing approval, acceptance, or support only when performances are perfect). In line with the internally controlling socialisation strategies emphasised in SDT, the focus in this component is on insidious, more covert, and typically (although not exclusively) non-verbal behaviours that put pressure on children to behave in a particular way (Soenens & Vansteenkiste, 2010). This includes communications that express disappointment, disregard for personal feelings and opinions, and love withdrawal. These behaviours are relevant as they appeal primarily to forces and regulations that reside within the child (Soenens & Vansteenkiste, 2010). That is, in an environment characterised by high levels of conditional regard, young people will feel like they must behave perfectly to avoid feeling guilty and validate their sense of self-worth.

In terms of a theoretical grounding, the component of conditional regard is highly relevant to the social expectations model of perfectionism development (Flett et al., 2002). As described earlier in the chapter, this model describes an environment in which children experience others as extremely difficult to please, reluctant to provide approval and rewards, and quick to disapprove of anything less than perfection. In this extreme environment, key social agents respond with disappointment in all circumstances other than occasions in which outstanding performance is achieved (Burns, 1980; Sorotzkin, 1998). In line with the internalisation process touched upon above, children who experience this sense of extreme conditional regard learn to belittle and condemn their own accomplishments, view themselves as unworthy, and alter their behaviour in a bid to avoid feelings of personal inadequacy. The goal of striving for perfection is the process by

which young people in such contexts feel that they can escape deep-seated feelings of inferiority and helplessness (Flett et al., 2002).

There are numerous studies that provide empirical support for conditional regard as a key component of perfectionistic climate. This support is perhaps most apparent in studies examining the role of parental conditional regard in the development of perfectionism (e.g., Curran et al., 2017; Curran, 2018; Curran et al., 2020). These studies show that perceptions of parental conditional regard positively predict various dimensions of trait perfectionism (including self-oriented and socially prescribed perfectionism; Curran et al., 2020). This collection of evidence is important as it demonstrates how conditional regard may give rise to multiple forms of perfectionistic pressure in young people. In terms of a broader model of perfectionism development, Curran et al. (2020) identified that parental conditional regard is also a key mediating factor in the relationship between parental-reported perfectionism and child-reported perfectionism. This finding is especially important as it indicates that parental conditional regard is a key socialisation practice in the intergenerational transmission of perfectionism.

A brief note on control and conditional regard. As emphasised above, the components of control and conditional regard share some overlap with distinct forms of psychological control that are emphasised in traditional models of controlling behaviour. For example, the two components are defined using terms consistent with definitions for *externally controlling behaviour* and *internally controlling behaviour* (Soenens & Vansteekiste, 2010). It is therefore important to clearly articulate how the proposed components are conceptually distinguishable from such interpersonal styles (Clark & Watson, 2019). This is the key focus within chapter three of the thesis. However, at this point, it is important to articulate the distinction in terms of specificity. Unlike SDT-based models of control, the perfectionistic climate components entail a narrow focus on controlling strategies that place pressure on others to feel, think, and behave *in accordance with a specific requirement for perfect performance*. This emphasis on perfection is a distinguishing feature of the

controlling practices embedded in models of perfectionism development (Flett et al., 2002; Hewitt et al., 2017).

Anxiousness. The final component of perfectionistic climate proposed by Hill and Grugan (2019) is *anxiousness*. In context of perfectionistic climate, anxiousness reflects *the perception that key social agents are extremely worried and vigilant about mistakes and the consequences of others not performing perfectly*. The best way to conceptualise this component is to think about how perfectionism involves an extreme aversion to mistakes and worry about the consequences of not being perfect (Frost et al., 1990). This is a defining characteristic of perfectionism captured in most models of trait perfectionism. The anxiousness component captures this same level of worry, nervousness, and apprehension regarding mistakes. The key distinction is that this extreme level of worry is communicated by a significant other (rather than experienced by the self). For example, in a highly perfectionistic climate, a key social agent may by hypervigilant to potential mistakes and constantly reminding others that mistakes need to be avoided.

In terms of conceptual grounding, the anxiousness component is drawn directly from the anxious rearing model of perfectionism development (Flett et al., 2002). As described earlier in the chapter, this model describes an environment in which key social agents instil a requirement for others to be perfect through their concern over mistakes. In line with the other components of perfectionistic climate, anxiousness captures an excessive level of worry. That is, in a highly perfectionistic climate, key social agents worry about all mistakes, go to extreme lengths to limit the potential for mistakes, and experience a level of concern that is disproportionate to any actual consequences of being imperfect. This type of behaviour is considered to transcend beyond any reasonable level of worry or concern. The issue with this level of anxiousness is that it may make children preoccupied with mistakes and fearful of anything other than perfection.

One stand-out study that provides support for anxiousness as a key component of perfectionistic climate was conducted by Mitchell et al. (2013). In this experimental study, Mitchell and colleagues examined the impact of anxious parental behaviour on observed perfectionistic

behaviour in children. In the study, children were asked to complete a series of scored visual processing tasks. In between tasks, children were subjected to either high levels of anxious parental behaviour (experimental condition) or non-perfectionistic parental behaviour (control condition). In the experimental condition, mothers were instructed to engage in behaviour synonymous with the anxious rearing model of perfectionism development (e.g., focus on mistakes, remind their child of the negative consequences of mistakes, and engage in overprotective behaviour). By contrast, mothers in the control condition were instructed to engage in calm, relaxed, and reassuring behaviours. The researchers found that exposure to high levels of parental anxiousness resulted in increased perfectionistic behaviour during the task (i.e., constant use of corrective implements, excessive checking behaviours, and negative reactions upon task time limit).

The Present Thesis

The model of perfectionistic climate outlined above represents a more generalised perfectionistic climate framework. In the current thesis, the broad aim is to apply this model to sport and develop the first psychometric scale to measure perfectionistic climate: Perfectionistic Climate Questionnaire-Sport (PCQ-S). The following chapters outline four interrelated empirical studies that underpin this broad aim. They each address important issues pertaining to the relevance and operationalisation of perfectionistic climate in sport.

The first empirical study, outlined in chapter two, focusses on the development and initial validation of the PCQ-S. This chapter initially addresses a range of key issues and considerations relevant to the subsequent scale development project. The first section of the introduction focusses on the applicability of sport as a domain in which to study perfectionistic climate. The aim was to articulate that sport provides an ideal domain and starting point for the study of this new construct. The second section of the introduction focusses on outlining three key proposals relating to the study of perfectionistic climate in sport. The three proposals relate to: (a) who (i.e., which key social agent) is principally responsible for shaping perceptions of the perfectionistic climate in a youth sport context; (b) how the model of perfectionistic climate relates to existing models and

measures of perfectionism in sport; and (c) whether the component behaviours outlined in the model of perfectionistic climate (i.e., expectations, criticism, control, conditional regard, and anxiousness) are all relevant to the sporting context. Outlining these three key proposals is important in terms of providing a sound foundation for the development of the PCQ-S.

The scale development project itself is outlined across a three-part method and results section. The research in these sections follows a series of recommended scale development and validation procedures (e.g., DeVellis, 2017). Specifically, in part one, the initial item generation and subsequent item refinement processes are described. This research involved using expert panels (i.e., five researchers and seven coaches) and young athletes ($N = 20$) to generate important data regarding the PCQ-S items generated by myself and members of the Motivation, Performance, and Wellbeing (MPaW) research group. In part two, data collected from young athletes ($N = 243$) was used to examine the factor structure and psychometric properties of the retained PCQ-S items using an exploratory factor analytical technique. In addition to this aim, the reliability and readability of scale items were assessed. Finally, in part three, data collected form an independent sample of young athletes ($N = 244$) was used to assess the factor structure and psychometric properties of the retained PCQ-S items using confirmatory and exploratory-confirmatory factor analytical techniques.

The second empirical study, outlined in chapter three, focusses on assessing the PCQ-S in comparison to existing coach climate measures in sport. The aim is to assess whether the PCQ-S can be clearly delineated from coach climate constructs informed by contemporary theories of motivation (AGT and SDT). In this study, data were collected from a sample of young team-sport athletes ($N = 223$) using the PCQ-S, Motivational Climate Scale for Youth Sports (MCSYS), Controlling Coach Behaviour Scale (CCBS), and Sport Climate Questionnaire-Short Form (SCQ-SF). The empirical relationships between the coach climate variables under investigation are then investigated using traditional and more contemporary analytical approaches. In terms of the traditional analytical approach, exploratory factor analysis is used to assess the factor structure

underpinning the PCQ-S, MCSYS, CCBS, and SCQ-SF subscales. In terms of the more contemporary analytical approach, network analysis (Costantini et al., 2015; Epskamp et al., 2016; Ziegler et al., 2013) is used to provide a visualisation of the complex covariation and empirical relations among the same set of coach climate variables. This chapter also addresses two secondary research aims: (a) to examine the stability of the PCQ-S measurement models examined in chapter two using the data provided by team sport athletes in this chapter; and (b) to examine the measurement invariance of the PCQ-S using a collapsed data set ($N = 710$).

The third empirical study, outlined in chapter four, focusses on whether perceptions of the perfectionistic climate are relevant to youth sport experiences. In this chapter, this aim is explored by examining whether the PCQ-S predicts total and specific dimensions of athlete burnout and athlete engagement. The data in this project were provided by a sample of young athletes ($N = 246$) who completed the PCQ-S, Athlete Burnout Questionnaire (ABQ), and Athlete Engagement Questionnaire (AEQ). One important feature of the research in this chapter pertains to the two outcomes examined. Athlete burnout and athlete engagement are noteworthy on the basis that: (a) they reflect two very different (perhaps even opposite) sporting experiences; and (b) sport-specific perfectionism (i.e., an athletes' own perfectionism in sport) has been found to predict both outcomes in previous research (Hill et al., 2020b; Jowett et al., 2016, 2021). The choice of these two outcomes therefore provides an opportunity to examine: (a) whether perfectionistic climate predicts both more negative (i.e., burnout) and more positive (i.e., engagement) sporting experiences; and (b) whether perfectionistic climate perceptions need to be considered alongside sport-specific perfectionism in future research examining youth sport experiences.

The fourth empirical study, outlined in chapter five, focusses on the role of perfectionistic climate perceptions in the development of sport-specific perfectionism in young athletes. As described in the current chapter, and again in more detail in chapter five, perfectionism develops in response to socialisation processes that unfold over time. To effectively examine perfectionism change, longitudinal research designs are therefore required. With this in mind, the research in

chapter five follows a two wave, three-month research design. Using data provided by a sample of young athletes ($N = 179$), the principle aim in this chapter is to examine whether changes in perfectionism scores between the two time points are predicted by initial levels of perfectionistic climate (and vice versa). This aim is examined using *Latent Change Score* (J. J. McArdle & Hamagami, 2001; J. J. McArdle & Nesselroade, 1994) modelling which provides a powerful approach to testing developmental hypotheses. This chapter also addresses a secondary research aim. That is, to examine whether the PCQ-S items can be clearly distinguished from the items used to measure sport-specific perfectionism. This aim is explored using an exploratory-confirmatory factor analytical technique.

These projects are then proceeded by a general discussion in chapter six. This chapter is intended to firstly provide a clear and precise overview of each empirical chapter in the thesis and the key findings in each case. Once the summary of findings from the thesis is presented, a section will be dedicated to highlighting and discussing major ways in which the thesis contributes to existing research and applied practice in sport and exercise psychology. This section will focus on how the introduction of perfectionistic climate helps to both compliment and extend existing models, measures, and interventions strategies relevant to perfectionism and climate research. The discussion will then focus on three key priority areas for the future study of perfectionistic climate. In each area, a case will be made for the importance of the future research idea and methods by which researchers could advance the study of perfectionistic climate. In the final section of the general discussion, several relevant limitations pertaining to the research conducted in the thesis will be identified and discussed. The limitations identified will again be coupled with important future research directions that will help researchers to address the issues encountered in the future study of perfectionistic climate. In sum, this section will provide a critical reflection on the research and work relevant to the application and study of perfectionistic climate in sport.

Chapter 2 – Applying Perfectionistic Climate to Sport: The Development and Initial Validation of

the Perfectionistic Climate Questionnaire-Sport (PCQ-S)

Abstract

The purpose of the first study of the thesis was to apply the conceptual model of perfectionistic climate to sport and develop the first scale to measure perfectionistic climate– Perfectionistic Climate Questionnaire-Sport (PCQ-S). The PCQ-S was designed to capture athlete perceptions of the coach-created perfectionistic climate via the five major components of perfectionistic climate: [coach] expectations, [coach] criticism, [coach] control, [coach] conditional regard, and [coach] anxiousness. The development of the PCQ-S was a three-part process and involved quantitative data from 487 youth athletes (M_{age} = 14.17, s = 1.72 years). In stage one, outlined in part one of the method and results, PCQ-S items were generated and then refined using feedback provided by academics (N = 5), sport coaches (N = 7), and youth athletes (N = 20). In stage two, outlined in part two of the method and results, exploratory factor analysis was used to examine the internal structure of PCQ-S items. In stage three, outlined in part three of the method and results, confirmatory factor analysis and exploratory structural equation modelling techniques were then used to further test and confirm the internal structure of the retained items. The result of this three-part process was a 20-item five-factor scale that shows evidence of good factorial validity. Based on these initial findings, the PCQ-S provides the first valid and reliable way of measuring perfectionistic climate in sport.

Introduction

As outlined in the introductory chapter, perfectionism has traditionally been conceptualised as a personality trait (i.e., a personal quality of the individual). The introduction of perfectionistic climate provides an extension to existing perfectionism constructs and moves beyond the notion of perfectionism as an individual issue. Rather than focussing on the personal qualities of an individual that are perfectionistic, perfectionistic climate focusses on the degree to which the social environment can be considered perfectionistic. The theoretical basis for this new construct is provided by Flett et al.'s (2002) model of perfectionism development and defined using motivational climate work guided by AGT (Ames, 1992; Nicholls, 1984). In accord, perfectionistic climate is defined as the informational cues and goal structures (i.e., components of the environment that emphasise what people are expected to accomplish and how they are to be evaluated) that align with the view that performances must be perfect and less than perfect performances are unacceptable (Hill & Grugan, 2019). The introduction of perfectionistic climate offers an important new way to study the experience of the pressure to be perfect that complements existing approaches in sport and other domains.

Perfectionistic Climate in Sport and Other Domains

The study of motivational climate guided by contemporary theories of motivation has been applied across various contexts. For example, using AGT as a theoretical lens, researchers have studied the concept of motivational climate in physical education (Papaioannou, 1998), sport (Seifriz et al., 1992), and workplace settings (Nerstad et al., 2013). This research marks an important extension to classical classroom-based conceptions of motivational climate emphasised in AGT. The key point underpinning such developments is that classroom-based structures share a great deal of overlap with the structural features of other achievement settings. For example, in both sport and classroom environments, achievement outcomes are valued, formal evaluation is externally imposed, and young people are grouped by ability (Ames, 1992). The authority and reward structures are also adult defined. That is, an adult is typically responsible for how tasks are

defined, how children are grouped and evaluated, and what motivational strategies are employed in these settings (Ames, 1992). These are just some of the key ingredients underscoring the applicability of applying climate-based constructs across contexts.

In term of the perfectionistic climate construct, the family environment is a key context (Flett et al., 2002; Hewitt et al., 2017). However, in line with existing approaches to studying motivational climate, other contexts are equally important to consider. This is emphasised by Flett et al. (2002) acknowledging the role of teachers and peers in creating educational environments (e.g., competitive classroom settings) that contribute to young students' perceptions regarding the requirement to be perfect. In terms of more recent proposals, Hewitt et al. (2017) also emphasised that key social agents and settings outside of the family environment are highly relevant to the development of perfectionism during childhood. Specifically, Hewitt and colleagues acknowledged the importance of a young persons' relationships with friends, schoolmates, teachers, and coaches. The settings in which these relationships are formed and maintained include the family home, school classroom, and sport environment. What is perhaps key is that these are all settings in which young people may experience unrealistically high demands, pressure to avoid even minor mistakes, and criticism despite best effort or personal improvement.

In the current thesis, the focus is on the relevance of perfectionistic climate in the youth sport context. The reason for this is that youth sport is a popular activity for young people and a context in which athletes often experience interpersonal pressure, negative feedback, and contingent rewards (Fraser-Thomas et al., 2005; Gould, 2019; Ryan & Deci, 2017). As highlighted in the introduction of the previous chapter, the sense of pressure that young athletes are subjected to and often experience in sport is also considered by many researchers and sport organisations to be increasing (Beregon et al., 2015; Gould & Mignano, 2021; Gould, 2019). The key point that makes youth sport an ideal starting point for the study of perfectionistic climate is that, for many, the sense of pressure is perfectionistic. That is, some youth athletes report that they experience their environment as excessively demanding and frequently encounter performance standards that are not

just high, but ultimately unrealistic and perfectionistic.

The idea that youth athletes often experience extreme and perfectionistic environments is evident in media accounts of sporting environments. This is especially the case in recent years where several athletes have spoken up about the extreme pressure and psychological abuse embedded within youth sport. This is perhaps no more evident than in gymnastics. In recent years, former British gymnasts have shed light on the extreme and highly perfectionistic environments created by their coaches. This includes reports of coaches using physical punishment and humiliation in response to performance mistakes, putting pressure on young athletes to compete through injury, and shaping an environment of extreme fear (Ingle, 2021). These reports have recently been substantiated following the Whyte Review–an independent review of British gymnastics commissioned for by UK Sport and Sport England. This review identified that issues of physical and emotional abuse within gymnastics in Britain were systematic. One of the many worrying themes identified was that the pursuit of international and competitive success was put ahead of gymnast wellbeing and welfare (Falkingham, 2022). This was evident in findings of physical and emotional abuse toward gymnasts by coaches (e.g., pressure to train on injuries, derogatory verbal comments about performance and weight, and physically controlling punishment). This case therefore provides evidence for extremely perfectionistic, abusive, and exploitive environments in youth sport.

In addition to the accounts outlined above, there is also evidence from research that perfectionistic climates exist in youth sport. The first support that is relevant in this regard is from a qualitative investigation into the experiences of a former elite gymnast (given the pseudonym of Susan; see Krane et al., 1997). In this study, the authors were interested in developing an understanding of the behaviours of Susan and other key figures relevant to her experience as a youth elite gymnast. Three semi-structured interviews produced data that when analysed resulted in three dimensions: *motivational climate*, *evidence of an ego orientation*, and *correlates of ego involvement*. The motivational climate dimension reflected Susan's belief that her environment was

rife with emphasising winning, perfecting performances, training despite pain or injury, and demonstrating flawless body appearance. In reflecting on her experiences, it became apparent to Krane and colleagues that the central figures in Susan's gymnastics involvement shaped an environment in which striving for perfection was the only acceptable goal.

This requirement for perfection was apparent in the behaviours and practices that Susan's coaches and parents exhibited throughout her participation in gymnastics. For example, Susan described how her coaches pushed her to physical extremes, placed unhealthy physical demands on her gymnastics practice, and rewarded an unyielding dedication toward achieving physical perfection. This included being expected to dedicate excessive hours toward training and conditioning (e.g., eight-to-ten hours per day) and engage in extreme exercise behaviour (e.g., 250 sit-ups without stopping) at the age of ten years old. Susan also described how her coaches would use physical punishment whenever perfection was not attained (e.g., ten push-ups for minor mistakes) and become outraged in response to unavoidable setbacks. In one further example, Susan recounted how her coach would place serrated bottle caps on the heels of her gymnast's feet. This practice was designed to force the gymnasts into avoiding mistakes such as falling off the beam and landing on their heels. In sum, the experiences of Susan provide strong support to the notion that an athletic environment shaped by cruel, unforgiving, and excessive practices can give rise to extreme pressure to be perfect.

The second form of support comes from a similar qualitative investigation into the experiences of former elite gymnasts (Lavallee et al., 2007). In this study, the authors were specifically interested in the links between the pursuit of performance excellence, self-identify, and retirement from elite sport. One of the key findings from this study was that the athletes experienced a constant sense of external pressure to meet increasingly high levels of performance, compete under pressure, and get things just right. This was reflected in the response of one athlete who explained that there was a requirement to continuously build on levels of achievement. The key point articulated was that maintenance was insufficient and anything less than a step forward would

be deemed a failure. In addition to supporting the notion that the sporting environment can be perfectionistic, the study also highlighted some of the inherent issues that may stem from perfectionistic climates in sport. Most notably, the findings suggest that many of the athletes may have internalised environmental pressure to be perfect and became perfectionistic in their own behaviour. This was reflected in the responses of participants who discussed their need to meet exacting standards, avoid even minor mistakes, and beat themselves up whenever perfection was not achieved.

In addition to gymnastics, there is also evidence that perfectionistic climates exist in other sports. This support comes from qualitative investigations into the burnout process among young elite tennis players (Gould et al., 1996; Udry et al., 1997). One of the key findings from this early research was that young burned out tennis players who had withdrawn from their sport recalled an environment that was often extremely difficult. Specifically, across both studies, the researchers identified that many athletes were dissatisfied with the involvement of their parents and coaches. In the case of Gould et al.'s (1996) study, dissatisfaction stemmed from overbearing and critical parenting, hostile and unsupportive sporting environments shaped by coaches and peers, and poor social networks in sport. In the case of Udry et al.'s study (1997), athletes perceived a highly stressful environment in which parents and coaches were regarded as being extremely demanding, highly critical, psychologically controlling, and, ultimately, unsupportive. These studies are important for two reasons. In line with the previous studies highlighted, they provide further support to the notion that the youth sport environment can be perfectionistic. However, they also draw attention to the possibility that experiencing a highly perfectionistic environment may underpin disaffection, burnout, and dropout among young athletes.

While the accounts above are specific to gymnastics and tennis, there is a much broader concern that youth sport as an institution is becoming more perfectionistic (Beregon et al., 2015). In line with this issue, there is an important requirement to study perfectionistic climates in sport. In doing so, we can develop a better understanding of the experiences of athletes who participate in

highly perfectionistic environments, identify the effects of training and performing in highly perfectionistic environments, and, ultimately, learn how to better safeguard athletes from any subsequent negative consequences that come with these experiences. An important prerequisite to this long-term programme of research is the development of a sound psychometric measure of perfectionistic climate relevant to this context. With this in mind, the aim of the study outlined in the present chapter is to apply perfectionistic climate to sport and develop the first measure of perfectionistic climate in this context: Perfectionistic Climate Questionnaire-Sport (PCQ-S).

Applying Perfectionistic Climate to Sport: The Guiding Proposals

The conceptual model of perfectionistic climate outlined in chapter one provides the framework for the development of the PCQ-S. However, given that the conceptual model is not defined in relation to a specific context, the current application needs to appropriately consider issues such as: (a) which figure is principally responsible for shaping perfectionistic climates in sport; (b) how the model of perfectionistic climate relates to existing models and measures of perfectionism in sport; and (c) whether the component behaviours in the generalised model are all relevant to the sporting context. With these issues in mind, the application of perfectionistic climate to sport (and associated development of the PCQ-S) is underpinned by the three key proposals.

Key proposal number one

This first key proposal is that the coach is a key figure responsible for shaping the extent to which athletes experience a perfectionistic environment. This is an important consideration as perfectionistic climate is introduced as a construct that can be shaped by various significant others. While there are various key social agents who are influential in terms of youth sport experiences, the coach is especially important (Fraser-Thomas et al., 2005; Smoll & Smith, 2002). Their role involves designing and running training activities, setting performance expectations and evaluative standards, and shaping the overall values of the sporting environment. When coaches provide appropriate reinforcement and encouragement, athletes are likely to experience positive outcomes. This includes increased enjoyment, team unity, and lower dropout (Smoll et al., 1993). By contrast,

when coaches provide poor social support (e.g., set unrealistic expectations and demonstrate a lack of confidence in athletes) and engage in controlling coach behaviours (e.g., display an interpersonal style that is coercive, intimidating, and authoritarian), athletes are likely to experience negative outcomes. This includes the potential for diminished motivation, dropout, and illbeing in the form of athlete burnout (Gould et al., 1996; Pelletier et al., 2001; Robinson & Carron, 1982).

The coach is also recognised as a key figure who can shape the extent to which young athletes experience pressure to be perfect. In providing a critical overview of models of perfectionism development and their application to sport, Appleton and Curran (2016) emphasise the need to look beyond the parental pathways that are typically associated with perfectionism development. Specifically, Appleton and Curran emphasised that coach-related factors are also likely to contribute to the development of perfectionism in athletes. In terms of specific behaviours that are relevant in this regard, the authors draw attention to coach pressure (i.e., unrealistic coach expectations in combination with overly harsh coach criticism). In support of this link, they identify how numerous studies have showed positive relationships between measures of coach pressure and perfectionism in youth athletes (e.g., Gotwals, 2011; Madigan et al., 2019; Sagar et al., 2009).

Key proposal number two

The second key proposal is that that there is a need to revise how we conceptualise and measure coach pressure to be perfect. There are several sport-specific measures of trait perfectionism that incorporate a focus on the coach as a source of perfectionistic pressure. The two most utilised measures relevant in this regard are the Sport Multidimensional Perfectionism Scale (Sport-MPS; Dunn et al., 2002, 2006) and the Multidimensional Inventory for Perfectionism in Sport (MIPS; Stoeber et al., 2006). The Sport-MPS includes a *perceived coach pressure* subscale, whereas the MIPS includes a *perceived pressure from coach* subscale. In both cases, the subscales capture perceptions that an athlete's coach: (a) expects them to be perfect; and (b) criticises them if they fail to achieve perfection. These dimensions of coach pressure are situated and measured alongside other dimensions of perfectionism (e.g., personal standards, concern over mistakes, and

negative reactions to imperfection).

There are two key issues that apply to the above measures. The first issue is that they may be confounding etiological factors with core components of perfectionism. This has been emphasised by researchers who argue that components of pressure to be perfect (i.e., expectations and criticism from a specific significant other) are developmental aspects of perfectionism rather than core characteristics of the perfectionism personality trait (Damian et al., 2013; Sirois & Molnar, 2016; Rice et al., 2005). The inclusion of these aspects alongside core characteristics of perfectionism has the potential to interfere with the interpretation of results and cause confusion regarding the perfectionism personality trait (Rhéaume et al., 2000). In this regard, the application of perfectionistic climate to sport is important as it clearly positions components of coach pressure as sources of interpersonal pressure that contribute to experiences of a perfectionistic climate (as opposed to aspects of trait perfectionism).

The second issue pertains to the fact that these measures fail to distinguish between coach expectations and coach criticism. Although each measure includes items reflecting coach expectations (e.g., "My coach sets very high standards for me in competition" and "My coach demands nothing less than perfection of me") and coach criticism (e.g., "I feel like my coach criticizes me for doing things less than perfectly in competition" and "My coach criticizes everything I do not do perfectly), the item sets are collapsed to form broader measures of coach pressure to be perfect. This differs from the model of perfectionism development which asserts that expectations and criticism should be studied independently. In this model, Flett et al. (2002) argue that key significant others are likely to differ in relation to their level of perfectionistic expectations and propensity to engage in harsh and critical evaluations. The key point they emphasise in making this observation is that various forms of parental pressure are likely to exist that could contribute to subtle, yet important differences in the development of perfectionism. In this regard, adopting an approach that distinguishes between coach expectations and coach criticism may also be particularly important.

The importance of distinguishing between expectations and criticism is also supported empirically. Specifically, researchers have examined whether different combinations of perceived parental expectations and perceived parental pressure contribute to differential perfectionistic tendencies and perceptions of self-worth in adolescent athletes (S. McArdle & Duda, 2008). The first noteworthy finding in this study is the divergent pathways linking aspects of parental pressure to perfectionism. Specifically, perceived parental criticism was the only positive predictor of self-critical aspects of perfectionism (i.e., an individual's tendency to process mistakes negatively, view mistakes as personal failures, and experience extreme dissatisfaction with personal performance). The only aspect of perfectionism linked to higher levels of perceived parental expectations was personal standards (i.e., an individual's tendency to set and strive for exceedingly high standards of performance). This same pattern of findings was also evident for self-efficacy with perceived parental criticism being the only developmental aspect of perfectionism to predict diminished perceptions of self-worth. These initial findings are illustrative of the fact that expectations and criticism may have unique effects when it comes to predicting key outcomes in youth athletes.

The second noteworthy finding in the above study is that fluctuations in self-esteem were predicted by both an interaction term and a quadratic term. The significant interaction term illustrated that the effect of perceived parental expectations on self-esteem stability varied depending on levels of perceived parental criticism. In this case, self-esteem instability was greatest when high perceived parental criticism was coupled with low perceived parental expectations. In terms of the significant quadratic term, the result illustrated that high perceived parental expectations corresponded to heightened fluctuations in self-esteem across all levels of perceived parental criticism. Overall, in line with the model of perfectionism development, these findings demonstrate that various combinations of pressure are important to consider when assessing key outcomes in youth athletes. While this evidence is specific to perfectionistic parental practices, it may also extend to coach expectations and coach criticism.

Key proposal number three

The final key proposal guiding the current application is that perfectionistic climate in sport involves more than unrealistic coach expectations and harsh coach criticism. In line with theory relating to the development of perfectionism, there are various other behaviours, practices, and relational styles that influence the extent to which an environment is experienced as perfectionistic (Appleton & Curran, 2016; Flett et al., 2002). This requirement for a more comprehensive model of coach pressure is also supported by research on perfectionism from a motivational climate perspective. For example, Barcza-Renner et al. (2016) found that controlling coach behaviours (including controlling use of rewards and negative conditional regard) shared positive relationships with perfectionism in young athletes. In other research, Gustafsson et al. (2016) found that perceptions of worry-conducive behaviour (i.e., actions signalling an extreme focus on mistakes and the importance of avoiding errors) shared positive relationships with perfectionism in young athletes. In this regard, coach control, coach conditional regard, and coach anxiousness should all be considered as key and potentially unique components of perfectionistic climate in sport.

The Present Research

The aim of the present study was to develop the PCQ-S. In the following methods and results section, a three-part scale development process is described. The first part of this process involves initial item generation and refinement procedures. The second part involves an exploratory examination of the factor structure of PCQ-S items. The third part involves a further examination of the factor structure of PCQ-S items using confirmatory and exploratory-confirmatory analyses.

<div align="center">Method and Results</div>

Part 1

The first steps of the scale development process are outlined in part one of the methods and results section. These steps involved: (a) generating items that capture the five perfectionistic climate components; and (b) evaluating and refining an initial PCQ-S item pool. The procedures outlined in this part (and subsequent parts) of the methods and results section were approved by an

institutional ethics review board (see Appendix A.1).

Initial item generation and item refinement

Definitions of the five perfectionistic climate components were developed based on existing theory (Appleton & Curran, 2016; Flett et al., 2002) and empirical research (e.g., Frost et al., 1990). In line with the conceptual model of perfectionistic climate proposed by Hill and Grugan (2019), each component incorporated a focus on perfect performance as opposed to high, very high, or exceptionally high performance standards (e.g., "…unrealistic expectations that one should *perform perfectly*"). A parallel list of key characteristics was also created to accompany the definition of each component. This helped to ensure that the defining characteristics of expectations (e.g., expectations are unrealistic and rigid), criticism (e.g., criticism is unreasonable and unrelenting), control (e.g., control is overt and involves external contingencies), conditional regard (e.g., control is subtle and involves internal contingencies), and anxiousness (e.g., anxiousness is excessive and centred on non-perfect performances) were considered during the item generation and refinement process.

In line with the recommendations of DeVellis (2017), myself and members of the MPAW research group independently generated items using the definitions and key characteristics of each component to guide the process. The items were developed with the aim of representing the full range of characteristics and creating a set of unidimensional subscales. The items were also developed so that they were easily comprehendible (i.e., incorporated language that is recognisable and easy to read) and consistent with the response format adopted. In terms of the response format adopted, a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*) that is consistent with previous coach climate scales designed for youth athletes was adopted (R. E. Smith et al., 2008). This process yielded an initial pool of 127 items.

Once the initial item pool was developed, myself and members of the MPaW research group aimed to reduce item pool (from 127 items) to around 50 items (~10 items per perfectionistic climate component). This process was achieved by reviewing the items for clarity, readability

(assessed via Flesch-Kincaid grade level scores; Kincaid et al., 1975), relevance, similarity to other items generated and items in existing scales, and the degree to which they adhered to the specified criteria. This process helped to identify: (a) items that were too similar to items in existing scales (e.g., "*Only perfect performances are acceptable to the coach*" versus "*Only outstanding performance in competition is good enough for my coach*"); (b) items with high readability scores or low clarity (e.g., "*The coach expects perfect performance even when such demands are unrealistic*"); (c) items that do not capture the key defining characteristics of perfectionistic climate (e.g., "*The coach does not promote asking for feedback*"); and (d) items that share too much overlap with a non-target perfectionistic climate component (e.g., "*The coach shouts at you in front of others when you make performance mistakes*"). In addition to deleting items that could be placed in at least one of the categories outlined above, several similar items were identified (e.g., "*The coach expects performances to be perfect*" versus "*The coach expects performance to be perfect*"). In these cases, the preferred item was identified and retained. In line with our aim, this process helped to reduce the initial item pool down to 50 items.

Expert panel review

The first revised item pool of 50 items was then subject to an external review process. The first external panel consisted of five experts who were independent of the research group, had worked extensively with constructs relevant to perfectionistic climate in sport (e.g., perfectionism, motivational climate, and interpersonal relationships), and held both PhD degrees and senior academic roles at universities in the UK or Sweden. In addition, the expert panel also included editorial board members of leading sport and exercise psychology journals and chartered sport and exercise psychology consultants. The expert panel members were provided with a document containing the definition of each perfectionistic climate component, the accompanying key characteristics, and the revised pool of 50 items. In line with the recommendation of DeVellis (2017), they were instructed to: (a) identify the component each item reflects; (b) rate the content suitability of each item (high, moderate, or low); and (c) rate the comprehensibility of each item

(high, moderate, or low). The experts were also invited to provide comments regarding specific items, recommend new items, and provide alternative wording for existing items.

The same revised pool of 50 items was also subject to an external review by a panel of seven sport coaches (5 male, 2 female, $M_{age} = 43.14$ years, $s = 14.86$, range = 23-59). The coaches were recruited from youth sport organisations in the UK and represented various team and individual sports (e.g., netball, basketball, and tennis). They also varied in relation to the level at which they coached (recreational to international), the age of athletes they typically coached, and the number of years they had coached at the level they each specified. In line with the procedure for the academic review, each coach was contacted via e-mail and invited to participate in the coach review. The coaches were provided with a document containing the revised pool of items and instructed to: (a) indicate whether they considered the content of each item to be applicable to the sport they coached (applicable *versus* not applicable); and (b) rate the clarity of each item (high, moderate, or low).

Using feedback generated through the two external review panels, two members of the research group carefully reviewed the feedback relating to all items before making an informed decision about how to use the data. (DeVellis, 2017). When reviewing the academic feedback, items were flagged if in any of the five academic reviews they: (a) were mistakenly linked with a non-target component; (b) received a low content suitability rating; or (c) received a low clarity rating. When reviewing the coach feedback, there were high levels of agreement in relation to sport applicability. We therefore only flagged items that received a low number of 'high' clarity ratings (3 out of 5 'high' clarity ratings or less). In addition to these procedures, we also used qualitative data to flag potentially problematic items. When all this information was considered collectively, 30-items were retained, 4-items were deleted, and 16-items were re-worded. With the five items that were deleted, the items were either cases of replication or items that were too similar to a retained item. The 16-items that were re-worded aimed to address some of the issues identified from the panel reviews. This included re-wording items identified as potentially low in clarity and changing potentially problematic language (e.g., '*flawless*' replaced with '*no errors*'). In addition to

these changes, we also added 10 new items. In five of these cases, the items were parallel items (e.g., "*The coach is less approving when …*" versus "*The coach is more approving when …*)". The other five cases were new items entirely (e.g., "*The coach criticises every performance harshly*"). This process led to a second revised pool of 56 items.

Focus group review

The third stage of the external review process involved conducting focus groups with youth athletes. The primary aim of this stage was to further assess readability, comprehension, and content suitability of the second revised pool of 56 items (DeVellis, 2017). This process was also conducted to assess the stability of item interpretation across athletes and identify any items that athletes may be unwilling or unable to respond to (Collins, 2003). To recruit youth athletes for this stage, gatekeepers of youth sport organisations in the UK were contacted via email (see Appendix B.1). The email included information about the study and an invitation to be involved in the research project. With those expressing an interest in participating, data collection arrangements were made. Specifically, a convenient time and location was established in which the lead researcher (plus an additional member of the research team) could provide information regarding the project, address any queries, and invite athletes to take part in the research (see Appendix C.1). In advance of the research, parental/guardian consent was gained from participants who had volunteered to participate (see Appendix B.2). All participants also provided their informed consent prior to conducting the research (see Appendix D.1).

Three independent focus groups were conducted following common recommendations (Hennink, 2014). Participants taking part in these groups were youth footballers (5 males, 15 females, $M_{age} = 14.10$ years, $s = 0.91$ years, range = 13-16 years) representing varying levels of competition (regional to international). Each group consisted of same-sex participants of a similar age, five to nine participants, and lasted between 40 and 60 minutes in duration. In each session, participants were provided with the list of 56 items and a think-aloud protocol was adopted (Simon & Ericson, 1998). This process involved the lead researcher selecting items from the list, reading

them out to room, and asking athletes to verbalise their thoughts about each item. In some cases, to assess the readability of the items, focus group members were also invited to read specific items out to the group. To facilitate the discussion on each selected item, predetermined probes aimed at exploring the comprehension and content suitability of items (e.g., "how would you explain this to someone else", "what did you understand by this word/question", and "could you provide an example of this?"; Collins, 2003) were used. The additional member of the research group in attendance was there to make notes about specific items and the discussions that took place. This process helped to identify items that were "well received" and "well understood" by the groups, but also some potentially problematic items. This included items reflecting behaviours that all coaches may be likely to endorse (e.g., "*The coach expects every performance to be better than the last one*") and including terminology that was not considered relevant to sport (e.g., "*The coach uses prizes to …*"). These items were therefore deleted. The feedback generated across the three focus groups led to a third revised pool of 54-items.

Part 2

The next steps of the scale development process are outlined in this section of the methods and results. The first step in this part of the process was to explore the factor structure and psychometric properties of the third revised pool of 54 items identified in part one. In doing so, the aim was to identify a parsimonious model which: (a) adequately accounts for the correlations among the set of items; and (b) incorporates factors which are interpretable. The second step in this part of the process was to assess the final set of items in relation to scale readability and reliability. To achieve these aims, a convenience sample of youth athletes were invited to complete the revised pool of 54 items. This development sample ($N = 487$) was split into two subsamples via block randomisation (Arifin, 2012). The first subsample ($n = 243$) was reserved exclusively for part two and the second subsample ($n = 244$) was reserved exclusively for part three.

Participants

The subsample reserved for this process consisted of 243 youth athletes (110 males; 130

females; 3 missing; M_{age} = 14.19 years; s = 1.72; range = 10-18) who represented various individual

and team sports (e.g., football, rugby, netball, athletics, and rowing) and levels of competition

(recreational = 6, club = 136, county = 18, regional = 25, semi-professional = 4, professional = 11,

national = 17, international = 6, and missing = 20). On average, athletes had been competing in their

sport for 5.48 years (s = 3.16) and dedicated 7.30 hours (s = 4.46) to training and competition per

week. In comparison to other activities in their lives, athletes rated their sport as moderately-to-

extremely important (M = 7.79, s = 1.51; 1 = *extremely unimportant* to 9 = *extremely important*).

Data analysis

Exploratory factor analysis (EFA) was carried out with robust variance-adjusted weighted

least squares estimation (WLSMV) for categorical variables in M*plus* 8.1 (Muthén & Muthén,

1998-2017). The procedure was iterative and followed several common recommendations (Fabrigar

& Wegener, 2012). Factor retention was explored using eigenvalues, goodness of fit statistics for

competing models, and solution interpretability. This approach considers both relevant theory and

statistical criterion when considering the appropriate number of common factors to retain. The

factor solutions from EFA were assessed based on the magnitude of parameter estimates ($\geq$ .30 was

considered meaningful), degree of cross loading (the number of indicators loading meaningfully on

more than one factor), and solution interpretability (Morin et al., 2020).

In line with previous psychometric research (e.g., Appleton et al., 2016), multiple fit indices

were used to help evaluate overall model fit: chi-square statistic (χ^2), comparative fit index (CFI),

Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardised

root-mean-square residual (SRMR). However, as the χ^2 is oversensitive to sample size and minor

model misspecifications, the predominant focus was on the additional indices specified. In line with

established guidelines (Marsh et al., 2004), models meeting the following criteria were considered

to reflect adequate model fit: > .90 CFI, TLI, < .08 RMSEA, 90% CI < .05 to < .08; < .08 SRMR.

To aid assessment of the magnitude of factor correlations, descriptors for small ($.10 \leq |r| < .30$),

medium ($.30 \leq |r| < .50$), and large ($|r| \geq .50$) effects were used (Cohen, 1988). Inter-factor

correlations exceeding .85 were considered to reflect poor discriminant validity (Brown, 2015).

The readability of each item was assessed using the Flesch-Kincaid grade level score method (Kincaid et al., 1975). This method was used to assess the approximate grade-level and associated age range that each item is suitable for. For example, an item receiving a grade-level score of 4.7 is typically suitable for individuals with at least a 4th grade reading level (in the United Kingdom, 9- to 10-year-olds). In terms of reliability, the recommendations for estimating scale reliability by estimating McDonald's omega (ω) over the more traditional Cronabach's alpha (α) was adopted. The ω estimates and corresponding 95% confidence intervals were calculated in M*plus* 8.1 (see Hayes & Coutts, 2020). Inter-item correlations and corrected item-total correlations were also examined using SPSS 26.0 (inter-item correlations $.20 < r < .70$ and item-total correlation $> .30$ were used to guide assessment; Kidder & Judd, 1986).

Exploratory factor analysis

The iterative EFA procedure revealed that the most interpretable solution consisted of 20 items loading on five factors. This model yielded five eigenvalues with a magnitude of one or greater (eigenvalues = 10.24 to 1.00) and provided significantly better fit than the alternative models examined ($\chi^2 = 152.80^{***}$, $df = 100$, CFI = .99, TLI = .98, RMSEA = .05 [.03, .06], SRMR = .02). In this model, well-defined factors for expectations, criticism, control, conditional regard, and anxiousness were evident (see Table 1). This was demonstrated through meaningful factor loadings for each item on their target factor (target $\lambda = .42$ to .89) and minimal meaningful cross loadings (only four cases out of a possible 80). In two of these cases, items loaded higher on their target factor (target $\lambda = .52$ to .69; non-target $\lambda = .33$ to .35). While the other two cases provided a comparable or stronger loading on the non-target factor (target $\lambda = .44$ to .50; non-target $\lambda = .44$ to .54), these items were retained for further psychometric evaluation.

Table 1. Geomin rotated loadings and factor correlations for the five-factor EFA model.

	M	s	F1	F2	F3	F4	F5
1. The coach expects performances to be perfect at all times.	3.20	1.16	**.73* (0.10)**	-.26* (.10)	.03 (0.06)	.00 (0.05)	.04 (0.06)
17. The coach expects performances to be perfect.	2.58	1.16	**.73* (0.09)**	.08 (0.09)	-.04 (0.06)	.01 (0.06)	.08 (0.05)
26. The coach expects performances to include no errors.	2.27	1.08	**.59* (0.09)**	.20* (0.08)	-.01 (0.04)	.21* (0.08)	-.08 (0.05)
29. The coach expects nothing less than perfect performance.	2.25	1.05	**.70* (0.08)**	.03 (0.04)	.07 (0.07)	.09 (0.07)	.07 (0.05)
12. The coach criticises even the best performances.	2.36	1.22	-.01 (0.05)	**.79* (0.06)**	.05 (0.06)	-.02 (0.05)	.06 (0.06)
15. The coach criticises performances that are not perfect.	2.87	1.15	.03 (0.07)	**.57* (0.07)**	.07 (0.07)	-.04 (0.06)	.25* (0.08)
20. The coach criticises all mistakes no matter how small.	2.55	1.12	.15* (0.08)	**.69* (0.07)**	-.01 (0.05)	.01 (0.05)	.11 (0.07)
34. The coach criticises performances all the time.	2.30	1.13	.07 (0.08)	**.65* (0.07)**	.16* (0.07)	.18* (0.07)	-.08 (0.05)
33. The coach uses his/her position unfairly to try to make performances perfect.	2.18	1.11	<u>.44* (0.07)</u>	.08 (0.05)	**.44* (0.06)**	.00 (0.05)	.02 (0.05)
41. The coach uses threats to try to stop mistakes in performances.	1.82	1.05	<u>.35* (0.11)</u>	-.01 (0.04)	**.69* (0.07)**	-.05 (0.05)	-.05 (0.05)
50. The coach uses punishment to try to make performances perfect.	2.17	1.20	.05 (0.07)	.01 (0.05)	**.74* (0.07)**	.05 (0.06)	.07 (0.06)
54. The coach withholds rewards if performances are not perfect.	2.14	1.11	.01 (0.05)	.01 (0.05)	**.66* (0.06)**	.16 (0.08)	.00 (0.05)
45. The coach is less approving when performances are not perfect.	2.28	1.10	.18 (.10)	.10 (0.07)	.25* (0.08)	**.42* (0.06)**	.07 (0.05)
48. The coach is friendlier when performances are perfect.	2.84	1.17	.03 (0.04)	.02 (0.03)	-.08 (0.06)	**.83* (0.06)**	.08 (0.05)
52. The coach is kinder when no mistakes are made when performing.	2.63	1.15	.05 (0.05)	-.09 (0.06)	.06 (0.04)	**.89* (0.06)**	-.05 (0.03)
53. The coach is less friendly when performances are not perfect.	2.34	1.14	-.08 (0.06)	.03 (0.04)	<u>.54* (0.07)</u>	**.50* (0.08)**	.06 (0.04)
6. The coach is anxious about the possibility of even small mistakes when performing.	2.24	1.05	.22* (0.09)	-.13 (0.07)	.15 (0.09)	-.00 (0.04)	**.61* (0.06)**
7. The coach is tense when mistakes are more likely to happen during performances.	2.67	1.09	.01 (0.06)	.01 (0.02)	.09 (0.08)	.05 (0.05)	**.78* (0.05)**
9. The coach is nervous that things will not go perfectly during performance.	2.51	1.14	.05 (0.06)	.11 (0.08)	-.05 (0.06)	-.01 (0.05)	**.77* (0.06)**
11. The coach is concerned about mistakes during performance.	2.94	1.08	-.05 (0.08)	<u>.33* (0.08)</u>	-.02 (0.05)	.15* (0.07)	**.52* (0.08)**
Geomin Factor Correlations F1				.63*	.58*	.56*	.51*
F2					.48*	.48*	.39*
F3						.46*	.43*
F4							.50*

Note. $N = 243$; Bold typeface denotes meaningful loading ($\geq .30$) on target factor; Underlined typeface denotes meaningful cross-loading ($\geq .30$) on non-target factor; F1 = Expectations; F2 = Criticism; F3 = Control; F4 = Conditional regard; F5 = Anxiousness; Standard errors reported in parentheses; * $p < .05$, two-tailed.

Assessment of scale readability and reliability

In terms of scale readability, the Flesch-Kincaid grade level scores revealed that the 20 items ranged from 4.7 (4th grade, typically suitable for 9- to 10-year-olds) to 11.2 (11th grade, typically suitable for 16- to 17-year olds). Most item scores ($n = 15$ or 75%) were within 4th grade to 7th grade reading ability range (typically suitable for 9- to 12-year-olds). Three items were within an 8th grade reading ability range (typically suitable for 13-to 14-year-olds). The remaining two item scores were 9.0 (9th grade, typically suitable for 14- to 15-year-olds; item 12) and 11.2 (item six).

Based on the readability results outlined above, the PCQ-S is likely to function best and be most appropriate for athletes ages 12 years and older. However, it is important to note that two items (six and 12) may need further revision to improve readability for younger athletes (e.g., athletes < 16 years). In relation to scale reliability, the ω estimates and corresponding 95% confidence intervals for each PCQ-S factor identified in the EFA analysis were all acceptable: expectations = .82 (95% CI range = .77 to .85); criticism = .85 (95% CI range = .81 to .88); control = .84 (95% CI range = .80 to .88); conditional regard = .86 (95% CI range = .82 to .89); anxiousness = .84 (95% CI range = .80 to .87). The inter-item correlations were also within recommended limits ($r = .37$ to .70) and the corrected item-total correlations were all acceptable ($r = .51$ to .74).

Part 3

The primary purpose of study three was to further examine the five-factor 20-item structure identified in study two. Three alternative measurement models were examined using confirmatory factor analysis (CFA) and exploratory structural equation modelling (ESEM) techniques.

Participants

The subsample reserved for this process consisted of 244 youth athletes (114 males; 130 females; $M_{age} = 14.16$ years; $s = 1.72$; range = 10-18) who represented various individual and team sports (e.g., cricket, basketball, rowing, golf, and tennis) and levels of competition (recreational = 7,

club = 138, county = 20, regional = 35, semi-professional = 6, professional = 7, national = 12, international = 2, and missing = 17). On average, athletes had been competing in their sport for 5.71 years ($s = 3.09$) and dedicated 7.27 hours ($s = 5.91$) to training and competition per week. In comparison to other activities in their lives, athletes rated their sport as moderately-to-extremely important ($M = 7.71$, $s = 1.53$; 1 = *extremely unimportant* to 9 = *extremely important*).

Data analysis

The first model involved using CFA to examine a structure in which: (a) items were constrained to load on first-order target factors only; and (b) all latent factors were specified to covary. This model will hereafter be referred to as the *first-order CFA model*.

The second model involved using ESEM with oblique target rotation to examine a structure in which: (a) items were permitted to load on all first-order factors; and (b) all latent factors were specified to covary. This model will hereafter be referred to as the *first-order ESEM model*. In comparison to the first-order CFA model, which is highly restrictive (i.e., zero-cross loadings permitted), the first-order ESEM model is more flexible (i.e., cross-loadings are permitted). This flexibility is often required when evaluating complex multidimensional structures.

The third model involved using ESEM-within-CFA (see Morin et al., 2020) to examine a structure in which: (a) items were permitted to load on all first-order factors; and (b) all latent factors were specified to load on a second-order hierarchical perfectionistic climate factor. This model will hereafter be referred to as the *hierarchical ESEM model*. This model was specified to explore the possibility that a hierarchical perfectionistic climate construct may account for the covariation among the five first-order PCQ-S factors.

In all analyses, the WLSMV estimation method for categorical variables in M*plus* 8.1 was used. Moreover, the magnitude and interpretability of parameter estimates were assessed using the guidelines identified for EFA in part two of the method and results. Similarly, the overall model fit of each model was evaluated using the model fit indices and criteria previously identified.

Alternative measurement models

The first-order CFA model provided good fit to the data ($\chi^2 = 415.66^{***}$, $df = 160$, CFI = .96, TLI = .96, RMSEA = .08 [.07, .09], SRMR = .04). In terms of parameter estimates, all factor loadings were significant ($p < .001$) and meaningful ($\lambda \geq .67$). In the first-order CFA model, standardised factor correlations were positive, significant, and large ($r = .68$ to .84). See Table 2.

The first-order ESEM model provided improved model fit and further support for the hypothesised five-factor structure ($\chi^2 = 179.65^{***}$, $df = 100$, CFI = .99, TLI = .98, RMSEA = .05 [.04, .07], SRMR = .02). In line with the EFA results in part two, well-defined and discernible factors for expectations, criticism, control, conditional regard, and anxiousness were evident. This was demonstrated through meaningful factor loadings for each item on their target factor (target $\lambda \geq$ .42) and minimal meaningful cross loadings (only two cases out of a possible 80). In all cases of cross loading, items loaded higher on their target factor (target $\lambda = .57$ to .65; non-target $\lambda = .31$ to .40). In the first-order ESEM model, the standardised factor correlations were positive, significant, and moderate-to-large in magnitude ($r = .45$ to .71). See Table 3

The hierarchical ESEM model examined also provided excellent fit to the data ($\chi^2 = 175.13^{***}$, $df = 105$, CFI = .99, TLI = .98, RMSEA = .05 [.04, .07], SRMR = .02). In terms of parameter estimates, well-defined factors for the five PCQ-S components were evident. This was demonstrated through meaningful factor loadings for each item on their target factor (target $\lambda \geq$ .42) and minimal meaningful cross loadings (only three cases out of a possible 80). In all cases of cross loading, items loaded higher on their target factor (target $\lambda = .50$ to .62; non-target $\lambda = .30$ to .44). In this model, all second-order factor loadings were also meaningful ($\lambda \geq .64$; see Table 4). See Table 4.

Table 2. Standardised model results and factor correlations for the first-order CFA model.

Item	M	s	First-order CFA
1. The coach expects performances to be perfect at all times.	3.28	1.17	.67*** (.04)
17. The coach expects performances to be perfect.	2.62	1.26	.87*** (.02)
26. The coach expects performances to include no errors.	2.19	1.12	.83*** (.03)
29. The coach expects nothing less than perfect performance.	2.19	1.10	.88*** (.02)
12. The coach criticises even the best performances.	2.25	1.19	.73*** (.03)
15. The coach criticises performances that are not perfect.	2.96	1.28	.87*** (.03)
2. The coach criticises all mistakes no matter how small.	2.42	1.15	.77*** (.03)
34. The coach criticises performances all the time.	2.20	1.15	.81*** (.03)
33. The coach uses his/her position unfairly to try to make performances perfect.	2.07	1.11	.81*** (.03)
41. The coach uses threats to try to stop mistakes in performances.	1.86	1.11	.76*** (.03)
5. The coach uses punishment to try to make performances perfect.	2.26	1.18	.80*** (.03)
54. The coach withholds rewards if performances are not perfect.	2.30	1.21	.85*** (.03)
45. The coach is less approving when performances are not perfect.	2.30	1.14	.84*** (.03)
48. The coach is friendlier when performances are perfect.	2.87	1.24	.75*** (.03)
52. The coach is kinder when no mistakes are made when performing.	2.76	1.23	.82*** (.03)
53. The coach is less friendly when performances are not perfect.	2.43	1.22	.92*** (.02)
6. The coach is anxious about the possibility of even small mistakes when performing.	2.26	1.05	.77*** (.03)
7. The coach is tense when mistakes are more likely to happen during performances.	2.55	1.12	.83*** (.03)
9. The coach is nervous that things will not go perfectly during performance.	2.45	1.11	.84*** (.03)
11. The coach is concerned about mistakes during performance.	2.84	1.14	.81*** (.03)

Factor Correlations	F1			
F2	.82			
F3	.82	.86		
F4	.81	.79	.84	
F5	.70	.68	.69	.73

Note. $N = 244$; Items 1, 17, 26, and 29 = Expectations (F1); Items 12, 15, 20, and 34 = Criticism (F2); Items 33, 41, 50, and 54 = Control (F3); Items 45, 41, 50, and 54 = Conditional regard (F4); Items 6, 7, 9, and 11 = Anxiousness (F5). Standard errors reported in parentheses. *** $p < .001$.

Table 3. Standardised model results and factor correlations for the first-order ESEM model.

Item	Expectations	Criticism	Control	Conditional Regard	Anxiousness
1	**.63*** (0.09)**	-.03 (0.08)	.04 (0.07)	-.01 (0.08)	.08 (0.06)
17	**.60*** (0.09)**	-.00 (0.08)	.12* (0.05)	.12* (0.06)	.12* (0.05)
26	**.80*** (0.08)**	.05 (0.07)	-.01 (0.05)	.05 (0.05)	-.01 (0.05)
29	**.76*** (0.08)**	.10 (0.07)	.03 (0.05)	.06 (0.05)	-.02 (0.04)
12	.09 (0.07)	**.90*** (0.09)**	-.25*** (0.06)	-.03 (0.05)	.04 (0.04)
15	.12 (0.07)	**.62*** (0.08)**	-.04 (0.07)	.18*** (0.05)	.07 (0.05)
20	.04 (0.06	**.63*** (0.08)**	.17** (0.06)	-.10 (0.05)	.13** (0.04)
34	-.13* (0.06)	**.65*** (0.07)**	<u>.40*** (0.05)</u>	.01 (0.05)	.01 (0.04)
33	.29*** (0.06)	.17** (0.06)	**.49*** (0.06)**	-.07 (0.06)	.07 (0.05)
41	.00 (0.07)	-.02 (0.06)	**.75*** (0.07)**	.04 (0.06)	.18*** (0.05)
50	-.03 (0.08)	.20** (0.07)	**.57*** (0.07)**	.23*** (0.05)	-.02 (0.06)
54	.19* (0.08)	.08 (0.06)	**.42*** (0.06)**	.25*** (0.06)	.06 (0.05)
45	.13 (0.07)	.25*** (0.05)	.17*** (0.05)	**.46*** (0.06)**	-.05 (0.05)
48	-.08 (0.06)	-.01 (0.05)	-.13** (0.04)	**1.00*** (0.06)**	.03 (0.04)
52	.10 (0.06)	-.14* (0.05)	.04 (0.05)	**.70*** (0.06)**	.22*** (0.04)
53	.19** (0.06)	.05 (0.06)	<u>.31*** (0.04)</u>	**.57*** (0.05)**	-.06 (0.04)
6	.16* (0.06)	-.00 (0.06)	.06 (0.05)	-.13** (0.05)	**.74*** (0.06)**
7	-.05 (0.06)	-.06 (0.05)	.10* (0.05)	-.04 (0.05)	**.94*** (0.05)**
9	-.05 (0.07)	.06 (0.06)	-.06 (0.05)	.13* (0.05)	**.79*** (0.05)**
11	-.01 (0.09)	.26*** (0.07)	-.08 (0.07)	.19** (0.06)	**.48*** (0.06)**

Factor Correlations					
F1					
F2	.71				
F3	.53	.55			
F4	.62	.61	.47		
F5	.59	.51	.45	.60	

Note. N = 244; Bold typeface denotes meaningful loading (≥ .30) on target factor; Underlined typeface denotes meaningful cross-loading (≥.30) on non-target factor; F1 = Expectations; F2 = Criticism; F3 = Control; F4 = Conditional regard; F5 = Anxiousness; Standard errors reported in parentheses; *** $p < .001$; ** $p < .01$; * $p < .05$.

Table 4. Standardised model results for the hierarchical ESEM model.

PCQ-S Factors / Items	F1	F2	F3	F4	F5	HF
F1 = Expectations						
1	**.62 (.10)**	.02 (.09)	.03 (.08)	-.03 (.09)	.09 (.07)	
17	**.57 (.09)**	.05 (.09)	.11 (.07)	.10 (.07)	.14 (.07)	**.83 (.05)**
26	**.81 (.03)**	.05 (.00)	-.01 (.00)	.05 (.00)	-.01 (.00)	
29	**.75 (.09)**	.15 (.09)	.03 (.07)	.03 (.07)	-.02 (.06)	
F2 = Criticism						
12	.09 (.00)	**.92 (.05)**	-.25 (.01)	-.03 (.00)	.04 (.00)	
15	.16 (.09)	**.58 (.08)**	-.01 (.09)	.18 (.06)	.04 (.06)	**.78 (.06)**
20	.11 (.09)	**.60 (.09)**	.21 (.08)	-.12 (.08)	.07 (.06)	
34	-.05 (.11)	**.62 (.10)**	<u>.44 (.08)</u>	-.02 (.08)	-.04 (.07)	
F3 = Control						
33	<u>.31 (.08)</u>	.21 (.08)	**.50 (.07)**	-.11 (.08)	.05 (.07)	
41	.00 (.00)	-.02 (.00)	**.74 (.04)**	.04 (.00)	.18 (.01)	**.64 (.07)**
50	-.01 (.11)	.22 (.10)	**.58 (.08)**	.20 (.08)	-.03 (.07)	
54	.18 (.09)	.12 (.08)	**.42 (.06)**	.22 (.07)	.07 (.07)	
F4 = Conditional Regard						
45	.14 (.09)	.26 (.07)	.18 (.06)	**.44 (.07)**	-.05 (.06)	
48	-.08 (.00)	-.01 (.00)	-.13 (.01)	**1.00 (.03)**	.03 (.00)	**.78 (.05)**
52	.05 (.08)	-.14 (.07)	.03 (.06)	**.73 (.08)**	.26 (.06)	
53	.17 (.09)	.10 (.09)	<u>.30 (.06)</u>	**.53 (.06)**	-.03 (.07)	
F5 = Anxiousness						
6	.16 (.09)	-.04 (.07)	.06 (.08)	-.08 (.08)	**.73 (.07)**	
7	-.05 (.00)	-.06 (.00)	.10 (.01)	-.04 (.00)	**.94 (.03)**	**.71 (.05)**
9	-.05 (.09)	-.02 (.07)	-.05 (.07)	.21 (.08)	**.79 (.06)**	
11	.01 (.11)	.19 (.08)	-.06 (.09)	.23 (.08)	**.47 (.07)**	

Note. $N = 244$; Bold typeface denotes meaningful loading ($\geq .30$) on target factor; Underlined typeface denotes meaningful cross-loading ($\geq .30$) on non-target factor. PCQ-S Perfectionistic Climate Questionnaire (PCQ-S); HF = Hierarchical Perfectionistic Climate Factor. Standard errors reported in parentheses.

Discussion

The aim of the research in the present chapter was to develop a scale to measure perfectionistic climate in sport. The three-part process outlined above highlights key stages in the initial development and validation of the PCQ-S. In stage one, outlined in part one of the method and results section, PCQ-S items were generated and refined. In stage two, outlined in part two of the method and results section, exploratory factor analysis was used to examine the structure of PCQ-S items. The result of this analysis was a five-factor 20-item scale. In the final stage, outlined in part three of the method and results section, this five-factor 20-item scale was then assessed using CFA, ESEM, and ESEM-within-CFA modelling techniques.

Key Proposals Underpinning the PCQ-S

The development of the PCQ-S was underpinned and guided by several key proposals. The first key proposal relevant in this regard is that the coach is a key figure responsible for shaping the extent to which athletes experience an environment that is perfectionistic. While this proposal was not directly examined in this chapter, the qualitative data from the focus groups was highly revealing in terms of this proposition. For example, in addition to providing information about the comprehension and content suitability of each PCQ-S item, athletes in the focus group sessions provided key examples and personal experiences of perfectionistic climates created by coaches in sport. For example, one athlete, when reflecting on one of the criticism items, stated that: "Even if it's just a little mistake, [anonymous coach] will criticise you for it and tell you what you've done wrong". In another example, a player reflected on an expectations item by saying: "[anonymous coach] expects your performance to have nothing bad about it, so all positive, there should be no negatives in your performance". These are two of the key quotes that provide support for the idea that the coach is indeed a key figure with the capacity to shape perfectionistic climates in youth sport.

While there are growing concerns that youth athletes are increasingly being exposed to unrealistic and inappropriate demands from adults in sport (Beregon et al., 2015), it is important to

have evidence reflecting such concerns. In this regard, the qualitative data generated from the focus group discussions is important in that it provides credence to the notions that: (a) perfectionistic climates exist; and (b) the coach is a key figure responsible for shaping perfectionistic climates in youth sport. In terms of existing knowledge supporting these notions, there is qualitative evidence provided by gymnasts (Krane et al., 1997; Lavallee et al., 2007) and tennis players (Gould et al., 1996; Udry et al., 1997). The qualitative data in the present study builds on this evidence by showing that coach-created perfectionistic climates are applicable beyond the sports and contexts examined in the studies cited above. In particular, the evidence suggests that perfectionistic climates are applicable to team sport contexts and various levels of competition (regional to international). This evidence is important as it supports the applicability of using the PCQ-S to collect data from youth athletes representing various sports, ages, and levels of competition.

The second key proposal was that perfectionistic climate in sport is comprised of five distinct and interrelated components. In line with the conceptual model of perfectionistic climate outlined in chapter one, the PCQ-S items were developed with the aim of representing expectations, criticism, control, conditional regard, and anxiousness. This was achieved by using the definitions and associated characteristics of each component to produce unidimensional subscales. The first support for this hypothesised model was provided by the results of the EFA analyses. Specifically, the results provided support for a five-factor PCQ-S model as the most appropriate structure. This was evident in that: (a) the factors identified were distinct, discernible, and reflective of each perfectionistic climate component; (b) all inter-factor correlations provided support for adequate discriminant validity; and (c) the five-factor structure outperformed the other alternate models examined.

In addition to the EFA analyses, the first-order CFA and first-order ESEM models also provided strong support for the hypothesised perfectionistic climate model. This was once again evident in the pattern of parameter estimates and inter-factor correlations identified across all models. In line with previous research in sport (e.g., Appleton et al., 2016; Myers et al., 2011; Perry

et al., 2015), the first-order ESEM model provided the strongest support for the hypothesised first-order model specification. This was reflected in better model fit and lower factor correlations relative to the alternative first-order CFA model. However, even the more restrictive first-order CFA model provided good fit. In all, the findings suggest that the PCQ-S matches the intended structure of perfectionistic climate with five interrelated components capturing perceptions of the coach-created perfectionistic climate.

The third key proposal was that unrealistic expectations and harsh criticism are conceptually distinct constructs. While evidence was found for the factorial validity of all five PCQ-S factors, support for measuring expectations and criticism as independent factors is particularly noteworthy. The psychometric analyses conducted across multiple measurement models and analyses indicated that the two constructs are unique (Brown, 2015). In all analyses, the inter-factor correlation between these constructs was below commonly identified thresholds for discriminant validity (Brown, 2015). In line with this evidence, rather than collapsing the two factors to create a broader construct of coach pressure, as has been the case in previous scale development projects (e.g., Dunn et al., 2006), the PCQ-S is the first domain specific questionnaire in sport to capture unrealistic expectations and harsh criticism separately. As such, the PCQ-S can be used to further examine the unique and interactive effects of these two distinct sources of perfectionistic pressure in youth sport.

In keeping with theory and previous research pointing to the potential for an interaction between perfectionistic expectations and criticism in the prediction of key outcomes, researchers could examine the predictive ability of the PCQ-S using moderation analyses (Hayes, 2018). Specifically, moderation would allow researchers to examine whether the effect of coach expectations on an outcome variable (e.g., perfectionism, athlete burnout, or athlete engagement) differs depending on levels of coach criticism. If a statistically significant interaction is identified, researchers could then apply the Johnson-Neyman (J-N) technique to establish exactly how the relationship between coach expectations and the outcome variable changes as coach criticism increases. As the nature of this changing relationship could be complex, the J-N technique is a

critical follow-up procedure (Hayes, 2018). In sum, the outlined application of the PCQ-S could provide an important extension to previous research trying to tease apart the interactive effect of these two key dimensions of pressure (S. McArdle & Duda, 2008). This application would also provide an extension to research focussing on other interactions that are important to consider in the study of perfectionism (Hill, 2021).

The final key proposal considered was that perfectionistic climate in sport involves more than just unrealistic expectations and harsh criticism. The identified five-factor PCQ-S includes the additional components of control, conditional regard, and anxiousness. This broader spectrum of climate components better captures the related behaviours, practices, and relational styles central to the development of perfectionism in athletes (Appleton & Curran, 2016). One of the most compelling findings in the present study is that these perfectionistic climate components can be modelled in various ways. In line with the first-order CFA and first-order ESEM models highlighted above, the components of perfectionistic climate can be studied as independent factors. However, based on the hierarchical ESEM model specification examined, the components can also be used to study a broader, higher-order, and latent perfectionistic climate factor. This level of modelling flexibility is advantageous as it provides scope to examine the relative influence of each PCQ-S factor in relation to a specified outcome or examine the broader influence of an overall perfectionistic climate factor itself (Myers et al., 2014).

Critical Reflection

The introduction of perfectionistic climate builds on existing climate research to offer another way of studying the social environment in sport. In sport and exercise psychology, researchers have relied on a small number of existing approaches to study social psychological environments created by key social agents. While these approaches have improved our understanding of the different experiences of athletes in sport, the models do not cover the full range of environmental experiences that athletes may perceive or be subjected to in sport. Thus, there is a requirement to adopt and develop other approaches to better understand the range of

practices that shape how athletes experience their environment (Morgan, 2017). To some extent,

this need for change is already evident in sport and exercise psychology. Specifically, since the

inception of AGT-based climate models in sport (e.g., Seifriz et al., 1992; White et al., 1992),

researchers have drawn upon key tenets of SDT (e.g., Mageau & Vallerand, 2003) and integrated

multiple theoretical frameworks (e.g., Appleton et al., 2016; Duda, 2013) to study coach climates in

sport. This type of extension has been critical in improving our understanding of the repercussions

that different coach climate experiences may have on athlete motivation, health, and psychological

functioning (e.g., Appleton & Duda, 2016).

The development of the PCQ-S offers a further alternative to existing climate measures. The

key distinction that sets the PCQ-S apart is that it focuses exclusively on practices that shape

environments in which athletes experience extreme pressure to be perfect. Specifically, the

component behaviours of this new scale capture an extreme environment in which the coach is

excessively demanding, *impossible* to please, psychologically *controlling*, and *irrational* when it

comes to worrying about mistakes. While there are other approaches that exist focussing on

punishment for mistakes, the demonstration of normative ability, and psychologically controlling

coach behaviour, none of which sufficiently capture the extreme nature of coaching practices that

shape a perfectionistic environment. The development of this new measure should therefore provide

a useful addition to the study of coach climates in sport. To test whether this is likely the case, the

following chapter provides an examination of the PCQ-S in relation to some established coach

climate measures used in youth sport. The aim is to assess, whether as described above, the PCQ-S

is sufficiently distinct from well-established constructs in this area of research.

The application of perfectionistic climate to sport and development of the PCQ-S also

provides a new and alternative way to study the experience of the pressure to be perfect. While the

focus in existing perfectionism measures is on the individual and the extent to which they display

perfectionistic traits, experience perfectionistic cognitions, or feel the need to appear perfect to

others, the PCQ-S focusses on the extent to which an environment is experienced as being

perfectionistic. This is an important advance in this area. Notably, the construct of perfectionistic climate accounts for the possibility that all athletes–regardless of their own levels of perfectionism–can experience the consequences of extreme pressure to be perfect. In line with guiding theory, this may include the internalisation of external pressure that encourages the development of personal perfectionism, as well as other outcomes that are particularly distressing for athletes (e.g., athlete burnout).

The development of the PCQ-S also has important implications as far as primary prevention and intervention to help manage perfectionistic problems in sport are concerned. This includes safeguarding mental health, maintaining motivation, and optimising performance. To date, research on perfectionism intervention in sport has focussed on the individual and provided mixed success in terms of intervention effectiveness (e.g., Donachie & Hill, 2020; Mosewich et al. 2013; R. W. Thompson et al., 2011). To improve on current intervention strategies, researchers have emphasised that it is important to incorporate a focus on the coaching environment (Appleton & Curran, 2016; Mosewich et al., 2013). In this regard, a focus on coach education and changing current practice offers a new avenue to explore how perfectionistic problems in athletes might be prevented. There is evidence in sport and other contexts that this type of intervention can be effective (e.g., Braithwaite et al., 2011). Thus, the ability to measure the degree to which the social environment is experienced as perfectionistic is an essential tool to help researchers and practitioners assess and redress perfectionistic cues provided by the coach and test these types of interventions.

Conclusion

The purpose of the present research was to apply the construct of perfectionistic climate to sport and develop the first questionnaire to measure it. Here, the key stages involved in the development and initial validation of this new questionnaire have been reported. Based on these analyses, the PCQ-S shows evidence of good factorial validity, scale reliability, and item readability.

Chapter 3 – A Network Analysis of the Perfectionistic Climate Questionnaire-Sport

(PCQ-S)

Abstract

The conceptual model of perfectionistic climate outlined in chapter one was applied to sport and used to guide the development of the Perfectionistic Climate Questionnaire (PCQ-S) in chapter two. This new questionnaire assesses features of the coach-created climate that are perfectionistic. In the second study of the thesis, outlined in this chapter, two aims were examined. The first aim was to assess whether the PCQ-S can be clearly delineated from existing coach climate measures in sport, while the second aim was to assess the factorial stability and measurement invariance of the PCQ-S. A sample of 223 youth athletes ($M_{age} = 15.25$ years, $s = 1.90$) completed the PCQ-S, Motivational Climate Scale for Youth Sports (MCSYS), Controlling Coach Behaviour Scale (CCBS), and Sport Climate Questionnaire-Short Form (SCQ-SF). To assess the first aim, exploratory factor analysis (EFA) and network analysis approaches were used. The EFA approach yielded a three-factor solution representing perfectionistic, empowering, and disempowering dimensions of coach climate. The network analysis approach provided a visualisation of the complex covariation and empirical relations among the set of coach climate variables. This network was assessed in relation to dimensionality which provided further support for the three coach climate dimensions identified in the EFA. While the local patten of relationships identified some areas of potential conceptual overlap between the various coach climate measures, the overall findings in this study show that perfectionistic climate features can be delineated from more empowering and disempowering climate features in sport. To assess the second aim, the PCQ-S was examined using CFA, ESEM, and ESEM-within-CFA techniques. The findings show that the 20-item five-factor PCQ-S is stable across datasets and shows evidence of measurement invariance across reported gender (male, female) and age (≤ 14 years, ≥ 15 years) groups. This study therefore provides further evidence supporting the psychometric properties of the PCQ-S.

Introduction

In chapter two, the conceptual model of perfectionistic climate was applied to sport and used to guide the development of the Perfectionistic Climate Questionnaire-Sport (PCQ-S; Grugan et al., 2021). The PCQ-S is a self-report scale that focuses on the coach as a key figure responsible for shaping perfectionistic climates in sport. In line with the conceptual model of perfectionistic climate, the PCQ-S was designed to assess youth athlete perceptions of expectations, criticism, control, conditional regard, and anxiousness from the coach. In this regard, the PCQ-S provides a comprehensive and nuanced assessment of the various coaching practices likely to shape perfectionistic climates in sport (see Appleton & Curran, 2016). This sport-specific model of perfectionistic climate is also noteworthy as it is positioned alongside several existing coach climate models in sport. Specifically, in line with the conceptual foundations for perfectionistic climate, the PCQ-S is perhaps most closely related to coach climate models informed by AGT (e.g., R. E. Smith et al., 2008) and SDT (e.g., Bartholomew et al., 2010).

Established Motivational Climate Constructs

AGT. In research guided by AGT, the term motivational climate has been applied to sport to describe features of the coach-created social environment that hold motivational significance for athletes (Duda, 1992). In line with early AGT-based work, two broad coach climate dimensions are typically studied in sport (i.e., a task-involving climate and an ego-involving climate). In a task-involving climate, athletes perceive that the coach places emphasis on effort and cooperation, views mistakes as central to personal development, and values all performers regardless of ability. By contrast, in an ego-involving climate, athletes perceive that the coach places emphasis on outperforming others, views mistakes as worthy of punishment, and values only the best performers (R. E. Smith et al., 2008). As highlighted in chapter one, several sport-specific measures capturing these two overarching climate dimensions have been developed. This includes measures focussing on the role of coaches (Seifriz et al., 1992), parents (White et al., 1992), and peers (Ntoumanis & Vazou, 2005).

One of the central tenets of AGT is that the motivational climate will contribute to how an athlete tends to judge their competence and respond to achievement related activities (Duda, 1992). In this regard, research shows that perceptions of a task-involving climate are positively related with task-involving conceptions of competence and several desirable achievement-related outcomes (e.g., enjoyment, commitment to training, and performance). This contrasts with perceptions of an ego-involving climate which are positively related with ego-involving conceptions of competence and several undesirable achievement-related outcomes (e.g., anxiety, athlete burnout, and peer conflict; see Duda et al., 2014). Based on this evidence, motivational climate interventions guided by AGT have focussed on promoting more task-involving behaviours among adults in sport (e.g., McLaren et al., 2015).

SDT. The next theory that is important to highlight when discussing established motivational climate constructs is SDT. In the case of SDT, motivational climate is a term used to describe key features of the psychological environment that influence the fulfilment (or thwarting) of a young person's basic psychological needs (Ryan & Deci, 2017). In this theory, much like AGT, two broad coach climate dimensions are often studied in sport: an autonomy-supportive climate and a controlling climate (Vallerand & Losier, 1999). In an autonomy-supportive climate, athletes perceive that the coach cares about the opinions of all performers and provides athletes with meaningful information and choice (Mageau & Vallerand, 2003). By contrast, in a controlling climate, athletes perceive that the coach uses coercive, manipulative, and authoritarian practices that pressure performers to feel, think, and behave in a particular way (Bartholomew et al., 2010).

One of the central tenets of SDT is that the motivational climate plays a key role in influencing an athletes' wellbeing (Ryan & Deci, 2017). The basic distinction made is that an autonomy-supportive climate will contribute to the satisfaction of basic psychological needs, autonomous motivation, and subsequent wellbeing. By contrast, a controlling climate will contribute to the thwarting of basic psychological needs, controlled motivation, and subsequent illbeing (Ryan & Deci, 2017). In line with this theory, researchers have found that perceptions of an

autonomy-supportive climate share positive relationships with psychological need satisfaction, more autonomous motivation, and outcomes including vitality, positive affect, and psychological well-being (Bartholomew et al., 2011; Stenling et al., 2015). This contrasts with perceptions of a controlling climate which share positive relationships with psychological need thwarting, more controlled motivation, and outcomes including burnout, depression, and disordered eating (Barcza-Renner et al., 2016; Bartholomew et al., 2011). Based on this evidence, motivational climate interventions guided by SDT have focussed on promoting more autonomy-supportive behaviours among adults in sport (Ntoumanis et al., 2018).

AGT and SDT. The motivational climate dimensions emphasised in AGT and SDT have traditionally been studied independently of one another. That is, researchers typically adopt one theory of motivation and focus on how athlete perceptions of the corresponding climate dimensions (i.e., task *versus* ego-involving or autonomy-supportive *versus* controlling cliamte dimensions) influence athlete level outcomes. For example, a systematic review of research conducted by Harwood et al. (2015) identified 104 studies that examined the relationships between the two AGT-based climate dimensions and intrapersonal-based outcomes in athletes (e.g., goal orientations, emotions, and motivational processes). The same is also the case with research adopting an SDT-based approach. This is evident in that researchers adopting this theory have examined the relationships between the two SDT-based climate dimensions and outcomes including need satisfaction, motivation, subjective vitality, intentions to continue participation, and athlete burnout (Cho et al., 2019; Felton & Jowett, 2012; O'neil & Hodge, 2020).

While AGT and SDT have primarily been examined as separate frameworks, researchers have explored the conceptual and empirical links between their associated constructs. For example, Reinboth et al. (2004) examined how task-involving (AGT), autonomy-supportive (SDT), and socially supportive (SDT) climate dimensions relate to psychological need satisfaction and subsequent wellbeing in youth athletes. In another example, Standage et al. (2003) examined how task-involving (AGT), ego-involving (AGT), and autonomy-supportive (SDT) climate dimensions

relate to psychological need satisfaction, motivation, and subsequent intentions to partake in leisure-time physical activity. The findings from these studies emphasise two important points: (a) the motivational climate created by significant others is multidimensional; and (b) the simultaneous examination of multiple climate dimensions may provide a fuller account of the sporting experiences of young athletes.

The research identified above emphasises that the two major motivational climate approaches can be studied independently or integrated together and studied simultaneously. This latter point is the key premise of Duda's (2013) Empowering Coaching^{TM} training programme. The conceptual model underpinning this programme differentiates between two higher-order coach climate dimensions: an empowering climate and a disempowering climate. An empowering climate is characterised by task involving features of AGT and autonomy-supportive features of SDT, whereas an environment that is disempowering is characterised by ego-involving features of AGT and controlling features of SDT. This hierarchical model is useful as it allows the broad spectrum of climate dimensions proposed in AGT and SDT to be considered simultaneously and has been argued to provide a fuller account of the impact of coach-created climates in youth sport (Appleton et al., 2016).

In line the conceptual model of coach climate underpinning Duda's (2013) Empowering Coaching^{TM} training programme, Appleton et al. (2016) created the Empowering and Disempowering Motivational Climate Questionnaire (EDMCQ-C). This measure integrates items capturing task-involving, ego-involving, autonomy-supportive, controlling, and socially supportive climate dimensions in one scale. The results of the multi-stage scale development project show that certain factors were distinct and discernible (factors reflecting task-involving, ego-involving, and socially supportive climates). However, other factors in the empowering coaching model were indistinguishable. This was particularly the case for the autonomy-supportive and controlling climate dimensions. In both cases, items: (a) failed to provide meaningful target loadings; and (b) provided meaningful cross loadings on the task-involving or ego-involving climate factor. With this

evidence in mind, researchers have typically used the EDMCQ-C to examine the two higher-order factors. When adopting this approach, Appleton and Duda (2016) found that perceptions of an empowering climate were positively related to indicators of athlete well-being (e.g., enjoyment and global self-worth), while perceptions of a disempowering climate were positively related to indictors of athlete ill-being (e.g., symptoms of athlete burnout and physical ill-health).

Perfectionistic Climate and Established Motivational Climate Constructs

In situating the construct of perfectionistic climate alongside these well-established climate constructs, it is possible to identify key similarities and differences. In terms of areas of commonality, both an ego-involving climate and perfectionistic climate emphasise coach expectations (e.g., a requirement to outperform others), criticism (e.g., punishment for mistakes), conditional regard (e.g., recognition for more talented performers), and anxiousness (e.g., worry-conducive behaviour). The key distinction in all these cases is that perfectionistic climate emphasises behaviours that are more extreme. For example, rather than emphasising expectations that are high–or even very high–perfectionistic climate emphasises expectations that are rigid and unrealistically high. In terms of criticism, perfectionistic climate emphasises a particular style of criticism that is harsh, unreasonable, and unrelenting (e.g., punishment for all mistakes, no matter how small or inconsequential). This differs from the more typical or routine style of criticism captured by existing AGT-based coach climate models.

In terms of commonalities with SDT, both a controlling coach climate and perfectionistic climate involve the use of externally controlling contingencies (e.g., rewards and punishment) and manipulation of support and approval based on performance (e.g., conditional regard). The key distinction in both cases is that perfectionistic climate focusses on a narrower set of cues and behaviours that stress a requirement for perfection. For example, in existing models of controlling behaviour, the focus is on behaviours that pressure performers to feel, think, and behave in a particular way (Bartholomew et al., 2010). The distinction here is that perfectionistic climate focusses on controlling practices that pressure performers to feel, think, and behave *in line with a*

specific requirement for perfection. It is this level of specificity that transforms the controlling

behaviour relevant to SDT into controlling behaviours that are relevant to perfectionistic climate.

This transformation is relevant given that this emphasis on perfection is a distinguishing feature of

environments described in theory relating to the development of perfectionism (Flett et al., 2002;

Hewitt et al., 2017).

In comparison to established motivational climate constructs, perfectionistic climate

ultimately captures a sense of pressure that is altogether more extreme and specific to the

requirement for perfection. While this difference can be articulated on conceptual grounds, it is

important to establish evidence that the perfectionistic climate construct (and associated PCQ-S) is

indeed sufficiently distinct from near-neighbour constructs (and their associated measures). This is

a crucial issue that needs to be addressed when establishing the applicability of new psychometric

measures (Clark & Watson, 2019). In the present study, the focus will be on establishing the

construct validity of the PCQ-S in relation to well-established coach climate measures informed by

AGT and SDT. If evidence in support of the proposed conceptual distinction is supported, and

perfectionistic climate offers a viable alternative to existing climate approaches, differences

between climate measures should be evident in: (a) the degree to which the associated dimensions

are related to each other; and (b) the relative positions of each component in an associated network

diagram.

The Nomological Network and Construct Validity

The term *nomological network* was introduced by Cronbach and Meehl (1955) to describe

the theoretical relationships linking related constructs to each other. In this seminal paper, Cronbach

and Meehl (1955) identify that construct validity is concerned with whether the empirical relations

between test scores are consistent with the theoretical relations between the constructs they

represent (Preckel & Brunner, 2017). The key to assessing validity in this framework therefore

involves examining whether empirical data linking observations to each other (i.e., an empirical

network) matches the theoretical relationships laid forth within the nomological network of a given

construct. When there is agreement between the empirical and theoretical relations, support is provided for the validity of test score interpretations in terms of the nomological network (Borsboom et al., 2004). For example, Hewitt and Flett (1991) proposed that the nomological networks of self-oriented perfectionism, socially prescribed perfectionism, and other-oriented perfectionism should be distinguishable. They examined this empirically and found that each dimension of perfectionism was associated with a unique–and theoretically expected–pattern of outcomes. In this regard, the authors provided important validity information for the measure of perfectionism under investigation.

One issue that is relevant to scale development is whether the construct designed to be measured is distinguishable from similar constructs that already have established measures (Clark & Watson, 2019). Within the framework of construct validity outlined above, if a new measure is unique, the empirical relationships it shares with measures of similar constructs should reflect such distinctions. One statistical method that has traditionally been used to examine potential differences between scales designed to assess similar constructs is factor analysis. For example, Bianchi and Schonfeld (2018) examined whether the burnout symptom of exhaustion was statistically distinguishable from depressive symptomology using EFA. The authors found that items assessing exhaustion (from the Maslach Burnout Inventory-General; Maslach et al., 1997) and depression (from the Personal Health Questionnaire; PHQ-8; Kroenke et al., 2009) were best represented by one factor. This evidence raises issues regarding the redundancy of the constructs (and associated measures) under investigation. While this factor-analytical approach is appropriate for assessing the construct validly of psychometric measures, a more contemporary approach has recently emerged (Costantini et al., 2015; Epskamp et al., 2018a; Ziegler et al., 2013).

The method alluded to above is known as *network psychometrics* (Epskamp et al., 2018a). This approach involves computing a "network diagram" (Ziegler et al., 2013, p. 158). This network diagram provides a visualisation of the complex covariation between measures under investigation. In the estimated network, *nodes* (circles) are used to represent the measures (e.g., item or subscale

scores), whereas *edges* (lines connecting nodes together) are used to represent pairwise associations between measures (Epskamp & Fried, 2018). The resultant diagram is constructed such that measures that are more strongly associated with one another are more closely located in the estimated network. The colour, width, and saturation of the edges are also highly informative in terms of denoting relationship *direction* and *strength*. When this method is applied to measures of similar constructs, it is possible to visually evaluate how closely related different measures are to one another.

This capability was showcased by Ziegler et al. (2013) who used network psychometrics to evaluate the potential overlap between established measures of personality. In the diagram produced, several 'clusters' of personality measures emerged. For example, as one might expect, subscales measuring order and organisation were associated with each other and located closely together in the estimated network. This 'cluster' of personality facets was also relatively independent of clusters representing other unique aspects of personality (e.g., a cluster of subscales measuring anxiety). In this regard, the estimated network was useful in helping to identify key differences between measures of various facets of personality (e.g., support for the distinction between measures of anxiety *versus* order and organisation). However, importantly, the network was also useful in helping to identify measures that may share a high degree of overlap. For example, measures of perfectionism were closely associated with measures of order and organisation in the estimated network. This finding shows the that such measures may share a high degree of conceptual overlap. This finding makes sense given that a requirement for orderliness and perfect organisation are peripheral aspects of the perfectionism personality trait (Frost et al., 1990).

To provide a more objective and robust examination of network dimensionality, researchers can apply a technique known as exploratory graph analysis (EGA) to the network models they estimate (Golino et al., 2020). This technique helps researchers to identify the number of dimensions that best represent the psychological data modelled in an estimated network. For example, Christensen et al. (2019) used this technique on a network estimated based on data from

the Multidimensional Schizotypy Scale (Kwapil et al., 2018). The network diagram appeared (based on a visual inspection) to include three or four 'clusters' of nodes. The EGA was useful in that it provided confirmation that a four-factor (rather than a three-factor) structure best characterised the schizotypy network. An inspection of the nodes (i.e., measures) revealed that the dimensions represented positive schizotypy, two dimensions of negative schizotypy, and disorganised schizotypy. This result was important as it provided confirmation that positive, negative, and disorganised measures of schizotpy are unique and independent of one another. However, it also challenged this three-dimensional structure by providing evidence that negative schizotpy may be best characterised by two separate factors (i.e., measures capturing affective anhedonia *versus* social anhedonia).

Network Psychometrics in Sport

The use of network psychometrics has traditionally been used in areas of clinical, personality, and health psychology (Epskamp & Fried, 2018). However, researchers in sport have also started to apply this technique to analyse statistical relationships in psychological data. For example, Pons Bauzá et al. (2017) used a network analysis approach to examine the relationships between measures of stress appraisal, sport emotions, and various coping strategies. The researchers identified (using a visual inspection technique) three main clusters in the computed network diagram: a goal withdrawal cluster (including dejection, anger, venting of unpleasant emotions, disengagement, mental distraction, and social withdrawal items); a mastery zone cluster (including primary and secondary appraisal, excitement, happiness, effort expenditure, mental imagery, and thought control items); and an internal regulation cluster (including anxiety, logical analysis, thought control, relaxation, and seeking social support items). The authors concluded that these results provided support for a previously proposed three-factor classification of coping.

In a more recent study Mullen and Jones (2021) used a network analysis approach to examine the relationships between items measuring competitive state anxiety. Using EGA, the authors identified three dimensions in their computed network diagram. The first dimension

included cognitive anxiety items measuring worry about making mistakes, the uncertainty of what might happen, personal shortcomings, and being judged negatively by others. The second dimension included physiological items measuring somatic tension (e.g., experiencing tension headaches, physical nervousness, and body tenseness) and autonomic hyperactivity (e.g., experiencing tight chest, rapid heart rate, and tenseness in stomach). The final dimension included perceived control items (e.g., confidence in one's ability to cope and perform well). This analysis was useful in helping to provide support for a previously proposed three-factor classification of anxiety.

While there are only a few examples of network psychometrics in sport psychology, the technique may have important utility in this area of research. The important point to emphasise is that this technique has the potential to both compliment and extend traditional factor analytical techniques typically used to examine psychometric measures in this context. As highlighted by Flores-Kanter et al. (2021), network analysis (accompanied by EGA) offers several advantages over such traditional methods. This includes providing superior accuracy in estimating dimensionality in the presence of difficult conditions (e.g., high factor correlations, low number of indicators per factor, or weak factor loadings). In addition to this point, network-based assessments of dimensionality have the distinct advantage of providing a visual guide of dimensionality. That is, a network diagram shows which indicators cluster together and their level of association. With these advantages in mind, it may be timely for researchers to integrate network psychometrics into scale development and validation studies in sport.

The Present Research

The techniques described above may have great utility in helping to better understand the nomological network of relations between the PCQ-S and established measures of the coach-created climate. If there are key differences between the PCQ-S and existing measures, distinctions should be evident based on both traditional EFA and more contemporary network-based psychometric analyses. In the present study, the primary aim is therefore to provide an assessment of construct

validity by estimating the nomological network of relations between test scores on the PCQ-S and established coach climate measures. In line with this aim, an EFA was conducted to examine the structure underlying constructs within the nomological network of perfectionistic climate. Following this, a regularised partial correlation network was estimated to further examine dimensionality and explore areas of potential overlap between measures of different coach climate constructs within the nomological network. In addition to the primary aim, there were also two sub aims associated with this study. The first sub-aim was to provide an examination of the stability of the three PCQ-S measurement models tested in study one using a new and independent sample. The second sub-aim was to provide an initial exploratory examination of measurement invariance across age and gender groups.

Method

Participants

A convenience sample of 223 (183 males; 38 females; 2 missing; $M_{age} = 15.25$ years, $s = 1.90$; age range = 12–19) youth athletes recruited from sport clubs and schools in the United Kingdom provided the data for study four. The participants represented various team sports (e.g., football, cricket, hockey, rugby, netball, and basketball) and levels of competition (recreational = 27, club = 140, county = 18, regional = 15, semi-professional = 10, professional = 1, national = 4, international = 1, and missing = 7). On average, athletes had been competing in their sport for 7.51 years ($s = 3.68$), dedicated 7.61 hours ($s = 4.49$) to training and competition per week, and had been working with their current coach for 2.47 (s = 2.37) years. In comparison to other activities in their lives, athletes rated their sport as moderately-to-extremely important ($M = 7.49$, $s = 1.87$; 1 = *extremely unimportant* to 9 = *extremely important*).

Procedure

Following ethical approval from an institutional review board (see Appendix A.2), gatekeepers of secondary schools and youth sport organisations in the UK were contacted via e-mail and invited to participate in a study examining how youth sport participants think coaches behave in

the sport environment (see Appendix B.1). The lead researcher made data collection arrangements with all organisations expressing an interest in supporting the study. Data collection involved a member of the research group attending the sport club or school, providing potential participants with relevant information regarding the project, and inviting youth sport participants to complete a voluntary multi-item inventory (see Appendix C.2). In advance of data collection, parental/guardian consent was gained from the parents of youth sport participants who had volunteered to participate (see Appendix B.2). All participants also provided their informed consent prior to completing the below measures (see Appendix D.1).

Measurement

Perfectionistic Climate. The Perfectionistic Climate Questionnaire-Sport (PCQ-S) developed in chapter two was used to assess perfectionistic features of the social psychological in sport. This 20-item self-report scale assesses perceptions of five components of coaching behaviour central to perfectionistic climate in sport: expectations (EXP; 4-items, e.g., "The coach expects performances to be perfect"), criticism (CRIT; 4-items, e.g., "The coach criticises all mistakes no matter how small"), control (CTRL; 4-items, e.g., "The coach withholds rewards if performances are not perfect."), conditional regard (CR; 4-items, e.g., "The coach is less friendly when performances are not perfect"), and anxiousness (ANX: 4-items, e.g., "The coach is nervous that things will not go perfectly during performance"). Participants were instructed to think about the coach that they spend the most time with and rate their level of agreement or disagreement with each statement using a 5-point (1 = *strongly disagree* to 5 = *strongly agree*) Likert scale (see Appendix E.1). Evidence supporting the five-factor structure and scale reliability ($\alpha \geq .81$) of the PCQ-S is provided in chapter one.

Motivational Climate. The Motivational Climate Scale for Youth Sports (MCSYS; R. E. Smith et al., 2008) was used to assess features of the social psychological environment emphasised in AGT. This 12-item self-report scale captures perceptions of task-involving features (TASK; 6-items, e.g., "The coach encourages us to learn new skills.") and ego-involving features (EGO; 6-

items, e.g., "The coach pays most attention to the best players") of the motivational climate. Participants were instructed to think about the coach that they spend the most time with and rate their level of agreement or disagreement with each statement using a 5-point (1 = *not at all* to 5 = *very true*) Likert scale (see Appendix E.2). Researchers have provided evidence supporting the two-factor structure and scale reliability of the MCSYS ($\alpha \geq .78$; R. E. Smith et al., 2008).

In addition to the evidence of good factor structure and scale reliability, the MCSYS possesses two other important characteristics that factored into the scale selection process. The first point is that, in comparison to other AGT-based measures of coach climate (e.g., PMCSQ-2), the MCSYS items have a readability level of grade 4.0 or below (typically suitable for individuals 9-year-old and above; R. E. Smith et al., 2008). This means that the scale is more age-appropriate for young athlete samples. The second point was that, in comparison to other AGT-based measures of coach climate, the MCSYS is a shorter scale (12-item MCSYS *versus* 33-item PMCSQ-2). In these regards, the MCSYS was selected on the grounds that it is highly appropriate to the age and reading level of the athletes in the present study (especially the younger youth athletes) and to mitigate against participant fatigue or boredom when responding to the questionnaire inventory. These considerations are both relevant to data quality (Alcaraz et al., 2013).

Controlling Climate. The Controlling Coach Behaviours Scale (CCBS; Bartholomew et al., 2010) was used to capture controlling features of the social psychological environment emphasised in SDT. This 15-item scale captures perceptions of five facets of controlling coach behaviour: controlling use of rewards (CREW; 4-items, e.g., "My coach only rewards/praises me to make me train harder."), negative conditional regard (NCR; 4-items, e.g., "My coach pays me less attention if I have displeased him/her."), intimidation (INT; 4-items, e.g., "My coach shouts at me in front of others to make me do certain things."), and excessive personal control (EPC; 3-items, e.g., "My coach tries to control what I do during my free time."). Participants were instructed to think about the coach that they spend the most time with and rate their level of agreement or disagreement with each statement using a 7-point (1 = *strongly disagree* to 7 = *strongly agree*) Likert scale (see

Appendix E.3). Bartholomew et al. (2010) have provided evidence supporting the four-factor structure and scale reliability of the CCBS ($\alpha \geq .74$).

The process for selecting an SDT-based measure of controlling coach behaviour was quick and easy. While there have been other scales used to measure controlling coach behaviour in athletes (e.g., Pelletier et al., 2001; A. L. Smith et al., 2010a), the CCBS is the predominant measure of controlling coach behaviour in sport. One of the major strengths of the CCBS is that it was developed in accordance with theory. Specifically, guided by SDT-based models of interpersonally controlling behaviour, Bartholomew et al. (2009, 2010) identified five prominent controlling coach strategies (controlling use of rewards, negative conditional regard, intimidation, excessive personal control, and judging and devaluing). This taxonomy was used to guide the development of the CCBS. Through a systematic and robust factor analytical process, the final 15-item CCBS model (capturing four related, but distinct constructs of controlling behaviour) was developed. In this regard, the CCBS provides a comprehensive examination of the controlling practices athletes may be exposed to in sport.

Autonomy-Supportive Climate. The Sport Climate Questionnaire–Short Form (SCQ-SF) was used to capture autonomy-supportive features of the social psychological environment emphasised in SDT. The original SCQ is a 15-item scale based on the Health Care Climate Questionnaire (HCCQ; Williams et al., 1996). The SCQ-SF has been developed and used in research to capture perceived autonomy support (PAS) provided by the coach in sport (e.g., Felton & Jowett, 2012). The scale includes 6-items (e.g., "I feel that my coach provides me with choices and options."). Participants were instructed to think about the coach that they spend the most time with and rate their level of agreement or disagreement with each statement using a 7-point (1 = *do not agree at all* to 7 = *completely agree*) Likert scale (see Appendix E.4). Felton and Jowett (2012) have provided evidence for the scale reliability of the SCQ-SF ($\alpha = .92$).

The process of selecting an SDT-based measure of autonomy-supportive coach behaviour was also quick and easy. The SCQ-SF has a strong conceptual grounding given that it is based on

the HCCQ–one of the first dedicated SDT-based measures of perceived autonomy support. Not only

is the HCCQ still the most predominant SDT-based self-report measure of perceived autonomy

support in health care research, but it is also the basis on which several other domain specific

measures have been developed (e.g., Learning Climate Questionnaire; Williams & Deci, 1996). To

amend the HCCQ to sport, researchers amended items to focus on the role of the coach *rather than*

a health care provider. For example, Reinboth et al. (2004) developed a 7-item SCQ based on the

original 15-item HCCQ. While this 7-item version was initially used by researchers in sport (e.g.,

Adie et al., 2008), the two most predominant versions of the SCQ are a full 15-item version (e.g.,

Matosic & Cox, 2014) or a short-form 6-item version (e.g., Felton & Jowett, 2012). To reduce

participant burden, the short-form version was selected for this study.

Data Analysis

The study analyses were carried out using IBM Statistics SPSS 26.0, M*plus* 8.1, and *R*

version 3.5.0. The first stage of the analytical procedure involved cleaning the raw data (Tabachnick

& Fidell, 2014). Following this, descriptive statistics, bivariate correlations, and scale reliability

estimates were computed. These preliminary analyses were then followed by a series of primary

analyses.

EFA. The first primary analysis involved exploring a series of competing EFA models using

maximum likelihood (ML) estimation in M*plus* 8.1 (Muthén & Muthén, 1998-2017). Specifically,

the factor structure underpinning the PCQ-S, MCSYS, CCBS, and SCQ-SF subscales was explored

in line with common recommendations (Fabrigar & Wegener, 2012). In line with the EFA

conducted in study one, factor retention was explored using eigenvalues, goodness of fit statistics

for competing models (one-factor *versus* two-factor *versus* three-factor model), and solution

interpretability. This approach highlights the importance of considering both relevant theory and

statistical criterion when considering the appropriate number of factors to retain. The factor

solutions were assessed based on the magnitude of parameter estimates (≥ .30 was considered

meaningful), degree of cross loading (the number of indicators loading meaningfully on more than

one factor), and solution interpretability (Morin et al., 2020). The model fit information and factor

correlations were evaluated in relation to the same criteria and cut-off values identified in study one.

Regularised Partial Correlation Network. The second primary analysis involved

estimating a regularised partial correlation network using the *R* package *qgraph* (Epskamp et al.,

2012). In the current application of this technique, a network of coach climate variables was

estimated using partial correlation coefficients (Epskamp & Fried, 2018). This means that the

resultant network includes nodes (circles) that represent different coach climate variables and edges

(lines connecting nodes together) that represent associations between variables after controlling for

all other variables in the network.

To limit the number of potentially spurious edges included in the final model, the least

absolute shrinkage and selection operator (LASSO; Tibshirani 1996) was used to limit the sum of

absolute partial correlation coefficients. This regularisation technique shrinks all partial correlations

and constructs a sparse network in which likely spurious associations are excluded (i.e., some

partial correlations are shrunk to exactly zero; see Epskamp & Fried, 2018). The edges not

identified to be exactly zero can therefore be considered sufficiently strong to be included in the

estimated network (Epskamp et al., 2018b). This approach functions well in retrieving the true

network structure and is particularly useful for dealing with relatively small datasets when

estimating psychological networks (Costantini et al., 2015; Epskamp & Fried, 2018).

Once a psychological network is constructed there are several analyses that can be applied to

examine global structure and local patterns within the network (Costantini et al., 2015). In the

present study, the: (a) overall dimensionality of the network; and (b) associations between specific

pairs of nodes were examined. To examine network dimensionality, EGA (Golino et al., 2020) was

conducted in line with the recommendations and *R* code provided by Christensen et al. (2020). EGA

has been found in simulation studies to yield comparable or improved accuracy in identifying

dimensionality in comparison to traditional factor analytical techniques (Golino et al., 2020). To

examine the associations between specific pairs of nodes, the edge weights (i.e., regularised partial

correlation coefficients) of each association in the estimated network were computed and reported.

This provided evidence pertaining to the relative strength of each retained edge weight.

CFA, ESEM, and ESEM-within-CFA. The third primary analysis involved examining the

stability of the five-factor 20-item PCQ-S identified in chapter one using the independent chapter

two data set. In line with the analyses conducted in chapter two, three alternative measurement

models were examined: (a) first-order CFA model; (b) first-order ESEM model; and (c) hierarchical

ESEM model. These models were evaluated against the same criteria and cut-off values identified

in study one.

Measurement Invariance. The final primary analysis involved testing the first-order

ESEM model of the PCQ-S for measurement invariance across meaningful subgroups defined based

on their gender and age. This testing procedure was adopted as it provides a robust test of model

generalisability and generates important statistical information regarding the applicability of making

gender- and age-based comparisons in future research. To provide the data needed to examine

measurement invariance, one combined dataset ($N = 710$) was created. This data set was comprised

of data from chapter two ($N = 487$) and the independent sample used in the present chapter ($N =$

223).

In line with the approach to evaluating measurement invariance adopted by Jin (2020), three

nested first-order ESEM models were examined to evaluate two aspects of measurement invariance

per multi-group analysis: metric invariance (i.e., invariance of factor loadings) and scalar invariance

(i.e., invariance of factor loadings and thresholds). The first model (i.e., configural model) freely

estimates factor loadings and thresholds without equality constraints between groups while holding

configural invariance. The second model (i.e., metric model) freely estimates thresholds between

groups while constraining factor loadings to be equal between groups. Finally, the third model (i.e.,

scalar model) constrains both factor loadings and thresholds to be equal between groups. In all three

models, one reference indicator per factor was selected for the purposes of model identification. The

thresholds of the reference indictor were constrained to be equal between groups in each of the three

models. The WLSMV estimator and oblique target rotation with delta parameterisation were used to analyse each model.

Using the combined dataset, measurement invariance across the two independent samples was initially examined. In line with the primary aim, measurement invariance of the first-order ESEM model across gender (male = 407; female = 298; total N = 705) and age ($\leq$ 14 years = 360; $\geq$ 15 years = 349; total N = 709) groups was then examined. In each assessment, the first stage involved examining the overall fit of each specified model using the fit indices and corresponding criteria identified in study one. In the second stage, metric invariance and scalar invariance were evaluated by reviewing differences in CFI (ΔCFI), TLI (ΔTLI), and RMSEA (ΔRMSEA) between nested models. To assess metric invariance (i.e., metric versus configural model) and scalar invariance (i.e., scalar versus metric model), cut-off values identified based on Jin's (2020) simulation study were used as an evaluative guide: metric non-invariance (ΔCFI > -.003, ΔTLI > -.004, and ΔRMSEA > +.014) and scalar non-invariance (ΔCFI > -.001, ΔTLI > -.001, and ΔRMSEA > +.005).

Results

Preliminary Analyses

Data Cleaning. The initial missing value analysis indicated that there were 174 complete cases and 49 cases with at least one item non-response. Cases with item non-response that exceeded the 5% threshold (n = 9) were removed from any further analyses. Item non-response for the remaining cases with missing data was minimal (M = 1.25, s =.44, range = 1 to 2 items). Little's missing completely at random (MCAR) test revealed that the remaining missing data could not be characterised as MCAR (χ^2 = 1729.40, df = 1550, p = .00). However, an examination of the missing value patterns indicated that there was no systematic reason for the remaining missing data. This was evident from the high ratio of missing data patterns in relation to the number of participants with missing data (ratio = .75; McKnight et al., 2007). The remaining cases with missing data were

computed using the mean of non-missing items from corresponding subscales (Graham et al., 2003).

Subscales were then computed and screened for univariate and multivariate outliers. Standardized z-scores greater than +/- 3.29 ($p < .001$, two-tailed) served as the indicator for univariate outliers, whereas a Mahalanobis distance greater than $\chi^2 (12) = 32.91$ ($p < .001$) was used as the criteria to identify multivariate outliers. These evaluations resulted in three further cases being removed from the study ($n = 211$; male $n = 173$; female $n = 37$; $M_{age} = 15.23$; $s = 1.92$). Skewness and kurtosis values were then analysed. All variables were considered approximately univariate normal (absolute skewness values = .03 to .99; absolute kurtosis values = .01 to .98). Mardia's normalised coefficient for multivariate kurtosis was 3.06, indicating that the data used in the subsequent network analysis satisfies the assumption of multivariate normality. The final stage of this procedure involved assessing the reliability of all scales. In line with recent recommendations for estimating scale reliability, McDonald's omega (ω) was adapted over the more traditional Cronabach's alpha (α). The ω estimates and corresponding 95% confidence intervals were calculated in M*plus* 8.1 (see Hayes & Coutts, 2020).

Descriptive Statistics, Bivariate Correlations, and Scale reliability. The descriptive statistics and bivariate correlation estimates are displayed in Table 5. The bivariate correlations show that each of the five PCQ-S components shared positive relationships with the disempowering coach climate subscales. The only exception to this was the non-significant relationship between the criticism component of the PCQ-S and the EPC subscale of the CCBS. By contrast, the five PCQ-S components shared either negative or non-significant relationships with the empowering coach climate subscales. In line with previous research, the disempowering climate subscales shared mainly inverse relationships with the empowering subscales (Appleton et al., 2016). The scale reliability estimates and corresponding 95% confidence intervals for each subscale are also reported in Table 5 (ω = .68 to .90).

Table 5. Descriptive statistics, bivariate correlations, edge weights, and reliability estimates.

Subscale	M	s	ω [95% CI]	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. EXP (PCQ-S)	2.79	0.98	.88 [.85, .90]		.29	.11	.23	.07	– –	.15	.08	– –	– –	– –	– –
2. CRIT (PCQ-S)	2.73	0.81	.74 [.68, .80]	.57***		.06	.03	.23	– –	.04	– –	.06	– –	– –	.02
3. CTRL (PCQ-S)	2.15	0.81	.74 [.68, .79]	.51***	.45***		.20	.20	-.10	– –	.14	– –	.22	– –	-.01
4. CR (PCQ-S)	3.12	0.90	.84 [.80, .87]	.57***	.45***	.56***		.22	– –	.06	– –	.09	– –	– –	-.01
5. ANX (PCQ-S)	2.67	0.71	.74 [.67, .79]	.49***	.53***	.54***	.55***		– –	.01	.01	.04	.01	– –	– –
6. TASK (MCSYS)	4.15	0.60	.75 [.69, .81]	-.10	-.11	-.29***	-.11	-.11		-.04	.07	– –	-.02	-.04	.42
7. EGO (MCSYS)	2.47	0.72	.68 [.54, .75]	.47***	.38***	.40***	.43***	.37***	-.23**		.10	.28	.08	.00	– –
8. CREW (CCBS)	3.50	1.24	.80 [.73, .85]	.40***	.25***	.45***	.35***	.34***	.03	.45***		.24	.01	.08	– –
9. NCR (CCBS)	3.23	1.29	.86 [.82, .89]	.34***	.39***	.41***	.46***	.41***	-.23**	.60***	.55***		.28	.12	-.06
10. INT (CCBS)	2.63	1.29	.82 [.77, .86]	.25***	.31***	.54***	.32***	.38***	-.27***	.48***	.43***	.64***		.37	– –
11. EPC (CCBS)	2.24	1.32	.86 [.81, .90]	.15*	.10	.38***	.16*	.16*	-.30***	.37***	.38***	.52***	.64***		-.17
12. PAS (SCQ-SF)	5.15	1.08	.90 [.87, .92]	-.07	.01	-.25***	-.21**	-.14*	.55***	-.21**	-.04	-.30***	-.30***	-.39***	

Note. Values below the diagonal are bivariate correlations; Values above the diagonal are edge weights (regularised partial correlation coefficients) from the regularised partial correlation network analysis (see Figure 1); Missing values (– –) indicate the LASSO estimation shrunk the partial correlation to exactly "0"; PCQ-S = Perfectionistic Climate Questionnaire-Sport; EXP = Expectations; CRIT = Criticism; CTRL = Control; CR = Conditional regard; ANX = Anxiousness; MCSYS = Motivational Climate Scale for Youth Sports; Task = Task-involving climate; EGO = Ego-involving climate; CCBS = Controlling Coach Behaviour Scale; CREW = Controlling use of rewards; NCR = Negative conditional Regard; INT = Intimidation; EPC = Excessive personal control; SCQ-SF = Sport Climate Questionnaire; PAS = Perceived autonomy support; $N = 211$. *$p < .05$; **$p < .01$; ***$p < .001$, two-tailed.

Table 6. Geomin rotated loadings and factor correlations for the three-factor EFA model.

	F1	F2	F3
1. Expectations (PCQ-S)	**.79* (0.08)**	-.04 (0.10)	-.01 (0.03)
2. Criticism (PCQ-S)	**.69* (0.08)**	.00 (0.10)	.04 (0.09)
3. Control (PCQ-S)	**.49* (0.09)**	.28* (0.10)	-.15 (0.10)
4. Conditional Regard (PCQ-S)	**.74* (0.05)**	.00 (0.05)	-.11 (0.12)
5. Anxiousness (PCQ-S)	**.67* (0.09)**	.06 (0.11)	-.05 (0.11)
6. Ego-involving (MCSYS)	.22* (0.09)	**.53* (0.09)**	.04 (0.08)
7. Controlling use of Rewards (CCBS)	.03 (0.07)	**.74* (0.10)**	<u>.37* (0.11)</u>
8. Negative Conditional Regard (CCBS)	-.01 (0.04)	**.84* (0.05)**	.10 (0.09)
9. Intimidation (CCBS)	-.18 (0.10)	**.94* (0.08)**	.05 (0.07)
10. Excessive personal control (CCBS)	<u>-.43* (0.11)</u>	**.96* (0.11)**	-.04 (0.07)
11. Task-involving (MCSYS)	-.10 (0.11)	.00 (0.01)	**.71* (0.09)**
12. Perceived Autonomy Support (SCQ-SF)	-.01 (0.02)	-.12 (0.16)	**.71* (0.15)**
Eigenvalues	5.00	1.80	1.20
Geomin factor correlations F1		.63	-.03
F2			-.40

Note. Bold typeface denotes meaningful loading (≥ .30) on target factor; Underlined typeface denotes meaningful cross-loading (≥.30) on non-target factor; PCQ-S = Perfectionistic Climate Questionnaire-Sport; EXP = Expectations; CRIT = Criticism; CTRL = Control; CR = Conditional regard; ANX = Anxiousness; MCSYS = Motivational Climate Scale for Youth Sports; EGO = Ego-involving climate; CCBS = Controlling Coach Behaviour Scale; CREW = Controlling use of rewards; NCR = Negative conditional Regard; INT = Intimidation; EPC = Excessive personal control; Task = Task-involving climate; SCQ-SF = Sport Climate Questionnaire-Short Form; PAS = Perceived autonomy support. N = 211; Standard errors reported in parentheses; * p < .05.
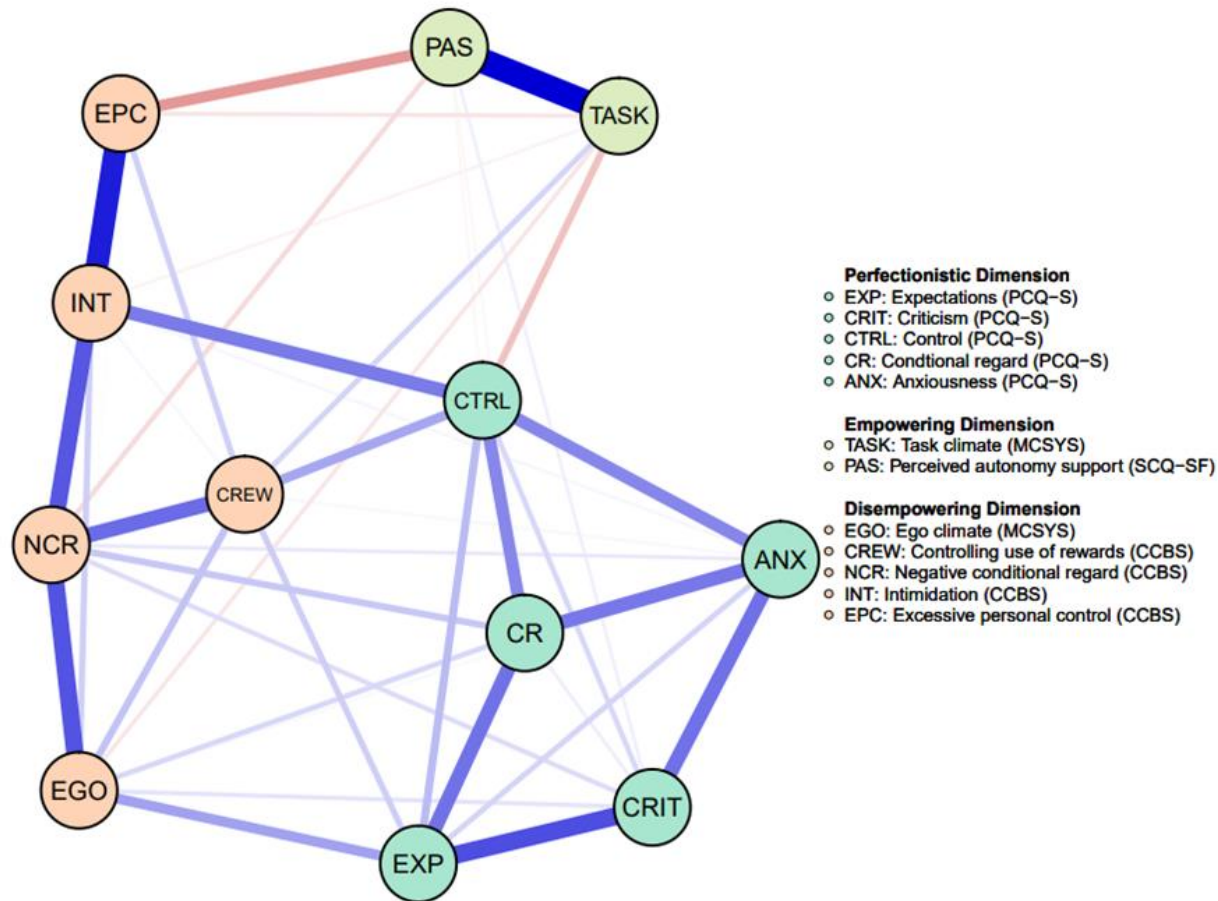
Figure 1. Regularised partial correlation network. *Note*. The network contains coach climate nodes (i.e., variables) from the Perfectionistic Climate Questionnaire-Sport (PCQ-S), Motivational Climate Scale for Youth Sports (MCSYS), Controlling Coach Behaviour Scale (CCBS), and Sport Climate Questionnaire-Short Form (SCQ-SF). Blue lines represent positive associations; red lines represent negative associations; The width and saturation of an edge represent the strength of the association.

Primary Analyses

EFA. The EFA procedure revealed that the most interpretable solution consisted of three factors. This model yielded three eigenvalues with a magnitude greater than one (eigenvalues = 5.00 to 1.20) and provided significantly better fit than the alternative models examined (χ^2 = 113.40***, df = 33, CFI = .93, TLI = .85, RMSEA = .11 [.09, .13], SRMR = .03). In this model, well-defined factors reflecting perfectionistic, empowering, and disempowering features of the coach climate were evident (see Table 6). This was demonstrated through meaningful factor loadings for each coach climate variable on their respective factor (λ = .49 to .96) and minimal cases of meaningful cross loading (only one case out of a possible 24). In this case, the coach climate variable provided a stronger loading on the expected factor (expected λ = .74; unexpected λ = .37).

Regularised Partial Correlation Network. The regularised partial correlation network is displayed in Figure 1. The network features 12 nodes and 43 edges (65% of all possible associations). The LASSO regularisation technique resulted in 23 of the possible 66 edges being removed (35% of all possible associations were shrunk to exactly zero). The EGA identified that this network contained three dimensions. In line with the EFA solution identified in Table 6, the dimensions identified reflect perfectionistic (dimension one: five PCQ-S components), disempowering (dimension two; five disempowering coach climate subscales), and empowering (dimension three; two empowering coach climate subscales) features of the coach climate. The nodes within each dimension were fully connected (i.e., no edges were shrunk to exactly zero; see Table 5) and located closely to one another in the estimated network

The edge weights (regularised partial correlation coefficients) included in the estimated network are reported in Table 5. The estimated network features 35 positive edges and eight negative edges. The strongest association (r = .42) in the network was between the TASK and PAS nodes. These two empowering coach climate nodes were typically negatively related to the

disempowering coach climate nodes in the network. For example, PAS was negatively associated with EPC ($r = -.17$) and NCR ($r = -.06$), while TASK was negatively associated with EGO ($r = -.04$), INT ($r = -.02$), and EPC ($r = -.04$). In the network, the nodes belonging to the perfectionistic dimension (expectations, criticism, control, conditional regard, and anxiousness) shared stronger and more frequent edges with nodes belonging to the disempowering dimension in comparison to nodes belonging to the empowering dimension. Specifically, expectations was positively associated with EGO ($r = .15$) and CREW ($r = .08$), criticism was positively associated with EGO ($r = .04$) and NCR ($r = .06$), control was positively associated with CREW ($r = .14$) and INT ($r = .22$), conditional regard was positively associated with EGO ($r = .06$) and NCR ($r = .09$), and anxiousness was positively associated with EGO ($r = .01$), CREW ($r = .01$), NCR ($r = .04$), and INT ($r = .01$).

CFA, ESEM, and ESEM-within-CFA. The three models examined provided support for the stability of the 20-item five-factor PCQ-S. Specifically, in line with the findings from study one, all three models provided good fit to the data (see Table 7). The findings were also consistent in that the first-order ESEM model provided superior model fit in comparison to the first-order CFA model. In terms of parameter estimates, both models provided support for the 20-item five-factor PCQ-S. With the first-order CFA model, support was evident given that all factor loadings were significant ($p < .001$) and meaningful ($\lambda \geq .42$). With the first-order ESEM model, support was evident based on the high percentage of meaningful ($\lambda > .30$) target factor loadings (95% of cases) and small percentage of meaningful non-target factor loadings (only 7.5% of cases). In terms of the hierarchical ESEM model, support for a hierarchical perfectionistic climate construct accounting for the covariation among the five first-order PCQ-S factors was again evident. This support was evident in that well-defined factors for the five PCQ-S components were evident. This was demonstrated in the high percentage of meaningful ($\lambda > .30$) target factor loadings (90% of cases) and small percentage of meaningful non-target factor loadings (only 5% of cases). In this model, all second-order factor loadings were also meaningful ($\lambda \geq .51$).

Table 7. Goodness of fit statistics for CFA and ESEM, and invariance measurement model.

	WLSMV χ2 (*df*)	CFI	TLI	RMSEA	RMSEA 90% CI	SRMR	ΔCFI	ΔTLI	ΔRMSEA
CFA and ESEM Models									
First-order CFA	384.12*** (160)	.947	.937	.079	[.069, .089]	.055	– –	– –	– –
ESEM	180.14*** (100)	.981	.964	.060	[.046, .074]	.028	– –	– –	– –
Hierarchical ESEM	171.71*** (105)	.984	.971	.053	[.038, .067]	.028	– –	– –	– –
Invariance Models									
	Sample Invariance (Initial Development Sample = 487; Independent Study Four Sample = 223; Total *N* = 710)								
Configural	540.61*** (260)	.984	.977	.055	[.049, .062]	.026	– –	– –	– –
Metric	855.98*** (335)	.971	.967	.066	[.061, .072]	.040	-.013	-.010	+.011
Scalar	872.10*** (350)	.970	.968	.065	[.059, .070]	.040	-.001	+.001	-.001
	Gender Invariance (Male = 407; Female = 298; Total *N* = 705)								
Configural	478.47*** (260)	.987	.981	.049	[.042, .056]	.024	– –	– –	– –
Metric	608.49*** (335)	.984	.982	.048	[.042, .054]	.034	-.003	+.001	-.001
Scalar	628.95*** (350)	.984	.982	.048	[.042, .053]	.034	.000	.000	.000
	Age Invariance (≤ 14 years = 360; ≥ 15 years = 349; Total N = 709)								
Configural	431.75*** (260)	.990	.985	.043	[.036, .050]	.021	– –	– –	– –
Metric	566.86*** (335)	.986	.984	.044	[.038, .050]	.031	-.004	-.001	+.001
Scalar	609.34*** (350)	.984	.983	.046	[.040, .052]	.032	-.002	-.001	+.002

Note. EFA = Exploratory factor analysis; CFA= Confirmatory factor analysis; ESEM = Exploratory structural equation modelling; *df* = Degrees of freedom; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root mean square error of approximation; CI = Confidence interval; SRMR = Standardised root mean square residual; ESEM models were estimated with target oblique rotation; *** $p < .001$; ** $p < .01$; * $p < .05$.

Measurement Invariance. The goodness of fit statistics for all invariance models are reported in Table 7. In terms of measurement invariance across independent samples, the three increasingly restrictive models provided a good level of fit. In terms of the specific cut-off values identified, support for metric invariance was provided by ΔRMSEA (+ .010). By contrast, support for scalar invariance was provided by ΔCFI (-.001), ΔTLI (+.001), and ΔRMSEA (-.001). The two scores that exceeded the specific cut-off values for metric invariance either approximated (ΔCFI = .013) or satisfied (ΔTLI = .009) more traditional criteria often applied in tests of measurement invariance (i.e., non-invariance reflected by ΔCFI and ΔTLI > .010; F. F. Chen, 2007). While the applicability of traditional cut-off values is unclear for assessing measurement invariance in this type of analysis, they have been found to show some sensitivity to metric non-invariance with first-order ESEM models that have a small or medium degree of cross-loading (Jin, 2020). With this in mind, the two samples were combined for the purpose of testing gender and age invariance.

In terms of measurement invariance across gender groups, the three increasingly restrictive models provided good fit. In terms of the specific cut-off values identified, support for metric invariance was provided by ΔCFI (-.003), ΔTLI (+.001), and ΔRMSEA (-.001). Similarly, support for scalar invariance was provided by ΔCFI (.000), ΔTLI (.000), and ΔRMSEA (.000). In sum, this evidence shows that the PCQ-S model operates equivalently across the two identified gender groups.

In terms of measurement invariance across age groups, the three increasingly restrictive models provided a satisfactory level of fit. In terms of the specific cut-off values identified, support for metric invariance was provided by ΔTLI (-.001) and ΔRMSEA (+.001). Similarly, support for scalar invariance was provided by ΔTLI (-.001) and ΔRMSEA (+.002). The ΔCFI values used to assess metric invariance (-.004) and scalar invariance (-.002) only marginally exceeded the specific cut-off values identified. With this in mind, there is sufficient evidence that the PCQ-S model operates equivalently across the two age groups.

Discussion

Guided by the nomological network conceptualised in the model of perfectionistic climate, the aim of the present study was to examine whether coach climate features assessed by the PCQ-S can be clearly delineated from the coach climate features emphasised by neighbouring AGT and SDT coach climate measures. The structure underlying the set of climate variables under investigation in the present study was initially examined using EFA. This traditional approach was also supplemented by a more novel psychometric approach to examining dimensionality. Specifically, a regularised partial correlation network was estimated to provide a visualisation of the complex covariation and empirical relations between the same set of coach climate variables.

Perfectionistic Climate and Established Motivational Climate Constructs

The findings of the EFA suggest that three distinct coach climate dimensions can be extracted from the data obtained using the PCQ-S, MCSYS, CCBS, and SCQ-SF. These three dimensions were considered to reflect perfectionistic, empowering, and disempowering features of the coach climate. This factor structure provides support for the integration of AGT and SDT climate features specified within Duda's (2013) hierarchical model of coach-created motivational climate. Specifically, the ego-involving dimension of the MCSYS and controlling subscales of the CCBS provided strong and meaningful loadings on a disempowering factor, whereas the task-involving dimension of the MCSYS and SCQ-SF measure of perceived autonomy support provided strong and meaningful loadings on an empowering factor. This evidence compliments previous research that integrates items capturing these coach climate dimensions into two higher-order dimensions representing empowering and disempowering coach climate factors (Appleton & Duda, 2016).

In line with the conceptual distinctions outlined in the introduction to this chapter, the extracted factor structure also provided support for the distinction between perfectionistic subscales of the PCQ-S and disempowering subscales of the MCSYS and CCBS. While the perfectionistic and disempowering factors were moderately related, their inter-factor correlation provided support

for discriminant validity (Brown, 2015). Thus, while there may be areas of conceptual overlap, the dimensions of perfectionistic climate are sufficiently distinct from the well-established disempowering climate dimensions examined. This is a crucial finding that supports the applicability of the perfectionistic construct and associated PCQ-S (Clark & Watson, 2019). One potential way of interpreting the key distinction is in terms of how an athlete experiences the coach-created perfectionistic climate. The key points to emphasise are that: (a) a climate that is disempowering is not necessarily experienced as being perfectionistic; and (b) a climate that is perfectionistic is experienced differently than a climate that is disempowering. In terms of this latter point, the key *difference* may be that a perfectionistic climate is experienced as being altogether more extreme. This is a theme that will be expanded on throughout this discussion.

The next step in the current study involved estimating a regularised partial correlation network of coach climate variables. Network analysis offers a novel psychometric approach to identifying the empirical relations between measures of constructs within an identified nomological network (e.g., Ziegler et al., 2013). This technique appears most commonly in areas of clinical, personality, and health psychology (Epskamp & Fried, 2018). However, the present study offers one of the first applications of this technique in the field of sport psychology (see also Pons Bauzá et al., 2017). The advantage of using this technique in the current study is that the estimated network provides a visualisation of the complex covariation and empirical relations among the set of coach climate measures under investigation. In terms of the network diagram generated in the present study, it was apparent (based on a visual inspection) that three clusters of nodes emerged. These clusters reflected the same three factors identified in the EFA analysis.

Once the network diagram was estimated, it was important to provide a more objective and robust examination of network dimensionality using EGA. This technique provided confirmation that the coach climate data modelled in the estimated network is best represented by three dimensions. In line with the EFA results (and visual inspection of the network diagram), the nodes (i.e., measures) in each identified dimension were representative of perfectionistic, empowering,

and disempowering coach climate features. Taken together, the findings from the EFA and network analysis emphasise that the PCQ-S functions differently from the AGT-based and SDT-based measures of coach climate. It was conceivable that the PCQ-S dimensions might have loaded on and broadened the range of disempowering coach behaviours specified in Duda's (2013) hierarchical model of coach climate. However, this was not the case across the two analyses conducted in this study. In this sense, the findings stand to emphasise that an environment that is motivationally disempowering may be experienced differently from an environment that is shaped by perfectionistic coach behaviour.

The final step of the network analysis involved examining local patterns of relationships within the estimated network. This was done to help identify climate features assessed by neighbouring measures that may be experienced simultaneously by athletes. In relation to AGT, the expectations, criticism, conditional regard, and anxiousness components of the PCQ-S shared positive relationships with the ego-involving dimension of the MCSYS. These relationships were considered to reflect commonalities in the content and behaviour of each climate variable. In line with prominent ego-involving climate features emphasised by Duda et al. (2014), the PCQ-S components are similar in that they emphasise the demonstration of normative ability (expectations), punishment for mistakes (criticism), recognition for more talented performers (conditional regard), and concerns about failure (anxiousness).

The weakest relationship between the PCQ-S and ego-involving dimension of the MCSYS involved anxiousness. This finding is interesting as anxiousness shares commonalities with the worry-conducive dimension of an ego-involving climate. In a worry-conducive climate, young people think that key social agents are worried about them making mistakes and not performing as well as others (White et al., 1992). This type of climate experience therefore shares a similar focus to the anxiousness component which reflects the perception that key social agents are extremely worried and vigilant about mistakes and the consequences of others not performing perfectly. One reason for the relatively weaker relationship in the estimated network is that the MCSYS does not

include items tapping directly into worry-conducive behaviour. A focus on others as worried, nervous, and anxious about mistakes is unique to AGT-based models of the parental motivational climate in sport (e.g., White et al., 1992).

While the relationships identified above show some level of conceptual overlap between the PCQ-S and the ego-involving dimension of the MCSYS, it is important to reiterate that their corresponding climate variables belong to separate dimensions in the estimated network. There are several key distinctions to draw between the corresponding variables of these two measures. In terms of expectations, perfectionistic climate focusses on a requirement for unrealistically high standards *rather than* simply high, very high–or even exceptionally high–performance standards. In the case of criticism, perfectionistic climate focusses on a style of criticism that is unreasonable, harsh, and unrelenting *rather than* more routine or typical. In terms of conditional regard, perfectionistic climate focusses on the reward of approval based on the attainment of unrealistically high standards *rather than* simply outperforming others. Finally, in the case of anxiousness, perfectionistic climate focusses on a style of worry and vigilance that is extreme and reflects concerns over even the smallest of mistakes. This, once again, *differs from* the more routine level of concern characteristic of an ego-involving climate. The important point to note is that all these characteristics were used to help guide the development of the PCQ-S items in chapter two. In this regard, there is good reason to believe that the differences identified in the present study are reflective of such distinctions.

In relation to SDT, the control component of the PCQ-S shared positive relationships with the controlling use of rewards and intimidation subscales of the CCBS. These relationships may reflect commonalities in the content and behaviour emphasised within these climate variables. In line with controlling climate features emphasised by Bartholomew et al. (2010), the control component of the PCQ-S reflects controlling strategies that involve the manipulation of external rewards and threat of punishment. This pattern of relationships may indicate that the externally controlling strategies captured by the control component of the PCQ-S are likely to be experienced

by athletes as highly intimidating. A further positive relationship relevant to SDT was between the conditional regard component of the PCQ-S and the negative conditional regard component of the CCBS. This relationship was expected due to a shared focus on the contingent reward of approval, recognition, and support (Bartholomew et al., 2010).

Once again, while these relationships show some level of conceptual overlap between the PCQ-S and the controlling subscales of the CCBS, their corresponding coach climate variables belonged to separate dimensions in the estimated network. There are several key distinctions to draw between the corresponding variables of these two measures. In terms of control, perfectionistic climate focusses on externally controlling strategies (e.g., threats, punishments, and rewards) that stress a requirement for perfection (and nothing less). This differs from the more general use of rewards and praise to get athletes to stay focussed, keep on task, and train harder (Bartholomew et al., 2011). In terms of conditional regard, SDT-based models focus on reduced coach support when the coach is *disappointed*. The key distinction in perfectionistic climate is that the specific incident which causes such disappointment and displeasure is non-perfect performance. That is, the reward of approval is based specifically on the attainment (or non-attainment) of unrealistically high standards. In sum, perfectionistic climate focusses on controlling practices that pressure performers to feel, think, and behave *in line with a specific requirement for perfection*. This level of specificity was captured during the item generation process in chapter two. In this regard, there is, once again, good reason to believe that the differences identified in the present study are reflective of such distinctions.

The estimated network also included several other relationships that provide important information regarding the PCQ-S. For example, the expectations component of the PCQ-S shared a positive relationship with the controlling use of rewards subscale of the CCBS. This relationship suggests that experiences of unrealistic expectations for perfect performance from the coach may co-occur with perceptions that the coach uses rewards as a controlling strategy (Bartholomew et al., 2010). This relationship may indicate that the extent to which the coach is considered to demand

perfect performance is at least partly based on the performance contingent rewards that they emphasise in their coaching practice. In the estimated network, the criticism and anxiousness components of the PCQ-S were both positively related to the negative conditional regard subscale of the CCBS. These relationships may indicate that the extent to which the coach is perceived to be critical and anxious about non-perfect performances may be at least partly influenced by the level of recognition, approval, and support that the coach provides following poor performances.

A Note on Factor Stability and Measurement Invariance

In the previous chapter, evidence was provided supporting the factor structure of the PCQ-S. This included evidence supporting the applicability of a first-order five-factor model (based on the first-order CFA and first-order ESEM models) and a hierarchical model (based on the hierarchical ESEM model). An important point to note is that the evidence for each of these models was based on data provided by the same sample of youth athletes. This is important to note as the stability of model specifications across samples is an important test of model applicability (Fabrigar & Wegener, 2012). If the models are viable, researchers should find a replicable pattern of parameter estimates across multiple tests. In the present study, to provide an examination of factor stability, the three model specifications listed above were therefore tested using the PCQ-S data unique to the current chapter. The results provided further support for the applicability of all three models. In each case, model fit was satisfactory and the pattern of parameter estimates provided support for the five-factor structure of the PCQ-S. This suggests that the evidence presented in the previous chapter is not sample-specific (i.e., based on the characteristics are idiosyncrasies inherent to that specific group of athletes).

In addition to examining the factor stability of alternative measurement models, an important aim in the present study was to examine the measurement invariance of the PCQ-S. In line with previous psychometric scale validation studies, the aim was to evaluate whether the scale operates equivalently across different age (older *versus* younger youth athletes) and gender (male *versus* female athletes) groups (Checa et al., 2021; Crocker et al., 2018; Gucciardi et al., 2011). This

type of assessment is important as many studies in sport psychology are focussed on comparing groups of athletes in relation to specified constructs (e.g., perfectionism scores in male *versus* female athletes; Haase et al., 2002). An important prerequisite to such research is that the measures used operate equivalently across the specified groups (Marsh et al., 2014; Schellenberg et al., 2014). In the current study, and in-line with this requirement, important initial evidence was presented for the equivalence of the PCQ-S across the two sets of groups identified. This initial evidence is important for researchers wishing to make group-based comparisons on PCQ-S data provided by youth athletes who differ in relation to age and gender.

In terms of the other climate measures examined in this chapter, all have demonstrated evidence of model stability across samples. This is evident with the MCSYS (Elsborg et al., 2022; R. E. Smith et al., 2008); CCBS (Bartholomew et al., 2010; Hodge et al., 2013), and SCQ-SF (Hein & Jõesaar, 2015; Lim & Wang, 2009). However, when it comes to measurement invariance, only the CCBS has been tested for model stability across specific groups of athletes. In the initial validation study for the CCBS, using a multi-sample CFA approach, Bartholomew et al. (2010) found evidence that the scale operated equivalently across gender (male *versus* female) and sport type (team *versus* individual sport). This evidence on the CCBS and other climate scales helps to: (a) showcase the robustness of the processes employed in the validation of the PCQ-S; and (b) direct ongoing validation practice. For example, as per the studies highlighted above, it will be important to establish consistent evidence of factorial validity and provide tests of measurement invariance across important groups in sport (e.g., team *versus* individual sport).

Critical Reflection

One of the most important themes articulated throughout this thesis is that the psychological construct of perfectionistic climate is a sufficiently important and distinct construct to justify scale development. In the conceptualisation of perfectionistic climate, it was important to think about and clearly articulate how the construct is distinguishable from established climate constructs. In the present chapter, this involved articulating the hypothesised overlap and distinctiveness of

perfectionistic climate in relation to climate constructs informed by AGT (e.g., ego-involving climate dimensions) and SDT (e.g., controlling climate dimensions). The evidence from the EFA and network analysis allowed for an empirical examination of such relationships. In terms of the findings, the evidence provided is in keeping with theoretical expectations. That is, while there are some areas of conceptual overlap, perfectionistic climate is sufficiently distinct from the established coach climate constructs examined in the present study. This finding is crucial in terms of providing construct validity evidence to support the PCQ-S developed in the previous chapter.

The key message to take from the present study is that perfectionistic climate captures a unique climate-based experience. While AGT and SDT may be sufficient for capturing certain climate experiences (e.g., empowering *versus* disempowering coach climates), other theoretical frameworks are required to account for the range of climate experiences that youth athletes may encounter and experience (Morgan, 2017). In line with theory guiding the development of the perfectionistic climate construct, it is likely that perfectionistic coach behaviours (e.g., unrealistic demands, harsh criticism, and anxiousness over mistakes) lead to a climate experience that is more extreme than an environment shaped by disempowering coach behaviours. While this interpretation aligns well with theory, it is important for researchers to gain support for this by showing that the PCQ-S can predict outcomes that one would expect young athletes to experience in such extreme contexts. To test this aspect of construct validity, the following chapter provides an examination of the PCQ-S in relation to athlete burnout (as well as the conceptual antithesis of athlete burnout– athlete engagement).

The final point of reflection from this chapter is about the network-based analyses conducted using the *R* package *qgraph*. While the network-based analyses effectively produced the same results as the more traditional EFA conducted, the network diagram provided an effective tool for showcasing the differences (and similarities) between coach climate measures. This network-based approach to establishing construct validity is effective as it is easy to evaluate whether empirical relationships (depicted in a network diagram) match theoretical relationships laid forth

within the nomological network of a specified construct (Borsboom et al., 2004). With this in mind, there is a strong argument for network-based analyses of construct validity to be integrated into scale development and validation research. The utility of this method as an alternative to traditional factor analytical techniques has been recognised by other researchers (e.g., Suwartono et al., 2019). In this regard, researchers in sport psychology may want to consider using network-based analyses to either supplement (as per the present study) or replace methods such as EFA and CFA when examining the structure of psychometric data.

Conclusion

The present study applied traditional (EFA) and more novel psychometric analyses (network analysis) to examine the empirical relations between the coach climate constructs identified within the nomological network of perfectionistic climate. The findings identified some areas of conceptual overlap between the PCQ-S and the more disempowering coach climate features examined using the MCSYS and CCBS. However, the key finding emphasised in both analyses was that the construct of perfectionistic climate assessed by the PCQ-S can be clearly delineated from AGT- and SDT-based measures of the coach-created climate.

Chapter 4 – Perfectionistic Climate in Relation to Athlete Burnout and Engagement in Young

Athletes

Abstract

The previous chapter helped to establish that perfectionistic climate can be differentiated

from established climate constructs. In the third study of the thesis, outlined in this chapter, the aim

is to build on this evidence and examine whether perfectionistic climate can predict the sporting

experiences of youth athletes. Specifically, guided by relevant theory, the aim was to assess whether

perceptions of perfectionistic climate predict athlete burnout and athlete engagement. To this end, a

sample of 246 youth athletes (M_{age} = 14.48 years, s = 1.64) completed the PCQ-S and measures of

athlete burnout and athlete engagement. In total, four structural equation models were examined.

The first two models revealed that a latent perfectionistic climate factor shared significant

relationships with a latent athlete burnout factor (model one) and two (out of three) latent athlete

burnout symptoms (model two). The third and fourth models revealed that a latent perfectionistic

climate factor shared non-significant relationships with a latent athlete engagement factor (model

three) and four latent athlete engagement dimensions (model four). The findings suggest that

perfectionistic climates may contribute toward distress in young athletes in the form of athlete

burnout (particularly physical and emotional exhaustion and sport devaluation). However,

perfectionistic climates may not undermine or contribute to the levels of athlete engagement

experienced by young athletes. This potential for perfectionistic climate to contribute to darker and

more negative (but not more positive) outcomes is reflected on the in the discussion to this chapter.

Introduction

In chapter three of the thesis, perfectionistic climate was found to be statistically distinct from established measures of coach climate. In the present chapter, the aim is to build on this evidence and establish whether, as per established climate measures, the PCQ-S can predict the sporting experiences of youth athletes. The major premise guiding this chapter is that coaches are key figures responsible for shaping the sporting environment and influencing how youth athletes experience sport. That is, when coaches provide an environment characterised by positive interactions, support, and encouragement, young athletes are likely to experience sport positively (Fraser-Thomas et al., 2005). By contrast, when coaches fail to provide an optimal environment, the health, safety, and psychological development of young athletes is jeopardised. This includes when coaches demand too much of athletes, engage in harsh criticism, and put pressure on intense training routines (Gould and Mignano, 2021). In this regard, the study of perfectionistic coach climates may well be relevant to youth athlete experiences–especially more negative experiences. This potential was examined in the present study by focussing on athlete burnout and athlete engagement as two important and contrasting sporting experiences.

Athlete Burnout

As described by Raedeke and Smith (Raedeke, 1997; Raedeke and Smith, 2001, 2009), athlete burnout is a psychological syndrome characterised by a constellation of symptoms: *reduced sense of accomplishment*, *physical and emotional exhaustion*, and *sport devaluation*. This conceptualisation of the symptomology of burnout is specific to athletes and the ongoing demands they face in sport (Eklund & DeFreese, 2020). The first dimension, reduced sense of accomplishment, reflects a sense of low accomplishment and personal inadequacy in sport. This dimension is drawn from and reflects the *personal accomplishment* burnout dimension in Maslach and Jackson's (1981) model of burnout. As this model is specific to professional staff in human service institutions, personal accomplishment captures a sense of low accomplishment and personal inadequacy *in one's work with people*. In conceptualising the sport-specific manifestation of this

symptom, Raedeke and Smith (2001) focussed on the same feelings of incompetence and dwindling sense of achievement. However, the focus of this reduced sense of accomplishment was directed toward *one's sport participation and performance* (e.g., "I am not achieving much in sport").

The second athlete burnout dimension, physical and emotional exhaustion, reflects the perceived depletion of emotional and physical resources resulting from sport training and competition. This dimension is drawn from and reflects the *emotional exhaustion* burnout symptom in Maslach and Jackson's (1981) conceptualisation of burnout (i.e., feeling emotionally overextended and exhausted by one's work). There are two key distinctions in Raedeke and Smith's (2001) sport-specific manifestation of this dimension. The first point is that the sport dimension focuses on exhaustion from *sport participation and performance* rather than *work*. The second, and related point, is that the sport dimension includes the addition of a *physical exhaustion* component. The thinking behind this addition was that sport, unlike occupational settings, is a context in which physical demands are an obvious source of psychosocial stress. That is, athlete physicality is a central feature of sport training and competition likely to contribute toward an experiential state of exhaustion. This unique factor therefore necessitated a focus on both physical and emotional exhaustion.

The third athlete burnout dimension, sport devaluation, reflects the development of a diminished and cynical view toward the benefits of sport participation (Raedeke & Smith, 2001). This dimension is drawn from and reflects the *depersonalisation* burnout symptom in Maslach and Jackson's (1981) conceptualisation of burnout (i.e., cynical attitudes and feelings toward the recipients of one's care or service). The problem in mapping this dimension to sport was the fact that athletes do not provide a service to others (Eklund & DeFreese, 2020). In mapping this symptom of burnout to sport, and in line with the other dimensions of athlete burnout, Raedeke and Smith (2001) therefore focussed on an athletes' relationship and attitude toward *sport participation and performance* rather than *others*. This transformation is consistent with the reconceptualization

of depersonalisation into a broader sense of cynicism in the workplace (i.e., not just cynicism toward others; Maslach et al., 2001).

Given that some researchers refer to athlete burnout as "an extreme and persistent form of sport disillusionment", it is hardly surprising that the symptom dimensions have been found to contribute toward diminished physical and psychological well-being among athletes (Madigan et al., 2019, p. 6). In terms of empirical support, researchers have found that burnout is positively associated with a range of maladaptive outcomes (depressed mood, psychological stress, and negative affect) and negatively associated with a range of adaptive outcomes (e.g., coping skills, hope, perceived control, and optimism) among athletes (see Gustafsson et al., 2017). This empirical evidence is also accompanied by several hypothesised outcomes including long term performance impairment, illicit substance use, and sleep dysfunction (see Eklund and DeFreese, 2020). While it is difficult to know exactly how many athletes are affected by burnout and potentially vulnerable to the above identified outcomes, estimates suggest that up to 10% of athletes may be afflicted by meaningful levels of burnout (e.g., Gustafsson et al., 2007; Raedeke & Smith, 2009). This evidence underscores the need to investigate the development of athlete burnout.

In line with the early work and observations of Maslach who researched burnout in health care and human service workers (Maslach & Jackson, 1981), athlete burnout is often hypothesised to arise due to ongoing demands and stressors experienced by athletes in sport (Eklund & DeFreese, 2020). This established perspective is reflected in the model of athletic burnout which focusses on athlete burnout as a reaction to chronic psychosocial stress (R. E. Smith, 1986). This model is formalised into four components. The first component focusses on situations in which an athlete perceives an imbalance between situational demands and personal resources. The second component focusses on cognitive appraisals which arise in response to such situational demands. In the development of athlete burnout, some of the most salient cognitive appraisals include perceived overload, low perceived control, and diminished potential for meaningful accomplishment (Eklund & DeFreese, 2020). These appraisals are inextricably tied to several potential physiological

responses that are captured in the third component of the model. The key point emphasised is that chronic exposure to stress is assumed to underpin insomnia, ongoing fatigue, and illness susceptibility (Eklund & DeFreese, 2020). The final component of the model focusses on outcomes of this stress-related process which include athlete burnout and associated problems such as decreased performance, interpersonal difficulties, and withdrawal from the activity (Eklund & DeFreese, 2020).

The model of athletic burnout also focusses on athlete motivation and personality as factors that influence the stress-related processes implicated in the development of athlete burnout. This is important as individual difference factors will invariably influence the way an athlete evaluates situational demands, assigns value to sporting challenges, and copes with stressful events (Olsson et al., 2020). Specifically, while some athletes may experience certain demands in sport as manageable and perceive value in overcoming the stressor, others may experience them as overwhelming and perceive a relative absence of meaningful accomplishment in the challenge or activity (Eklund & DeFreese, 2020; Gustafsson et al., 2011). Overall, the model of athletic burnout therefore focusses on the role of stress as a central mechanism that underpins athlete burnout and considers various factors that may exacerbate or attenuate stress-fuelled athlete burnout (Eklund & DeFreese, 2017).

Using the model of athletic burnout as a theoretical guide, researchers have tested and found empirical support for various mechanisms and proposed relationships central to burnout development. For example, the key tenet of this model–that perceived stress underpins athlete burnout–has gained consistent support across both cross-sectional (e.g., Gustafsson et al., 2017) and longitudinal (e.g., DeFreese & Smith, 2014) research. In terms of stress-related mechanisms implicated in the model, researchers have identified that threat appraisals, low levels of perceived control, and avoidant coping strategies are all positively related to athlete burnout (Cresswell & Eklund, 2004; Gomes et al., 2017; Madigan et al., 2020). In terms of personality factors that may exacerbate such processes and underpin burnout development, researchers have identified that

perfectionism and trait anxiety both share positive relationships with athlete burnout (Hill & Curran, 2016; Raedeke & Smith, 2001). This body of research supports the notion that athletes who appraise situational demands as threatening and are ill-equipped to mitigate stress are particularly vulnerable to burnout.

Social Factors and Athlete Burnout

In addition to internal factors that influence stress-fuelled burnout (e.g., personality traits and motivational orientations), the model of athletic burnout also accounts for external sources of stress that may contribute to burnout development. This includes factors such as high training demands, training facilities, and sport organisation politics. One further source of external stress that is accounted for in this model comes from social interactions with others (DeFreese et al., 2015). Specifically, early qualitative research indicates that negative sport-based interactions with others represent a viable source of stress that may contribute to burnout development in young athletes (Gould et al., 1996; Udry et al., 1997). However, while this may be the case, most quantitative research efforts have focussed on positive sport-based interactions that are likely to attenuate stress and protect athletes from burnout experiences (Madigan et al., 2021).

This trend is evident in Pacewicz et al.'s (2019) meta-analytical review of the relationship between social constructs and athlete burnout. In the 20 studies included in this review ($N = 5,966$), 18 studies included an outcome indicative of positive social interactions. In eight of those studies, the relationship between perceived social support (i.e., social interactions with others aimed at generating positive outcomes) and athlete burnout was examined. The pattern of findings across these studies is clear. That is, perceived social support is negatively related with the individual symptoms of athlete burnout ($k = 3$), total burnout ($k = 2$), or both ($k = 3$). In meta-analysing these effects, Pacewicz and colleagues found that perceived social support shared a moderate negative relationship with each burnout measure: physical and emotional exhaustion ($r = -.31$), reduced accomplishment ($r = -.40$), sport devaluation ($r = -.34$), and total burnout ($r = -.36$). These findings

suggest that supporting relationships with salient others in sport may temper perceptions of exhaustion, reduced accomplishment, and sport devaluation (Pacewicz et al., 2019).

A further key finding in Pacewicz et al.'s (2019) meta-analytical review is that ten (out of 20) studies examined the relationship between perceived relatedness (i.e., feelings of connectedness with salient individuals in sport) and athlete burnout. The pattern of findings across these studies was again clear and consistent. That is, in all except for one relationship, perceived relatedness was negatively related with the individual symptom(s) of athlete burnout ($k = 4$), total athlete burnout ($k = 1$), or both ($k = 5$). In meta-analysing these effects, Pacewicz and colleagues found that perceived relatedness shared small-to-moderate negative relationships with each burnout measure: physical and emotional exhaustion ($r = -.20$), reduced accomplishment ($r = -.34$), sport devaluation ($r = -.31$), and total burnout ($r = -.37$). This finding suggests that having connections with salient others and experiencing a sense of belonging in sport may diminish perceptions of exhaustion, reduced accomplishment, and sport devaluation. This may because athletes who feel this acceptance by others are better equipped to cope with stress and more likely to enjoy sport (Pacewicz et al., 2019).

The review by Pacewicz et al. (2019) only identified three (out of 20) studies focussing on the relationship between negative social interactions and athlete burnout. The three studies examined the relationship between negative social interactions (i.e., unhelpful, insensitive, and rejecting social interactions with others) and athlete burnout. The pattern of findings across these studies was uniform. That is, negative social interactions were positively related with the individual symptoms of athlete burnout and total athlete burnout in each study. In meta-analysing these effects, Pacewicz and colleagues found that negative social interactions shared small negative relationships with each burnout measure: physical and emotional exhaustion ($r = .28$), reduced accomplishment ($r = .24$), sport devaluation ($r = .23$), and total burnout ($r = .30$). This pattern of findings shows that insensitive and rejecting social interactions may lead to increased perceptions of exhaustion, reduced accomplishment, and sport devaluation (Pacewicz et al., 2019).

The predominant focus on positive *versus* negative social interactions identified in Pacewicz et al.'s (2019) review is surprising given that early qualitative research examining the role that others play in triggering the burnout process shows that negative social interactions are pivotal. The first study that is relevant in this regard explored the experiences of 10 burned out elite-level youth tennis players who had withdrawn from their sport (Gould et al., 1996). One of the key developmental factors identified was negative social and interpersonal influences. Specifically, dissatisfaction with: (a) social life; (b) parental involvement; and (c) others more broadly were key experiences discussed by athletes. These experiences of dissatisfaction came from various sources including overbearing and critical parenting, hostile and unsupportive sporting environments shaped by coaches and peers, and poor social networks in sport. This study, and these findings, provided the initial impetus for researchers to further explore how social dynamics and relationships in sport can underpin experiences of extreme sport disaffection, burnout, and withdrawal from sport.

The second qualitative study to further advance the notion that negative social interactions are fundamental to the burnout process was conducted by Udry et al. (1997). In this study, Udry and colleagues recruited 10 young burned out elite-level tennis players and explored their experiences of parental and coach involvement. In terms of parental involvement, while some athletes perceived a level of involvement that was positive (e.g., supportive) or neutral (e.g., detached), most athletes perceived a level of involvement that was negative (e.g., suffocating). Specifically, most athletes (90%) perceived that their parents were excessively concerned with performance outcomes and placed unrealistically high demands on performance expectations. This was experienced by athletes in the form of highly stressful environments (i.e., perceptions of extreme parental pressure and inappropriate parental expectations), a lack of perceived control (i.e., perceptions of being controlled by parent-centred behaviour and motives), and/or undermining parental interactions (i.e., perceptions of highly critical and unempathetic parental behaviour). In terms of coach involvement, Udry and colleagues found a very similar pattern of findings. Specifically, negative coach interactions were cited more frequently than positive or neutral coach interactions. Most athletes

(70%) perceived that the coach was highly demanding, unresponsive, and unsupportive. These findings are important as they highlight some of the negative social interactions likely to shape sport environments that fuel the burnout process.

In addition to the above research on social interactions and athlete burnout, there is a small body of research linking motivational climate perceptions to athlete burnout. This research provides further evidence regarding the distinction between the role of positive and negative social interactions in the development of athlete burnout. In terms of the coach-created climate, research findings show that athlete perceptions of more task-involving, autonomy-supportive, and empowering coach climates are associated with lower level of athlete burnout. By contrast, athlete perceptions of more ego-involving, controlling, and disempowering coach climates are associated with higher levels of athlete burnout (Appleton & Duda, 2018; Barcza-Renner et al., 2016; Lemyre et al., 2008). This collection of evidence is important as it highlights potentially protective *versus* potentially facilitative coach interactions relevant to experiences of athlete burnout. In protecting athletes from stress and burnout, coaches may need to place emphasis on mistakes for learning (over punishment for mistakes), equal treatment regardless of ability (over preferential treatment for better performers), and choice and autonomy (over coercion and intimidation).

In terms of the parental-created motivational climate, a similar pattern of findings has been identified. In a study of Swedish junior athletes, Gustafsson et al. (2016) examined athlete burnout in relation to two ego-involving (i.e., worry-conducive climate and success-without-effort climate) and one task-involving parental climate dimension (i.e., learning and enjoyment climate). In line with the coach-climate research outlined above, the two ego-involving dimensions shared positive associations with athlete burnout. The key point to note is that the worry-conducive climate dimension shared the strongest associations with each athlete burnout symptom. The more task-involving climate dimension of learning and enjoyment was unrelated to each symptom of athlete burnout. Again, this pattern of findings suggests that ego-involving behaviours are likely to shape environments in which burnout is more likely to develop. This may be particularly likely when

parents engage in behaviours that signal extreme worry and concern over mistakes (Gustafsson et al., 2016).

In addition to the role of coaches and parents, there is evidence that teammates can create a motivational climate that influences burnout development. Specifically, in a sample of Swedish junior athletes, researchers examined athlete burnout in relation to two ego-involving (i.e., intra-team competition and intra-team conflict) and three task-involving peer climate dimensions (i.e., improvement, effort, and relatedness; A. L. Smith et al., 2010b). In line with the general pattern of findings outlined in the studies above, the ego-involving dimension of intra-team conflict was associated with higher levels of athlete burnout. However, the ego-involving dimension of intra-team competition was unrelated to each symptom of athlete burnout. In terms of the more task-involving climate dimensions, the associations with each symptom of athlete burnout were again either negative or non-significant. This research suggests that experiencing an environment in which teammates help each other improve (over trying to outperform each other), emphasise effort (over performance outcomes), and get on with each other (over criticise each other) may protect athletes from burnout development (A. L. Smith et al., 2010b).

Perfectionistic Climate and Athlete Burnout

The research identified above highlights several behaviours that are likely to shape stressful environments in which burnout develops. This includes environments in which others are perceived to be extremely demanding, critical of mistakes, and negligent in terms of providing appropriate support. Thus, interactions that lead athletes to perceive that their coach is extremely perfectionistic in their demands and overly critical of mistakes may be especially relevant to athlete burnout. Indeed, there are two more specific sources of evidence supporting this idea. This evidence comes from research focussing on coach pressure to be perfect and perceptions of coach other-oriented perfectionism in relation to athlete burnout.

The first source of evidence comes from studies examining the relationships between perceptions of coach pressure to be perfect (i.e., beliefs that your coach expects you to be perfect

and is highly critical of your performances) and athlete burnout symptoms. There are three studies relevant in this regard (Gotwals, 2011; Pacewicz et al., 2018; Skwiot et al., 2020). In each of these studies, the researchers found that coach pressure to be perfect shared small-to-moderate positive relationships with each of the three athlete burnout symptoms. The only exception to this was the non-significant relationship with reduced sense of accomplishment in one of the studies (Skwiot et al., 2020). While the significant relationships were relatively consistent in terms of magnitude, the largest effect size in each study was between coach pressure and physical and emotional exhaustion. This finding indicates that there is something about extreme coach pressure that may result in experiences of being physically overstretched and emotionally exhausted in sport.

The second source of evidence comes from a study which examined the relationships between perceptions of coach other-oriented performance perfectionism (i.e., beliefs that your coach expects others to perform perfectly and is highly critical of their performances) and athlete burnout. In this study, Olsson et al. (2021) sought to examine whether perfectionism dimensions positively predicted athlete burnout. In line with this aim, the authors found that: (a) socially prescribed performance perfectionism positively predicted physical and emotional exhaustion; and (b) self-oriented performance perfectionism positively predicted reduced sense of accomplishment. However, and importantly in terms of the present study, the authors also examined whether perceptions of coach other-oriented performance perfectionism added incrementally to the prediction of each burnout symptom. In testing this aim, the authors found evidence that perceived coach other-oriented perfectionism accounted for additional variance in both physical and emotional exhaustion and sport devaluation. This finding substantiates the notion that perceived perfectionistic coach behaviours are highly relevant to experiences of athlete burnout (even after controlling for athlete performance perfectionism dimensions).

In this regard, an athlete's perceptions of the perfectionistic climate created by the coach may provide an important area of study in relation to athlete burnout. In comparison to the previous constructs focussing on the coach and their perfectionistic qualities (e.g., perceived coach pressure

and perceived coach other-oriented performance perfectionism), perfectionistic climate entails a much more comprehensive coverage of coaching practices that place pressure on the attainment of perfection in sport. Specifically, in addition to unrealistic demands (i.e., expectations) and harsh evaluative tendencies (i.e., criticism), perfectionistic climate captures psychologically controlling (i.e., control and conditional regard) and overly anxious (i.e., anxiousness) behaviours. These additional components represent important sources of interpersonal pressure that may heighten experiences of stress and exacerbate burnout development.

The possibility that young athletes who experience a highly perfectionistic climate are potentially vulnerable to athlete burnout makes sense from a theoretical perspective. For instance, Hill and Grugan (2019) highlight that perfectionistic climate captures features of the environment that undermine a sense of conditional acceptance and give rise to a view of others as non-responsive, neglectful, and overly critical. In addition to providing an environmental experience that is relevant to the development of perfectionism, such beliefs also provide the perfect foundation for experiences of stress and burnout in young children. Specifically, the unrealistic demands, harsh criticism, and coercive forms of psychological control that characterise highly perfectionistic climates are likely to feed into a sense of perceived overload (e.g., "the standard of performance that is expected by the coach is far beyond the standard I am able to deliver as an athlete"), low perceived control (e.g., "athletes in this context must meet the standards that are set by the coach"), and diminished potential for meaningful accomplishment (e.g., "I am constantly criticised by the coach and unable to deliver the level of performance that merits their respect or approval"). Given that these are some of the most salient cognitive appraisals that underpin stress (Eklund & DeFreese, 2020), it makes sense that a perfectionistic climate may underpin burnout symptomology.

Athlete Engagement

Not all athletes experience stress that renders them vulnerable to disaffection and burnout. In fact, in many cases, athletes experience thoughts and emotions that reflect an extremely positive outlook regarding their sporting involvement. One outcome that is relevant in this regard–and often

viewed as the conceptual antithesis of athlete burnout–is athlete engagement (Raedeke et al., 2014). As described by Lonsdale et al. (2007a), athlete engagement is a persistent, positive, and cognitive-affective experience in sport. Specifically, the athlete engagement experience is characterised by a constellation of feeling states and beliefs: *confidence*, *dedication*, *enthusiasm*, and *vigour*. In this model, confidence reflects a belief in one's ability to attain a high level of performance and achieve desired goals, dedication reflects a desire to invest effort and time toward achieving personally important goals, vigour reflects a sense of physical and mental liveliness, and, finally, enthusiasm reflects feelings of high levels of excitement and enjoyment (Lonsdale et al., 2007b). Ultimately, these engagement dimensions are characteristic of the positive thoughts and feelings many athletes experience toward their overall involvement in sport.

The athlete engagement framework provided by Lonsdale et al. (2007b) allows researchers to study potential antecedents and consequences of positive sport experiences. In terms of anticipated consequences, researchers suggest that enhanced levels of athlete engagement should be related to positive outcomes for athletes (e.g., increased enjoyment; Hodge et al., 2009). In support of this assertion, researchers have found that engagement is positively associated with outcomes including life satisfaction, dispositional flow, and self-regulation (Hodge et al., 2009; Martin et al., 2013, 2015). In addition to such benefits, researchers have suggested that enhanced engagement levels may also protect athletes from harmful outcomes in sport. The most relevant outcome in this regard is athlete burnout (Eklund & DeFreese, 2015). In support of this link, researchers have consistently found athlete engagement to share an inverse relationship with athlete burnout (e.g., Lonsdale et al., 2007b). The available evidence ultimately supports the notion that athlete engagement has both protective and facilitative qualities. In this regard, it is especially important to investigate the development of athlete engagement.

One contemporary theory of motivation that accounts for factors underpinning subjective well-being and healthy functioning among athletes is SDT (Ryan & Deci, 2017). This was highlighted by Lonsdale et al. (2007b) who proposed that basic psychological needs theory (BPNT,

an SDT mini theory) provides a useful framework for understanding how athlete engagement develops. The central tenet of BPNT is that optimal development, integrity, and well-being are dependent upon the satisfaction of basic psychological needs (Ryan and Deci, 2017). These basic psychological needs include requirements for autonomy (i.e., the need to experience self-endorsement and ownership of one's actions), competence (i.e., the need to experience effectiveness in one's interactions with the social environment), and relatedness (i.e., the need to experience others as responsive and sensitive to the self, and vice versa; Ryan and Deci, 2017). When psychological and social needs are highly satisfied, an individual is likely to thrive and flourish. By contrast, when these psychological needs are highly thwarted, an individual is likely to show diminished wellness (Ryan & Deci, 2017). In the context of this framework, Lonsdale and colleagues considered athlete engagement as a form of generalised well-being that is nurtured by the satisfaction of the three basic psychological needs.

Using SDT as a theoretical guide, researchers have tested and found empirical support for athlete engagement as a form of well-being that is relevant to BPNT. Specifically, researchers have identified that basic psychological need satisfaction shares a positive relationship with athlete engagement (Curran et al., 2014; Hodge et al., 2009; Jowett et al., 2016). This evidence suggests that satisfaction of the psychological needs provides a foundation for feelings of confidence, dedication, enthusiasm, and vigour among athletes. In terms of evidence pertaining to psychological need thwarting, the inverse of this relationship may be true. Specifically, researchers have identified that basic psychological need frustration shares a negative relationship with athlete engagement, as well as positive relationships with disaffection and athlete burnout (Curran et al., 2016; Jowett et al., 2016). This means that thwarting of the three psychological needs provides a foundation for diminished engagement, as well as potential for passivity, withdrawal, and disillusionment among athletes.

Social Factors and Athlete Engagement

An important focus in SDT is on social factors that influence the three basic psychological needs and an individual's subjective well-being (Ryan & Deci, 2017). This focus is important as individuals are social beings and interpersonal interactions make up a key part of the human experience (Pelletier & Rocchi, 2016). In line with BPNT, and as described previously in the thesis, SDT focusses on interpersonal interactions that either facilitate or thwart satisfaction of the three basic psychological needs (Pelletier & Rocchi, 2016). In terms of need-supportive interactions, researchers have focussed principally on autonomy-supportive behaviours (Vallerand & Losier, 1999). This includes behaviours that involve providing athletes with meaningful information, opportunities to show initiative, and the capacity to make personal or team decisions (Mageau & Vallerand, 2003). In terms of need-thwarting interactions, researchers have focussed principally on controlling behaviours (Vallerand & Losier, 1999). This includes behaviours that involve limiting personal autonomy via motivational strategies such as using external rewards, intimidation, and other psychologically controlling practices (Bartholomew et al., 2010). While one set of behaviours may have potential to facilitate positive experiences for athletes in sport, the other may give rise to an altogether darker experience.

Using SDT as a theoretical guide, researchers have empirically examined the relationships between interpersonal interactions, psychological need satisfaction, and athlete experiences in sport. The first relationship that is relevant to SDT is between interpersonal interactions and psychological need satisfaction. In examining this relationship, researchers have consistently found that perceived autonomy support from the coach is associated with greater psychological need satisfaction (Adie et al., 2008; Coatsworth & Conroy, 2009; Hodge et al., 2015). By contrast, controlling coach behaviours have consistently been found to be associated with greater psychological need thwarting (Curran et al., 2014; Ntoumanis et al., 2017). The next relationship that is relevant to SDT is between social interactions and athlete well-being. In examining this relationship, researchers have found direct associations between perceived autonomy support from the coach and positive sport

experiences including athlete engagement (e.g., vitality, positive affect, and psychological well-being; Jowett et al., 2021). By contrast, controlling coach behaviours have typically been found to share negative relationships with athlete engagement and other positive sport experiences (e.g., vitality, adaptive coach-athlete relations, and psychological well-being; Curran et al., 2014; Felton & Jowett, 2012; Gucciardi et al., 2017; Stenling et al., 2017a).

To build on this evidence, Curran et al. (2016) examined a longitudinal SDT-based mediation model. In this model, several pathways to athlete engagement were considered. However, in line with theory, Curran et al. (2016) focussed principally on the pathway linking perceived autonomy support from the coach with athlete engagement via psychological need satisfaction. In testing this pathway, Curran and colleagues found that season-start coach autonomy support positively predicted mid-season psychological need-satisfaction, which, in turn, positively predicted season-end athlete engagement. This finding supports the idea that when athletes perceive an autonomy-supportive climate (i.e., an environment in which the coach provides opportunities for others to voice and act on ideas, instils confidence in others, and makes others feel valued), psychological need satisfaction and subsequent engagement will be promoted (Curran et al. 2016). In addition to this finding, Curran and colleagues found evidence for controlling coach behaviours exerting a negative influence on psychological need satisfaction and subsequent engagement over the course of the study period.

Perfectionistic Climate and Athlete Engagement

The second finding from the study outlined above supports the idea that environments which undermine satisfaction of competence, autonomy, and relatedness may underpin diminished engagement among athletes. Thus, interactions that lead athletes to perceive coaches as extremely perfectionistic in their demands, overly critical of mistakes, and excessively controlling in pressuring the pursuit of perfection may be especially relevant to athlete engagement. There is initial evidence to support this idea. For example, Trodd (2018) examined the relationships between perfectionism and athlete engagement using a perfectionism scale containing items capturing

perceived coach pressure (i.e., beliefs that your coach expects you to be perfect and is highly critical of your performances). The findings show that perceived coach pressure shares negative relationships with athlete engagement dimensions reflecting confidence, vigour, and dedication. These findings are important as they suggest experiences of extreme coach pressure may undermine athlete engagement.

In addition to the study outlined above, there is also a small body of evidence examining trait perfectionism in relation to athlete engagement (e.g., Hill et al., 2020b; Jowett et al., 2016, 2021). In the multi-sample project conducted by Hill et al. (2020b), two studies included an examination of athlete engagement in relation to socially prescribed perfectionism (i.e., a broader sense of perfectionistic pressure from others in general *rather than* from a specific person). In both studies, socially prescribed perfectionism was unrelated to each athlete engagement dimension. This finding suggests that perfectionistic pressure conceptualised at the broader trait-level may not undermine athlete engagement. When examining athlete engagement, in-keeping with the results outlined above, it may be more important to focus on the pressure athletes experience from the immediate sporting environment shaped by the coach. With this in mind, it is especially important to extend our focus on the perfectionism-athlete engagement relationship beyond the individual. Instead, a focus on how athletes think about their coach's perfectionistic behaviours and practices is needed. This is because such beliefs may be highly relevant to an athlete's engagement in sport.

In this regard, an athlete's perceptions of the perfectionistic climate created by the coach may provide an important area of study in relation to athlete engagement. This is because perfectionistic climate includes components that are likely to undermine the satisfaction of competence, autonomy, and relatedness. For instance, an athlete's competence is likely to be undermined in an environment where the coach is seen as being extremely demanding, difficult to please, and highly critical of even minor mistakes. An athlete's autonomy is likely to be undermined when the coach is seen as highly coercive, intimidating, and authoritarian in their perfectionistic pressure. Finally, an athlete's sense of relatedness is likely to be undermined when

the coach is seen as hostile, intimidating, and negligent toward those who are unable to attain extremely demanding performance standards. With this in mind, it may be that perceptions of the coach-created perfectionistic climate will share negative relationships with dimensions of athlete engagement tied to the satisfaction of these needs.

The Present Research

Guided by the relevant theory and research outlined above, the primary aim of the present study was to explore the predictive ability of perfectionistic climate in relation to athlete burnout and athlete engagement. In line with this aim, four structural equation models will be tested. The first two models will examine perfectionistic climate perceptions in relation to total athlete burnout (model one) and individual athlete burnout symptoms (model two). The third and fourth models will examine perfectionistic climate perceptions in relation to total athlete engagement (model three) and individual athlete engagement dimensions (model four). Based on the research and theory relating to athlete burnout, it was expected that perfectionistic climate would positively predict all burnout measures. By contrast, it was expected that perfectionistic climate would negatively predict all athlete engagement measures.

Method

Participants

Participants were 246 youth athletes (125 males, 119 females, 2 gender not reported; M_{age} = 14.48 years, s = 1.64; age range = 11–21) recruited from various team sport clubs in the United Kingdom. Participants were recruited from a range of individual and team sports (e.g., athletics, rowing, rugby, netball, and football) and represented various levels of competition (recreational = 6, club = 155, county = 20, regional = 43, semi-professional = 3, national = 12, international = 4, and not reported = 3). On average, athletes had been competing in their sport for 5.08 years (s = 3.06), dedicated 5.63 hours (s = 3.50) to training and competition per week, and had been working with their current coach for 2.20 years (s = 1.90). In comparison to other activities in their lives, athletes

rated their sport as moderately–to–extremely important (M = 7.78, s = 1.51; 1 = *extremely unimportant* to 9 = *extremely important*).

Procedure

Following ethical approval from an institutional review board (see Appendix A.3), gatekeepers of youth sport organisations in the UK were contacted via e-mail and invited to participate in a study examining how youth sport participants think coaches behave in the sport environment (see Appendix B.1). The lead researcher made data collection arrangements with all organisations expressing an interest in supporting the study. Data collection involved a member of the research group attending the sport club, sharing relevant information regarding the project, and inviting youth sport participants to complete a voluntary multi-item inventory (see Appendix C.3). In advance of data collection, parental/guardian consent was gained from the parents of youth sport participants (≤ 16 years) who had volunteered to participate (see Appendix B.2). All participants also provided their informed consent prior to completing the below measures (see Appendix D.1).

Measurement

Perfectionistic Climate. The Perfectionistic Climate Questionnaire–Sport (PCQ–S) developed in chapter two and examined in chapter three was used to assess perfectionistic features of the coach-created climate. This 20-item scale includes five subscales assessing expectations (EXP; 4-items, e.g., "The coach expects performances to be perfect"), criticism (CRIT; 4-items, e.g., "The coach criticises all mistakes no matter how small"), control (CTRL; 4-items, e.g., "The coach withholds rewards if performances are not perfect."), conditional regard (CR; 4-items, e.g., "The coach is less friendly when performances are not perfect"), and anxiousness (ANX: 4-items, e.g., "The coach is nervous that things will not go perfectly during performance"). Participants were instructed to think about the coach that they spend the most time with and rate their level of agreement or disagreement with each statement using a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Evidence supporting the five-factor structure and scale reliability (α ≥ .81) of the PCQ-S is provided in chapter one.

Athlete Burnout. The Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) was used to assess levels of burnout. This 15-item scale includes three subscales: reduced sense of accomplishment (5-items, e.g., "I am not achieving much in sport"), emotional and physical exhaustion (5-items, e.g., "I am exhausted by the mental and physical demands of sport"), and sport devaluation (5-items, e.g., "I'm not into sport like I used to be"). The participants were instructed to think about their current sport involvement and rate how often they experienced the feeling identified in each statement item using a 5-point (1 = *almost never* to 5 = *almost always*) Likert scale (see Appendix E.5). Raedeke and Smith (2001) have provided evidence supporting the three-factor structure and scale reliability of the ABQ ($\alpha \geq .85$).

The process of selecting a measure of athlete burnout was quick and easy. While there are other measures of athlete burnout available, the ABQ is the most widely used measure of athlete burnout (Eklund & DeFreese, 2020). One of the reasons for the popularity of this measure is that it has a sound conceptual grounding. Specifically, Raedeke and Smith's (2001) model of athlete burnout is based on the popular conceptualisation of burnout developed by Maslach and Jackson (1981). In this regard, the ABQ provides a sport-specific version of the Maslach Burnout Inventory (MBI; Maslach & Jackson, 1981). Another reason for the popularity of the ABQ relates to psychometric qualities and associated evidence. That is, the ABQ has demonstrated evidence of good factorial validity, construct validity, temporal stability, and scale reliability (Creswell & Eklund, 2006; Raedeke & Smith, 2001). It is based on such evidence that the ABQ is often regarded as the "gold standard" measure for quantifying athlete burnout (Eklund & DeFreese, 2020, p. 1223).

Athlete Engagement. The Athlete Engagement Questionnaire (AEQ; Lonsdale et al., 2007b) was used to assess levels of athlete engagement. This 16-item scale includes four subscales assessing confidence (4-items, e.g., "I am confident in my abilities"), dedication (4-items, e.g., "I am determined to achieve my goals in sport"), vigour (4-items, e.g., "I feel energetic when I participate in my sport"), and enthusiasm (4-items, e.g., "I feel excited about my sport"). The participants were instructed to think about their sport involvement during the last four months and

rate how often they experienced the feeling identified in each statement item using a 5-point (1 = *almost never* to 5 = *almost always*) Likert scale (see Appendix E.6). Lonsdale et al. (2007b) have provided evidence supporting the four-factor structure and scale reliability of the AEQ ($\alpha \geq .84$).

The process of selecting a measure of athlete engagement was also straight forward. In terms of a conceptual grounding, and much like Raedeke and Smith's (2001) model of athlete burnout, Lonsdale et al.'s (2007b) model of athlete engagement is based on an established work-based model of the same construct. In this case, Maslach et al.'s (2001) model of engagement (consisting of vigour, dedication, efficacy, and absorption) provides the strong conceptual grounding for the model of athlete engagement. Following a qualitative investigation with elite athletes, Lonsdale et al. (2007a) identified confidence, dedication, and vigour as key dimensions of engagement in sport. In building upon this study, Londale et al. (2007b) developed a scale measuring these key dimensions. The key difference to note between the original conceptualisation and the developed measure is the addition of items measuring enjoyment and excitement. These items formed an additional dimension of athlete engagement (i.e., enthusiasm) that was found to be conceptually distinct from vigour and the other core engagement dimensions.

Data Analysis

A multi-stage procedure was implemented to analyse the data. These analyses were carried out using IBM Statistics SPSS 26.0 and M*plus* 8.1 (Muthén & Muthén, 1998-2017). The first stage involved following Tabachnick and Fidell's (2014) data screening protocol. Following this, descriptive statistics, scale reliability, and bivariate correlation analyses were conducted. The next stage involved examining four independent structural equation models using Anderson and Gerbing's (1988) two-step approach in each case.
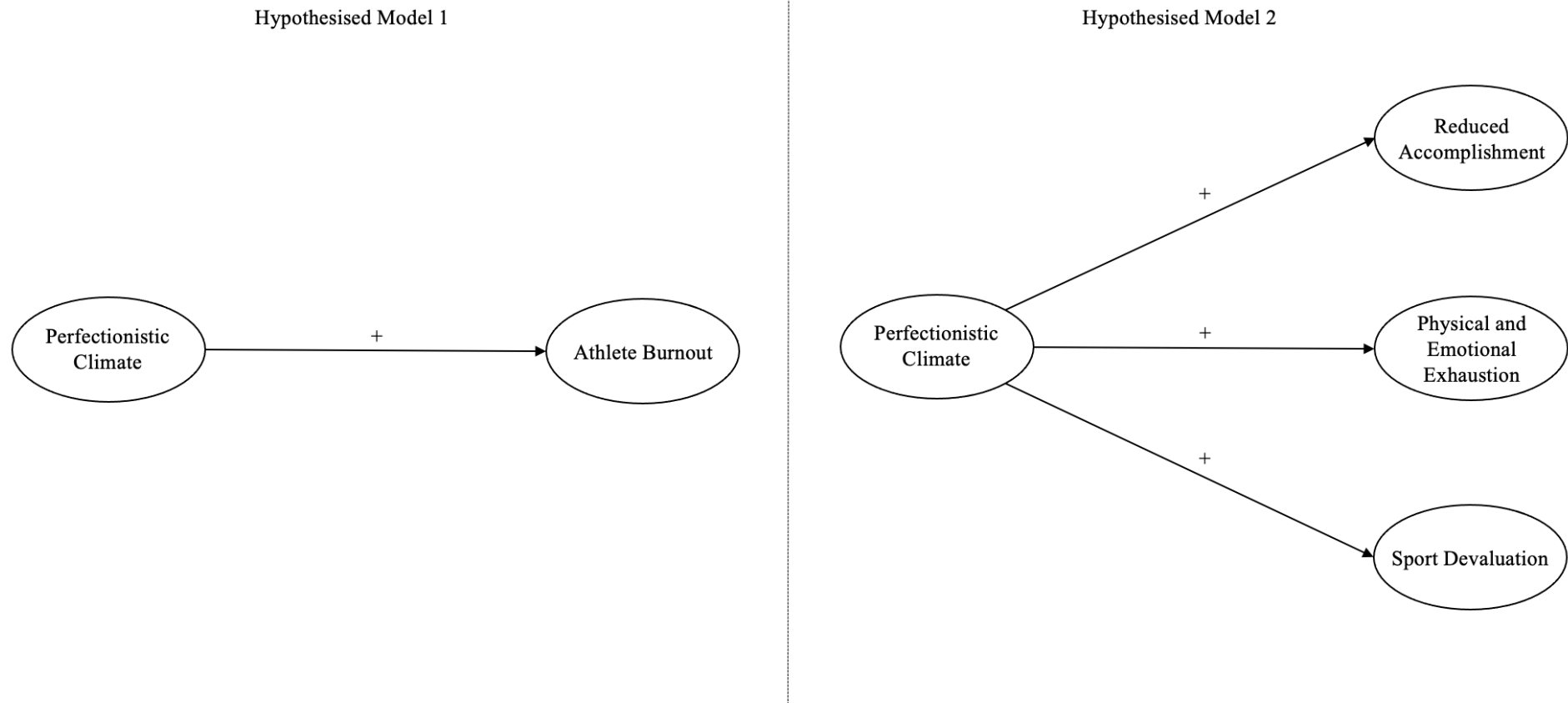
Figure 2. The hypothesised relationships from perfectionistic climate to total athlete burnout and athlete burnout symptom dimensions.
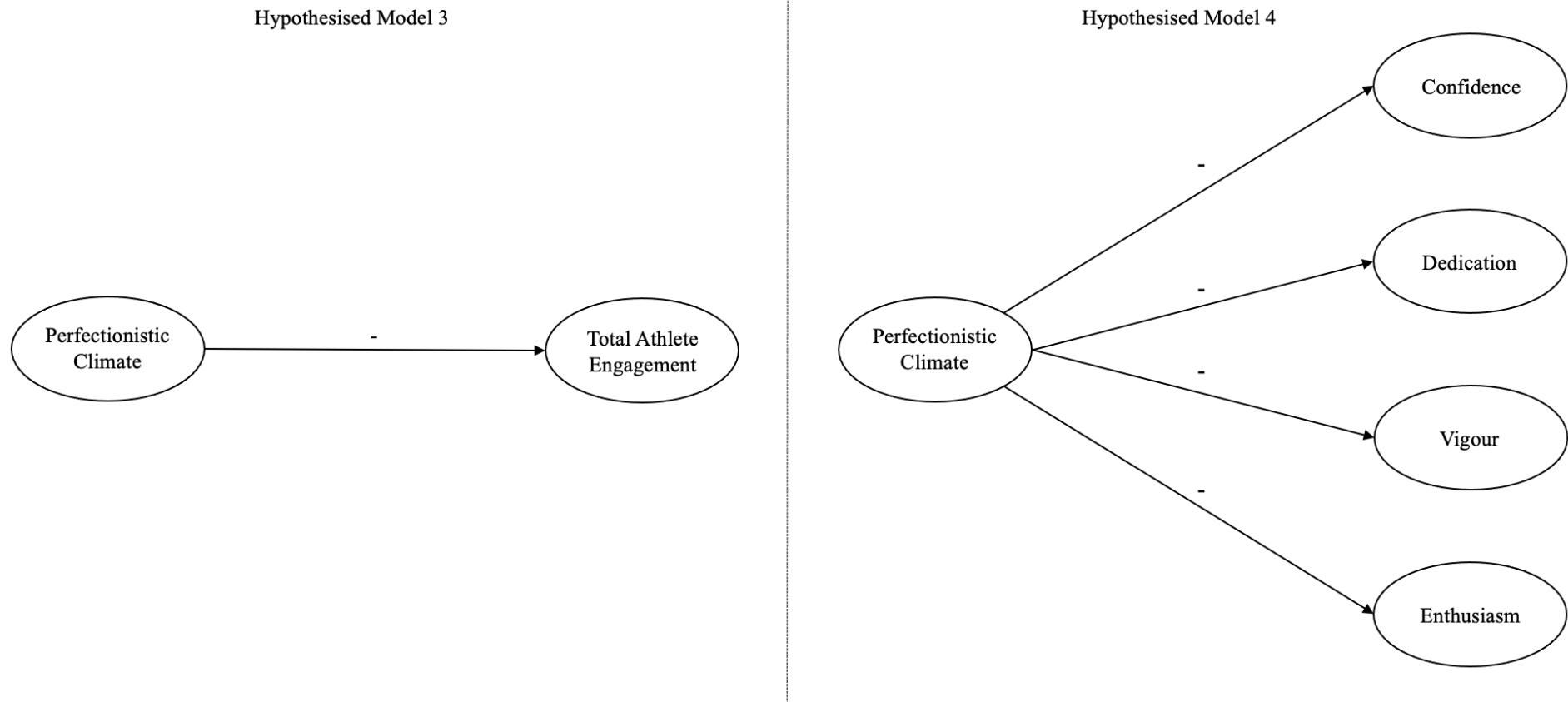
Figure 3. The hypothesised relationships from perfectionistic climate to total athlete engagement and athlete engagement dimensions.

The first two models examined perfectionistic climate in relation to total athlete burnout and symptom dimensions of athlete burnout (see Figure 2 above). The third and fourth models examined perfectionistic climate in relation to total athlete engagement and specific dimensions of athlete engagement (see Figure 3 above). The fit of each model was assessed in relation to the same indices and guidelines identified in chapter one (> .90 CFI, TLI, < .08 RMSEA, 90% CI < .05 to < .08; < .08 SRMR.

Results

Preliminary Analyses

The missing value analysis indicated that there were 214 complete cases and 32 cases with at least one item non-response. Cases with item non-response that exceeded 5% ($n = 8$) were removed. Item non-response for the remaining cases with missing data was ≤ 2 items ($M = 1.13$, $s = 0.34$). Little's MCAR test revealed that the remaining missing data could not be characterised as MCAR ($\chi^2 = 1118.66$, $df = 847$, $p = .00$). However, an examination of the missing value patterns indicated that there was no systematic reason for the remaining missing data. This was evident from the high ratio of missing data patterns in relation to the number of participants with missing data (ratio = .71; McKnight et al., 2007). As the amount of missing data was minimal and the scales adopted have demonstrated acceptable scale reliability estimates, the remaining missing values were replaced using the mean of non-missing items from corresponding subscales (Graham et al., 2003).

Subscales were then computed and screened for univariate outliers. Standardized z-scores greater than +/- 3.29 ($p < .001$, two-tailed) served as the indicator for univariate outliers. This assessment resulted in four cases being removed. A Mahalanobis distance greater than $\chi^2 (12) = 32.91$ ($p < .001$) was used as the criteria to identify multivariate outliers. This evaluation resulted in three further cases being removed from the study ($n = 231$, 117 males, 112 females, 2 gender not reported; $M_{age} = 14.52$ years, s = 1.63; age range = 11–21). Following the removal of these cases, skewness and kurtosis values were then analysed. All variables were considered approximately univariate normal (absolute skewness values = .02 to 1.04; absolute kurtosis values = .12 to .76).

The variables relevant to the hypothesised models examining athlete burnout (five perfectionistic climate components and three athlete burnout symptoms) satisfied the assumption of multivariate normality (Mardia's normalised coefficient for multivariate kurtosis = 4.94). This assumption of multivariate normality was also satisfied (Mardia's normalised coefficient for multivariate kurtosis = 4.15) for the variables relevant to the hypothesised models examining athlete engagement (five perfectionistic climate components and four athlete engagement dimensions).

Descriptive Statistics, Scale Reliability, and Bivariate Correlation Analysis. The descriptive statistics and bivariate correlations are displayed in Table 8 (below). The bivariate correlations show that perfectionistic climate shared a positive relationship with total athlete burnout and two (out of three) individual burnout symptoms. By contrast, perfectionistic climate was unrelated to total athlete engagement and all four individual engagement dimensions. In line with previous research, total athlete burnout and specific athlete burnout symptoms shared inverse relationships with total athlete engagement and specific athlete engagement dimensions (Lonsdale et al., 2007b). The scale reliability estimates and corresponding 95% confidence intervals for each coach study variable are also reported in Table 8 (ω = .70 to .88).

Primary Analyses

Hypothesised Models. The first model focussed on the relationships between a latent perfectionistic climate variable and one latent athlete burnout variable. In this model, the exogenous perfectionistic climate variable was measured using the five manifest PCQ-S subscale scores (expectations, criticism, control, conditional regard, and anxiousness) as indicators. This modelling strategy is consistent with evidence (see studies one and two) that a hierarchical perfectionistic climate factor accounts for the covariation among the five first-order PCQ-S factors. The endogenous athlete burnout variable was modelled using subscale level indicators ($n = 3$). The measurement model, in which the two latent variables were specified to covary, provided reasonable fit to the data ($\chi^2 / df = 3.13$, CFI = .94, TLI = .91; RMSEA = .10, 90% CI = .07 to .12, SRMR = .08).

Table 8. Descriptive statistics, bivariate correlations, and reliability estimates.

Subscale	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Perfectionistic Climate															
1. PCQ-S															
2. EXP (PCQ-S)	.78***														
3. CRIT (PCQ-S)	.72***	.42***													
4. CTRL (PCQ-S)	.81***	.61***	.45***												
5. CR (PCQ-S)	.85***	.60***	.49***	.61***											
6. ANX (PCQ-S)	.76***	.42***	.50***	.54***	.57***										
Athlete Burnout															
7. ABQ	.18**	.07	.22***	.18**	.15*	.09									
8. RSA (ABQ)	-.07	-.14*	-.00	.02	-.07	-.08	.75***								
9. EXH (ABQ)	.30***	.16*	.33***	.25***	.26***	.21**	.80***	.30***							
10. DEV (ABQ)	.16*	.12	.18**	.15*	.14*	.06	.87***	.59***	.55***						
Athlete Engagement															
11. AEQ	.08	.11	.02	.01	.05	.10	-.61***	-.69***	-.28***	-.55***					
12. CON (PCQ-S)	.07	.12	.06	.01	.04	.03	.50***	-.66***	-.19**	-.41***	.81***				
13. DED (PCQ-S)	.09	.10	.03	.06	.06	.12	-.52***	-.62***	-.17**	-.52***	.88***	.67***			
14. VIG (PCQ-S)	.11	.14	.02	.02	.10	.13	-.51***	-.55***	-.28***	-.43***	.86***	.55***	.66***		
15. ENTH (PPS-S)	-.02	.13*	-.05	-.06	-.04	.06	-.53***	-.46***	-.32***	-.51***	.81***	.45***	.64***	.70***	
M	2.46	2.58	2.52	1.88	2.78	2.52	2.06	2.10	2.32	1.76	4.26	3.87	4.35	4.28	4.52
s	0.66	0.87	0.80	0.74	0.98	0.81	0.60	0.69	0.87	0.68	0.53	0.69	0.62	0.63	0.57
ω	.85	.82	.70	.71	.86	.80	.75	.76	.87	.78	.86	.83	.88	.85	.86
ω 95% LLCI	.82	.78	.64	.63	.83	.76	.69	.71	.84	.73	.83	.78	.84	.81	.81
ω 95% ULCI	.88	.86	.76	.77	.89	.84	.80	.81	.90	.83	.89	.87	.91	.88	.90

Note. PCQ-S = Perfectionistic Climate Questionnaire-Sport; EXP = Expectations; CRIT = Criticism; CTRL = Control; CR = Conditional regard; ANX = Anxiousness; ABQ = Athlete Burnout Questionnaire; RSA = Reduced sense of accomplishment; EXH = Physical and emotional exhaustion' DEV = Sport devaluation; AEQ = Athlete Engagement Questionnaire; CON = Confidence; DED = Dedication; VIG = Vigour; ENTH = Enthusiasm; N = 231; *p < .05; **p < .01; ***p < .001, two-tailed.

Table 9. Standardised coefficients from the hypothesised structural equation models.

Path	Standardised coefficient	Standard error	95% CI
Model 1 and Model 2			
Perfectionistic climate → Athlete Burnout	.18*	.07	.03 to .31
Perfectionistic climate → Reduced sense of accomplishment	-.06	.10	-.25 to .13
Perfectionistic climate → Physical and emotional exhaustion	.34***	.07	.19 to .47
Perfectionistic climate → Sport devaluation	.18*	.08	.02 to .34
Model 3 and Model 4			
Perfectionistic climate → Athlete Engagement	.09	.07	-.05 to .23
Perfectionistic climate → Confidence	.06	.08	-.08 to .21
Perfectionistic climate → Dedication	.10	.07	-.04 to .24
Perfectionistic climate → Vigour	.07	.08	-.09 to .24
Perfectionistic climate → Enthusiasm	-.04	.08	-.18 to .12

Note. $N = 231$. *$p < .05$; **$p < .01$; ***$p < .001$, two-tailed.

The second model focussed on the relationships between a latent perfectionistic climate variable and three athlete burnout latent variables: reduced sense of accomplishment, physical and emotional exhaustion, and sport devaluation. In this model, the same modelling strategy employed in the previous model was used to measure the exogenous perfectionistic climate variable. The endogenous athlete burnout symptoms were modelled using item-level indicators ($n = 5$ per latent variable). The measurement model, in which the four latent variables were specified to covary, provided acceptable fit to the data ($\chi^2 / df = 1.90$, CFI = .92, TLI = .91; RMSEA = .06, 90% CI = .05 to .07, SRMR = .07).

The third model focussed on the relationships between a latent perfectionistic climate variable and one latent athlete engagement variable. The same modelling strategy employed in the previous model was used to measure the exogenous perfectionistic climate variable. In terms of athlete engagement, subscale level indicators ($n = 4$) were used to specify the endogenous variable in the model. The measurement model, in which the two latent variables were specified to covary, provided reasonable fit to the data ($\chi^2 / df = 2.69$, CFI = .95, TLI = .93; RMSEA = .09, 90% CI = .06 to .11, SRMR = .04).

The fourth model focussed on the relationships between a latent perfectionistic climate variable and four athlete engagement latent variables: confidence, dedication, vigour, and enthusiasm. In this model, the same modelling strategy employed in the previous model was used to measure the exogenous perfectionistic climate variable. In terms of athlete engagement, item-level indicators were again used to specify the endogenous variables in the model ($n = 4$ per latent variable). The measurement model, in which the five latent variables were specified to covary, provided reasonable fit to the data ($\chi^2 / df = 2.45$, CFI = .91, TLI = .89; RMSEA = .08, 90% CI = .07 to .09, SRMR = .06).

Structural Equation Models. The first model provided reasonable fit to the data ($\chi^2 / df = 3.13$, CFI = .94, TLI = .91; RMSEA = .10, 90% CI = .07 to .12, SRMR = .08). In this model, the latent perfectionistic climate factor accounted for 3% of variance in athlete burnout. The results in

Table 9 show that perfectionistic climate shared a positive relationship with athlete burnout (β = .18, SE = .07, p = .02). In this model, the residual variance of the devaluation indicator was constrained to zero to account for a negative residual variance in the initial model specification. All freely estimated standardised factor loadings from indicator variables to latent variables were meaningful (λ > .30) and significant (p < .001).

The second model provided acceptable fit to the data (χ^2 / df = 1.90, CFI = .92, TLI = .91; RMSEA = .06, 90% CI = .05 to .07, SRMR = .07). In this model, the perfectionistic climate accounted for less than 1% of variance in reduced sense of accomplishment, 12% of variance in physical and emotional exhaustion, and 3% of variance in sport devaluation. The results in Table 9 show that perfectionistic climate shared a non-significant relationship with reduced sense of accomplishment (β = -.06, SE = .10, p = .50) but significant relationships with physical and emotional exhaustion (β = .34, SE = .07, p = .00) and sport devaluation (β = .18, SE = .08, p = .02). In this model, standardised factor loadings from indicator variables to relevant latent variables were all meaningful (λ > .30) and significant (p < .001). Moreover, the three athlete burnout symptoms all shared positive and significant correlations (r = .45 to .77).

The third model provided reasonable fit to the data (χ^2 / df = 2.69, CFI = .95, TLI = .93; RMSEA = .09, 90% CI = .06 to .11, SRMR = .04). In this model, the latent perfectionistic climate factor accounted for less than 1% of variance in athlete engagement. The results in Table 9 show that perfectionistic climate shared a non-significant relationship with athlete engagement (β = .09, SE = .07, p = .23). In this model, standardised factor loadings from indicator variables to relevant latent variables were all meaningful (λ > .30) and significant (p < .001).

The fourth model provided reasonable fit to the data (χ^2 / df = 2.45, CFI = .91, TLI = .89; RMSEA = .08, 90% CI = .07 to .09, SRMR = .06). In this model, perfectionistic climate accounted for less than or equivalent to 1% of variance in all four athlete engagement variables. The results in Table 9 show that perfectionistic climate shared a non-significant relationship with all dimensions of athlete engagement: confidence (β = .06, SE = .08, p = .43), dedication (β = .10, SE = .07, p =

.14), vigour ($\beta = .07$, $SE = .08$, $p = .39$), and enthusiasm ($\beta = -.04$, $SE = .08$, $p = .62$). In this model, standardised factor loadings from indicator variables to relevant latent variables were all meaningful ($\lambda > .30$) and significant ($p < .001$). The fours athlete engagement symptoms all shared positive and significant correlations ($r = .52$ to .79).

Discussion

To build on evidence that the PCQ-S is unique, the aim of the study in the present chapter was to examine the predictive ability of the PCQ-S. This was explored by examining the PCQ-S in relation to measures of athlete burnout and athlete engagement. These two outcomes were selected on the basis that they reflect very different sporting experiences and are outcomes that have previously been linked with trait dimensions of sport-specific perfectionism (Hill et al., 2020b; Jowett et al., 2016, 2021). The four structural equation models examined identified that perfectionistic climate predicted more negative (i.e., total athlete burnout and specific symptom dimensions of athlete burnout), but not more positive (i.e., total athlete engagement and specific dimensions of athlete engagement) sporting experiences. These findings are important as they indicate that perfectionistic climate experiences may be especially relevant to more negative sporting experiences.

Perfectionistic Climate and Athlete Burnout

The first structural equation model revealed that perfectionistic climate positively predicted total athlete burnout. This model is useful insofar as it highlights a link between perfectionistic climate and the broad experience of athlete burnout. This finding is also important as it adds to a growing body of research showing that perceptions of an environment shaped by negative sport-based interactions are likely to underpin burnout in young athletes (e.g., Gould et al., 1996; Pacewicz et al., 2019; Udry et al., 1997). Based on previous research, there is support for the role that environments shaped by ego-involving, controlling, and more disempowering coach behaviours play in predicting athlete burnout (Appleton & Duda, 2018; Barcza-Renner et al., 2016; Lemyre et al., 2008). The present study adds to this body of research by suggesting that perfectionistic coach

behaviours are also important to consider. This finding is especially important in context of research showing that perceptions of coach other-oriented performance perfectionism and coach pressure to be perfect are potential antecedents of athlete burnout (Gotwals, 2011; Olsson et al., 2021; Skwiot et al., 2020). While this initial finding is insightful, it is important to be aware that burnout is multidimensional and measuring total athlete burnout may mask underlying differences pertaining to each individual symptom (Raedeke & Smith, 2004).

In line with the notion that athlete burnout symptoms may have different antecedents and develop independently (DeFreese & Smith, 2020), perfectionistic climate was also examined in relation to each specific symptom dimension. This first finding in this analysis was that perfectionistic climate positively predicted physical and emotional exhaustion. This burnout dimension reflects the perceived depletion of emotional and physical resources resulting from sport training and competition (Raedeke & Smith, 2001). One potential explanation for this relationship is that athletes who perceive a highly perfectionistic climate may overexert themselves while trying to avoid minor mistakes and attain unrealistically high standards. This style of overstriving is a characteristic response when individuals experience an intense need to avoid failure. For example, Blatt (1965) described how individuals who are intensely worried about mistakes are often forced into an endless cycle of overstriving. That is, these individuals experience an environment replete with threat, yet compulsively strive to attain high standards, avoid minor mistakes, and gain approval from others who they believe are impossible to please.

The problem with overstriving is that it may contribute to further experiences of stress, which, if left unchecked, could result in severe psychological and physiological symptoms. This could include general apathy, disturbed sleep, loss of appetite, irritability, feelings of exhaustion, and increased vulnerability to injury. These are common symptoms cited by athletes who feel that they are overtrained and under too much stress or pressure (Nixdorf et al., 2022). When athletes feel this way, one outcome that is likely is physical and emotional exhaustion. This link was identified by Lemyre et al. (2007) who found that overtraining symptoms (e.g., disturbances in sleep, appetite,

energy, and training quality) positively predicted physical and emotional exhaustion in youth athletes. In the context of the current study, overstriving and overtraining could be two key mechanisms that explain why perfectionistic climate is positively related to physical and emotional exhaustion.

The second key finding in the analysis examining independent burnout symptoms was that perfectionistic climate positively predicted sport devaluation. This burnout dimension reflects the development of a diminished and cynical view toward the benefits of sport participation (Raedeke & Smith, 2001). One issue that may be at the centre of this relationship is difficulties in securing approval from the coach. This is because athletes in a highly perfectionistic climate perceive a coach who is extremely demanding, critical of minor mistakes, and impossible to please. The issue with this is that an athlete is rarely (if ever) able to feel like they can gain the acceptance of their coach. This sense of failure to meet externally imposed standards could give rise to cynical attitudes about sporting participation (e.g., "I can never perform to the standards that the coach wants, so maybe my time and energy would be better spent doing something else").

The idea that extreme coach pressure and an inability to meet externally imposed standards is relevant to sport devaluation is supported by previous research. Specifically, as highlighted in the introduction to this chapter, Olsson et al. (2021) examined the relationships between perceived coach other-oriented performance perfectionism (i.e., the belief that the coach tends to impose perfectionistic performance standards on others) and athlete burnout. In this study, the authors found that perceived coach other-oriented performance perfectionism positively predicted sport devaluation (even after controlling for athlete dimensions of performance perfectionism). This finding is important as it provides credence to the notion that athletes who perceive a coach who is difficult to please may be vulnerable to burnout symptomology in the form of cynicism toward sport. To build on this relationship, researchers could examine whether constructs capturing a need for approval from others (e.g., validation seeking) mediate the perfectionistic climate-sport devaluation relationship.

The final key finding in the analysis examining independent burnout symptoms was that perfectionistic climate was unrelated to reduced sense of accomplishment. This burnout dimension reflects a sense of low accomplishment and personal inadequacy in sport (Raedeke & Smith, 2001). In the hypothesised model, it was assumed that a positive relationship between these two variables would be found. This hypothesis was consistent with Missilidine's (1963) idea that highly perfectionistic climates have the capacity to erode a young person's sense of personal accomplishment and lead to deep-seated feelings of personal inadequacy. In a highly perfectionistic coach climate, young athletes are likely to feel like they are constantly falling short of, being criticised about, and made to feel guilty for failing to meet unrealistically high standards. These negative appraisals may well undermine perceptions of personal success and accomplishment in sport (e.g., "I am not performing up to my ability in sport").

One potential explanation for the unexpected finding is that there is a difference between attaining standards that are *personally meaningful* and attaining standards that *merit that approval of the coach*. In this sense, an athlete competing in a highly perfectionistic climate could feel that they are attaining worthwhile goals in sport yet are still never able to satisfy the expectations of the coach. In this sense, a highly perfectionistic climate could give rise to a reduced sense of coach-defined accomplishment (e.g., "It seems that no matter what I do, I don't perform as well as *the coach thinks I should"*) rather than a reduced sense of *personally defined* accomplishment ("It seems that no matter what I do, I don't perform as well as *I should"*). The exception to this explanation would be when athletes have internalised coach pressure for unrealistically high standards into their own perfectionistic personality. That is, over time, athletes in highly perfectionistic climates may learn to judge themselves and their performances against unrealistic standards. When athletes do so, they may start to feel unsuccessful and inadequate. This idea is supported by researching showing positive relationships between self-oriented performance perfectionism and reduced sense of accomplishment (Olsson et al., 2021).

Perfectionistic Climate and Athlete Engagement

The third and fourth structural equation models revealed that perfectionistic climate was unrelated to both total athlete engagement and each of its constituent dimensions (i.e., confidence, dedication, vigour, and enthusiasm). In the hypothesised models, it was assumed that perfectionistic climate would share a negative relationship with each engagement outcome. One of the factors underpinning this assumption was the notion that athlete engagement is the conceptual antithesis of athlete burnout (Raedeke et al., 2014). On this basis, it made sense to assume that perfectionistic climate would share divergent relationships with athlete burnout and athlete engagement. While evidence to support some level of divergence was found (i.e., mostly positive *versus* uniformly non-significant relationships), directly opposing relationships were not identified. There are several points that need to be addressed in discussing this result.

The first point to note is that the relationship between negative climate experiences and athlete well-being is inconsistent. This is evident in research examining athlete perceptions of controlling coach behaviour and indicators of athlete well-being. For example, Felton and Jowett (2012) found that controlling coach behaviour was unrelated to vitality (i.e., physical and mental aliveness and energy), physical self-concept (i.e., perceptions of performing effectively), and skill self-concept (i.e., perceptions of being skilful). However, in other studies, researchers have found that controlling coach behaviour negatively predicts vitality, psychological well-being, and engagement (Curran et al., 2014; Gucciardi et al., 2017; Stenling et al., 2017a). This mixed pattern of findings shows that the relationship between perceptions of coach control and positive outcomes is not necessarily straight forward. This may therefore also be the case when examining perfectionistic climate in relation to such outcomes.

One potential explanation for the unexpected result in the current study is that athlete engagement may not be the antipode (i.e., direct opposite) of athlete burnout. This issue has been recognised by researchers who state that burnout and engagement should be viewed as negatively correlated, yet conceptually distinct constructs (DeFreese & Smith, 2013). When viewed in this

way, the idea that an athlete could feel physically and mentally alert while participating in sport should not exclude the potential for them to also experience physical and emotional exhaustion from their training and competition (Schaufeli & Bakker, 2004). In the context of the current study, it may also mean that a climate experience underpinning higher levels of athlete burnout does not necessarily also underpin lower levels of athlete engagement. This idea is supported in previous researching showing that perceptions of an ego-involving peer climate share a positive relationship with athlete burnout, but a non-significant relationship with athlete engagement. Thus, athlete burnout and athlete engagement may well develop in response to different factors and experiences.

This idea has received support in research on engagement and burnout in the work domain. Using meta-analytical structural equation modelling, Goering et al. (2017) found that perceptions of hinderance at work (e.g., role conflict, role ambiguity, excessive bureaucracy, organisational politics, and general hassles) shared a positive relationship with work burnout, but a non-significant relationship with work engagement. This finding demonstrates that perceptions of a work environment characterised by stressors that interfere with goal attainment and thwart personal growth are highly relevant to exhaustion, cynicism, and inefficacy at work. However, the influence that such factors have on employees' levels of vigour, dedication, and involvement at work is less obvious. This finding is important as it reflects the same pattern of relationships identified between perfectionistic climate, athlete engagement, and athlete burnout. In this sense, while perceptions of a perfectionistic climate appear to be highly relevant to athlete burnout, the influence exerted on athlete engagement is less obvious.

Another factor that could help to explain the non-significant relationships identified in the present study is inter-induvial variability in the personal characteristics of the athlete sample. For example, some athletes may have been well equipped to deal with stress in sport, while others may have struggled or not cared about managing stress in sport. This is relevant as the ability to accept criticism from the coach, cope with adversity, and deal with pressure in sport are all factors that share a positive relationship with athlete engagement (Özcan, 2021). Therefore, examining the

interaction between perfectionistic climate and coping skills could help to reveal a more complicated relationship with athlete engagement (e.g., a relationship that differs depending on how well an athlete copes with stress). While this example has focussed on the role of athlete coping, other personal factors such as perfectionism, mental toughness, and passion may also interact with perceptions of perfectionistic climate to determine an athlete's levels of sport engagement.

Critical Reflection

In the present study it was assumed that perceptions of a highly perfectionistic climate would: (a) promote athlete burnout; and (b) undermine levels of athlete engagement. As this hypothesis was only partially supported, it is important to reflect on what the findings infer about the construct of perfectionistic climate. In doing so, it is important to focus on the inherent qualities and characteristics of highly perfectionistic climates. The key point to reflect on is whether the inherent qualities and characteristics of perfectionistic climate are only relevant to negative outcomes (e.g., athlete burnout). The possibility that perfectionistic climate might be unrelated to positive outcomes (e.g., athlete engagement) had not been fully considered until reflecting on the findings in the present study. This possibility is carefully considered in the present section.

The first point to note is that perfectionistic climate is likely to be highly relevant to negative sporting experiences and outcomes. In the current study, this notion is supported via positive relationships between perfectionistic climate and athlete burnout. However, based on theory pertaining to perfectionism development, burnout may be one of a range of negative experiences tied with perfectionistic climate experiences. In describing factors that exacerbate perfectionism development, Hewitt et al. (2017) describe how environments of perfectionistic pressure are likely to engender intense psychological pain. This includes feelings of depression, loneliness, and several self-conscious emotions (e.g., shame, guilt, and anxiety). This array of dark outcomes aligns with the view that highly perfectionistic climates are suffocating, rejecting, and degrading. These are some of the major characteristics that have been emphasised throughout the thesis and were central to the hypotheses in the present study.

The second point to note is that perfectionistic climate may exert less influence on positive sporting experiences. Indeed, in the present study it was found that perfectionistic climate was unrelated to athlete engagement. While this finding was identified, it is perhaps too premature to assume that perfectionistic climates will be unrelated to all positive sporting outcomes. For example, in describing the potential outcomes of highly perfectionistic climates, Hewitt et al. (2017) suggest that young people may experience diminished feelings of joy, exhilaration, and satisfaction. Thus, there is a requirement to expand the range of potential positive outcomes that may be relevant to perfectionistic climates in sport. A further key issue is that a relationship between perfectionistic climate and positive outcomes (including athlete engagement) may emerge over time. Only when athletes become tired of perfectionistic demands and expectations might the negative impact on positive outcomes become apparent. While this suggestion is only tentative, it represents a key area of future research. The key point to emphasise is that perfectionistic climate may be more relevant to negative outcomes in sport, but not entirely unrelated to all positive outcomes. Thus, researchers should continue to examine a nomological network of perfectionistic climate that includes both positive and negative outcomes.

Conclusion

To build on evidence that PCQ-S is a unique climate construct, the primary aim in the present study was to examine the predictive ability of the scale in relation to athlete burnout and athlete engagement. The results of the structural equation modelling technique employed revealed that perfectionistic climate perceptions positively predicted measures of athlete burnout, but shared non-significant relationships with measures of athlete engagement. The key message from this study is that perfectionistic climate has the capacity to contribute to distress in young athletes in the form of athlete burnout.

Chapter 5 – Perfectionistic Climate and Perfectionism Development in Youth Athletes

Abstract

The aim of the previous chapter was to examine whether perceptions of perfectionistic climate predict divergent youth sport experiences. In the fourth study of the thesis, outlined in this chapter, the aim is to build on this evidence and examine the relationships between perfectionistic climate and performance perfectionism in sport. This study employed a three-stage data analytical procedure. The first stage involved using ESEM analyses to examine whether the PCQ-S is sufficiently distinct from the Performance Perfectionism Scale for Sport (PPS-S). The second stage involved using structural equation modelling (SEM) to establish whether the PCQ-S can predict PPS-S dimensions. The final stage involved using a series of Latent Change Score (LCS) models to examine a more complex and dynamic relationship between the PCQ-S and PPS-S dimensions. Using a two-wave longitudinal design, data were collected from a sample of 179 youth athletes (M_{age} = 15.27 years, s = 1.72). The first stage of data analysis (ESEM analyses) provided evidence that the three PPS-S dimensions can be distinguished from the five PCQ-S components. The second stage of data analysis (SEM models) provided evidence that PCQ-S scores positively predict the PPS-S dimensions within measurement occasions. The final stage of data analysis (LCS models) revealed that increases in PCQ-S and PPS-S scores were evident across the two time points. However, initial PCQ-S scores did not significantly predict changes in PPS-S dimensions over time (or vice versa). The findings of this study are discussed in relation to theory pertaining to perfectionism development and methodological challenges in longitudinal research.

Introduction

The PCQ-S was designed to capture the extent to which athletes perceive an environment in which the coach places pressure on athletes to perform perfectly. As outlined in the introductory chapter, part of the conceptual basis underpinning this new construct and scale is Flett, Hewitt, and colleagues' seminal work on perfectionism development (Flett et al., 2002; Hewitt et al., 2017). One argument born from this conceptual framework is that perceptions of perfectionistic climate ought to be highly relevant to the development of perfectionism. That is, athletes who perceive an environment in which the coach is harsh, negligent, and psychologically controlling, extremely difficult to please, and excessively worried about mistakes and the implications of others not being perfect may be vulnerable to the development of their own perfectionistic personality. To test whether this is the case, the study outlined in the current chapter examines the relationships between perfectionistic climate and performance perfectionism in sport.

Perfectionistic Climate and the Development of Perfectionism

The perfectionistic climate construct was conceived with the development of perfectionism in mind. When developing the perfectionistic climate construct, it was important to draw from both early and later developmental considerations pertaining to the development of perfectionism. Regarding early developmental considerations, Hewitt et al. (2017) focussed on how the social environment is key in acting on biological vulnerabilities and shaping early childhood experiences. Hewitt and colleagues focussed on how *asynchrony* (or mismatch) between a child's attachment needs (e.g., the need for affection, nurturance, and reassurance) and a caregiver's responses provide the basis for the development of perfectionism. When a caregiver is experienced as being unresponsive or inconsistent in fulfilling attachment needs, young children may develop a view of themselves as flawed and unworthy, and others as unavailable and critical. This fragile sense of self and negative view of others, in turn, instils beliefs that being or appearing perfect to others will provide respite from rejection and lead to acceptance.

The construct of perfectionistic climate is relevant to asynchrony in the sense that it captures features of the social environment that undermine a sense of unconditional acceptance and give rise to a view of others as non-responsive, neglectful, and overly critical. Specifically, the component behaviours and all-round interpersonal style captured in the model of perfectionistic climate are likely to provide a foundation for experiencing significant others as incapable (e.g., "The coach *cannot take care of my needs*") and unavailable (e.g., "The coach *will not be there to support me*"). This sense of asynchrony may also feed into a sense of the self as being incapable (e.g., "When I need something from the coach, *I am unable to do anything about it*") and unworthy ("My needs are never met by the coach, which means *I do not matter*"). As Hewitt et al. (2017) describe, these are essential ingredients that will thwart the capacity of young people to develop trust in others. In terms of personal development, these ingredients may also interfere with the formation of secure and healthy styles of relating, resilience to stressful events, and a healthy sense of self-esteem (Hewitt et al., 2017). In these regards, perceptions of a highly perfectionistic climate may lay a foundation for asynchrony and the development of perfectionism in young people (Hill & Grugan, 2019).

In terms of later developmental experiences, Flett et al. (2002) outlined a conceptual model incorporating several factors pertinent to the development of perfectionism (e.g., child factors, parental factors, and environmental factors). This model places an emphasis on family factors and the role of parents in contributing to the development of perfectionism. In particular, the model considers multiple family environments that are shaped by parents and have the potential to maintain, reinforce, or further exacerbate the development of perfectionism in young people. As described in the opening chapter, these family contexts include demanding environments in which parental acceptance is contingent upon meting unrealistically high parental standards (social expectations pathway), hostile environments in which parents engage in harsh parental practices (social reactions pathway), and intense environments in which parents are excessively worried about mistakes and the negative implications of their children not being perfect (anxious rearing

pathway). These pathways emphasise parenting styles and practices (i.e., what parents do) that shape an immediate family environment in which perfectionism develops. This contrasts with the other developmental pathway that focusses on the personality of parents (i.e., who parents are) and the tendency for young children to model or imitate perfectionism from their parents (social learning pathway).

There is clear synergy between perfectionistic climate and the pathways to perfectionism outlined above. In particular, perfectionistic climate straddles the first three developmental pathways. For example, the social expectations model provides a theoretical grounding for the *expectations* and *conditional regard* components of perfectionistic climate. The major premise of this model is that the requirement for young people to be perfect is reinforced in social environments where acceptance from others is conditional on meeting their unrealistically high expectations (Flett et al., 2002). In this sense, perfectionism is likely to develop when children view others as: (a) expectant of outstanding, excessively high, or unrealistic levels of performance; and/or (b) making their love, approval, or support contingent on meeting unrealistic performance standards. It is for these reasons that expectations (i.e., the perception that key social agents hold and demand unrealistically high performance expectations of others) and conditional regard (i.e., the perception that key social agents employ internally controlling strategies that place pressure on others to perform perfectly) were conceptualised as key components likely to underpin perfectionistic climates.

The social reactions model provides a theoretical grounding for the *criticism* and *control* components of perfectionistic climate. The major premise of this model is that the requirement for young people to be perfect develops from experiences of harsh socialisation practices and developing in a hostile social environment (Flett et al., 2002). In this model the reactivity of key social agents may take the form of: (a) harsh, judgemental, and hypercritical comments and behaviours; and/or (b) abusive, intimidating, and excessively controlling practices that put pressure on perfect performances. It is for these reasons that criticism (i.e., the perception that key social

agents engage in harsh criticism whenever the performance of others is not perfect) and control (i.e., the perception that key social agents employ externally controlling strategies that place pressure on others to perform perfectly) were conceptualised as key components likely to underpin perfectionistic climates. The key distinction between these components is that criticism is as an extreme response to mistakes and non-perfect performances while control is as an extreme motivational strategy to deter future mistakes and place pressure on attaining unrealistically high future standards.

The anxious rearing model provides a theoretical grounding for the *anxiousness* component of perfectionistic climate. The major premise of this model is that the requirement for young people to be perfect is reinforced in social environments that promote an excessive focus on mistakes and the negative implications of not performing perfectly (Flett et al., 2002). In this model, perfectionism is likely to develop when children view others as being overly anxious and overprotective. This includes viewing others as trying to guard against even minor mistakes, providing constant warning about the negative consequences of mistakes, and being hypervigilant toward potential factors that could interfere with performance. It is for these reasons that anxiousness (i.e., the perception that key social agents are extremely worried and vigilant about mistakes and the consequences of others not performing perfectly) was conceptualised as a key component of perfectionistic climate.

By grounding the components of perfectionistic climate in models of perfectionism development, the construct encapsulates the key perfectionistic behaviours, practices, and relational styles that contribute to experiences of perfectionistic social environments. Specifically, perfectionistic climate captures behaviours that give rise to a view of key social agents being extremely demanding yet impossible to please, hostile in retaliation to even minor performance discrepancies, and terrified of mistakes and the consequences of poor performance. With this in mind, the overall experience of intense pressure captured by the component behaviours of perfectionistic climate may be highly relevant to the development, maintenance, or reinforcement of

perfectionism in young athletes. However, before testing this assertion, it is important to draw upon existing research on perfectionism development and identify key areas in which the present study will build upon and advance existing knowledge. In this regard, there are a few studies that provide initial support for the relevance of coach pressure to be perfect on the development of perfectionism.

Coach Pressure and the Development of Sport-Specific Perfectionism

In terms of evidence for coach-related factors in the development of perfectionism, coach pressure to be perfect (i.e., unrealistic coach expectations in combination with overly harsh coach criticism) typically shares positive associations with core dimensions of perfectionism. This relationship is evident in research on youth (Hill et al., 2016; Madigan et al., 2019; Sapieja et al., 2011) and young-adult athletes (Gotwals, 2011; Sagar et al., 2009). In these studies, coach pressure to be perfect shares positive associations with multiple dimensions of perfectionism. This includes aspects of perfectionism associated with self-oriented striving for perfection and the setting of very high personal performance standards (i.e., perfectionistic strivings), as well as concern over making mistakes, fear of negative social evaluation, feelings of discrepancy between one's expectations and performance, and negative reactions to imperfection (i.e., perfectionistic concerns; Gotwals et al., 2012). This cross-sectional evidence suggests that extreme coach demands in combination with harsh coach criticism may underpin the development of multiple perfectionistic tendencies.

The most comprehensive study on the development of perfectionism in sport is a multi-sample ($k = 3$, $N = 423$) project including two longitudinal examinations of perfectionism development. In this project, Madigan et al. (2019) initially (in sub-study one) examined the cross-sectional relationships from coach and parental pressure to athlete perfectionism using a mini meta-analysis. This analysis included the results from all three samples. The results show that both sources of perfectionistic pressure (coach and parent) share positive associations with perfectionistic strivings (viz., striving for perfection) and perfectionistic concerns (viz., negative reactions to imperfection). This initial finding is important as it suggests that perfectionistic

pressure from both parents and coaches are important in the development of sport-specific perfectionism among junior athletes (ages 16-19 years). However, as Madigan and colleagues emphasise, this finding is based on cross-sectional evidence and does not allow for strong inferences of causality.

To build on this initial study, Madigan et al. (2019) conducted two longitudinal examinations on the predictive ability of coach and parental pressure in relation to perfectionism (in sub-studies two and three). In the first of these examinations, Madigan and colleagues sought to examine the extent to which coach pressure and parental pressure predict change in perfectionism over a relatively short period of three months. The authors found that coach and parental pressure added incrementally to the prediction of perfectionistic striving (after controlling for Time 1 perfectionistic strivings) but not perfectionistic concerns. In terms of individual predictors, it was coach pressure to be perfect (in both analyses) that emerged as a unique positive predictor. This finding is important as it suggests that perfectionistic pressure from coaches is influential in the development of sport-specific perfectionism (especially perfectionistic strivings) even over short periods of time.

In the second longitudinal examination, Madigan et al. (2019) sought to examine the extent to which coach pressure and parental pressure predict change in perfectionism over a slightly longer period of six months. In this sub-study, the authors found that coach and parental pressure added incrementally to the prediction of both perfectionistic strivings and perfectionistic concerns (after controlling for T1 perfectionistic strivings and perfectionistic concerns, respectively). In terms of individual predictors, and consistent with the previous sub-study, it was coach pressure to be perfect (in both analyses) that emerged as a unique positive predictor. This finding is important as it reinforces the idea that perfectionistic pressure from coaches is highly influential in the development of perfectionism among junior athletes. In addition to this broad observation, the results also indicate that exposure to coach pressure over a slightly longer period (six months *versus*

three months) may result in the development of multiple aspects of perfectionism (perfectionistic strivings and perfectionistic concerns).

The findings from Madigan et al. (2019) are important as they highlight that it is important to differentiate between coach and parental pressure when examining perfectionism development. In particular, the study shows that for older youth athletes (16-19 years), the coach is especially influential in the development of sport-specific perfectionism. This observation aligns nicely with a recent study examining coach and parental pressure in youth ($N = 1544$, $M_{age} = 15.44$, $s = 2.12$) *versus* adolescent and adult ($N = 1706$, $M_{age} = 20.80$, $s = 2.09$) athletes. In this study, Dunn et al. (2022) found that younger athletes reported significantly higher perceptions of parental pressure in comparison to athletes in late adolescence and early adulthood. Older athletes also reported significantly higher perceptions of coach pressure in comparison to younger athletes. This pattern of findings suggests that athletes' relationships with parents and coaches vary at different stages of development. In relation to the role of the coach, as young athletes get older, they may become more dependent upon the coach. In this period, athletes often spend a great deal of time with their coach, view them as gatekeepers to their selection and continued development, and therefore learn to become highly attuned to their performance expectations and criticism (Dunn et al., 2022).

Building on Previous Perfectionism Development Research in Sport

The present study on the development of performance perfectionism builds on previous research in three major ways. The areas of development relate to the scope of perfectionistic climate in relation to existing coach pressure to be perfect constructs, the dependent measure of performance perfectionism, and potential developmental pathways that warrant investigation.

A More Comprehensive Model of Coach Pressure. The first relevant point is that perfectionistic climate encompasses several different coaching practices likely to influence perfectionism development. In addition to coach expectations (i.e., unrealistic performance expectations and demands) and coach criticism (i.e., harsh criticism whenever the performance of others is not perfect), perfectionistic climate encompasses perceptions of coach control (i.e.,

externally controlling strategies that place pressure on athletes to perform perfectly), coach conditional regard (i.e., internally controlling strategies that place pressure on athletes to perform perfectly), and coach anxiousness (i.e., extreme worry and vigilance about mistakes and the consequences of others not performing perfectly). When considered collectively, the component behaviours of perfectionistic climate provide a much more comprehensive model of coach pressure to be perfect than is currently captured by existing models.

In terms of evidence for these other coach behaviours being relevant to the development of perfectionism, it is possible to draw inferences from research focussing on the coach motivational climate. For example, as highlighted earlier in the thesis, Barcza-Renner et al. (2016) examined the role of controlling coach behaviour in relation to perfectionism (i.e., self-oriented perfectionism and socially prescribed perfectionism). In a sample of National Collegiate Athletic Association (NCAA) Division One swimmers, the authors found that dimensions of coach control (i.e., controlling use of rewards, negative conditional regard, intimidation, and excessive personal control) shared positive relationships with both self-oriented and socially prescribed perfectionism. The only exception to this pattern of findings was the non-significant relationship between intimidation and self-oriented perfectionism. This pattern of correlations shows that perceiving a coach climate that is coercive, pressuring, and highly authoritarian corresponds with higher levels of perfectionism in young adult athletes. In terms of the two perfectionism dimensions examined, it was socially prescribed pressure (i.e., a belief that others expect and demand perfection of the self) that showed the stronger and more consistent positive associations.

In another relevant study, Gustafsson et al. (2016) examined perfectionism and the parental-initiated motivational climate in a sample of Swedish youth athletes. In this study, perfectionism (i.e., perfectionistic strivings and perfectionistic concerns) was examined in relation to two ego-involving (i.e., worry-conducive climate and success-without-effort climate) and one task-involving parental climate dimension (i.e., learning and enjoyment climate). The authors found that the task-involving dimension shared a negative relationship with perfectionistic concerns and a non-

significant relationship with perfectionistic strivings. In terms of the ego-involving dimensions, worry-conducive climate was positively related with both dimensions of perfectionism, while success-without-effort climate was positively related with perfectionistic concerns only. A key point to note is that the worry-conducive climate shared the strongest associations with the two perfectionism variables examined. This finding suggests that perceiving an environment in which parents are excessively worried about mistakes may be highly relevant to perfectionism development.

Performance Perfectionism in Sport. The second area of development is that the present study provides a focus on the development of *performance perfectionism* in sport. To date, research on coach-related factors implicated in the development of perfectionism have used sport-specific perfectionism measures that operate at the domain-specific level (e.g., "I must be perfect in sport"). However, a more recent measure of sport-specific perfectionism has been developed which operationalises the requirement to be perfect as it applies to a very specific aspect of sport–sport performance (e.g., "I must *perform* perfectly in sport"). This measure provides a sport-specific extension to Hewitt and Flett's (1991) model of multidimensional perfectionism, with self-oriented (i.e., the tendency to set excessively high personal *performance* standards), socially prescribed (i.e., the belief that significant others impose unrealistic *performance* standards on the self and that approval is contingent on their achievement), and other-oriented (i.e., the tendency to impose perfectionistic *performance* standards on others) perfectionism dimensions.

Using this measure of performance perfectionism provides two important advantages. The first advantage of this measure over alternative perfectionism measures is that it narrows an athlete's focus from a potentially vast range of areas that the requirement for perfection could be applied (e.g., being the perfect trainer, leader, or teammate) to one area only (e.g., being the perfect performer). This is significant on the basis that performance is a defining feature of sport and an aspect of participation that athletes typically value extremely highly (Hill et al., 2016). It is therefore significant that the present study provides the first comprehensive examination into a

potential antecedent of each performance perfectionism dimension. The second advantage is that

the PCQ-S provides a specific focus on performance rather than all aspects of sport more broadly

(e.g., "The coach expects *performances* to be perfect at all times" *rather than* "The coach expects

athletes to be perfect at all times"). This means performance perfectionism provides a highly

suitable dependent variable to examine when considering the role of perfectionistic climate in the

development of perfectionism.

The second major advantage associated with the proposed performance perfectionism

measure relates to theory. Flett, Hewitt, and colleagues (Flett et al., 2002; Hewitt et al., 2017) have

provided a theoretical framework that accounts for various pathways to the development of self-

oriented, socially prescribed, and other-oriented dimensions of perfectionism. While there are

various developmental trajectories relevant to each dimension, Hewitt et al. (2017) cover the most

pertinent pathways. In terms of self-oriented perfectionism, one such pathway focusses on

asynchronous relationships characterised by inconsistency in the fulfilment of attachment needs.

This inconsistency fuels a sense that one is flawed, needs to do better, and must be perfect to gain

consistent support and approval. This sense of pressure is then internalised and takes on the form of

the personal demands for perfection and extreme self-expectations characteristic of self-oriented

perfectionism (Hewitt et al., 2017). Given that highly demanding and unsupportive environments

may give rise to similar themes of asynchrony, perfectionistic climate may well lay a foundation for

the development of self-oriented performance perfectionism in athletes. In support of this

relationship, research in youth athletes has shown that coach pressure to be perfect positively

predicts aspects of self-oriented striving for perfection in academy athletes (Madigan et al., 2019).

In terms of the development of socially prescribed perfectionism, Hewitt et al. (2017) again

highlight the role of asynchronous relationships with specific significant others. In this case, during

a period when young children are hypersensitive to interpersonal interactions and rely on others to

form a working model of the world, asynchrony gives rise to a sense that others are unavailable,

uninterested, and uncommitted (Hewitt et al., 2017). In turn, this experience feeds into a sense that

one must be unworthy, invisible, or flawed as a human. To deal with this sense of vulnerability, some young children in this position place an irrational level of importance on securing the approval of others and feel that being or appearing perfect is the only way to achieve this aim. Given that highly demanding and unsupportive environments may give rise to similar themes of helplessness, perfectionistic climate may also lay a foundation for socially prescribed performance perfectionism. In terms of empirical support for this pathway, there is initial evidence that coach pressure to be perfect is a strong and consistent predictor of socially prescribed performance perfectionism in young recreational athletes (Hill et al., 2016).

In terms of other-oriented perfectionism, a sense of asynchrony is again potentially fundamental to perfectionism development (Hewitt et al., 2017). In this case, a learned sense of feeling irrelevant and invisible to unresponsive others thwarts a young person's emotional needs and gives rise to anger and frustration. In turn, any feelings of bitterness and indignation may provide the foundation for interpersonal hostility, a cruel disregard for others, and the requirement for others to be perfect (Hewitt et al., 2017). This outward requirement for perfection is proposed as a defensive manoeuvre intended to deflect attention away from personal shortcomings and feelings of inadequacy. In this sense, the characteristic demands of other-oriented perfectionism provide an attempt to gain control, power, and dominance in response to life situations that have left young people feeling neglected, imperfect, and powerless. Given that highly demanding and unsupportive environments may give rise to similar themes of negligence and resent, perfectionistic climate may also lay a foundation for other-oriented performance perfectionism. In terms of empirical support for this pathway, Hill et al. (2016) found that coach pressure to be perfect predicted other-oriented performance perfectionism in one of their samples of recreational athletes.

The Dynamic Nature of Perfectionism Development. The developmental pathways outlined in the present chapter focus on how perfectionism changes because of specific socialisation experiences that unfold over time. Specifically, the processes of perfectionism development described are a function of various social factors relating to the child and how they learn to

experience their immediate social environment and relationships with key significant others (Flett et al., 2002; Hewitt et al., 2017). To effectively study perfectionism development, it is therefore important to employ longitudinal research designs that account for the dynamic nature of the corresponding theoretical framework. While there are numerous studies that address this point when researching perfectionism development outside of sport (e.g., Damian et al., 2013, 2017; Domocus & Damian, 2018), there is only one longitudinal study on perfectionism development among athletes (Madigan et al., 2019). Most of the evidence linking social factors with sport-specific perfectionism is based on cross-sectional research. While this evidence can be used to make tentative assumptions on how perfectionism may develop in athletes, it cannot be used to draw strong inferences regarding causality (Stenling et al., 2017b). To understand how perfectionism in athletes is likely to unfold over time and identify the factors that may underpin such change, more purposeful longitudinal research on perfectionism development is required.

In addition to this broad requirement for more longitudinal research, there is a more specific need for research that can test competing developmental hypotheses. For instance, researchers typically take the viewpoint that exposure to extreme demands and harsh criticism by key significant others (e.g., parents or coaches) is a necessary precondition to perfectionism development. This viewpoint represents a clear causal pathway where perceptions of the social environment shaped by key social agents underpins subsequent change in perfectionism. In research, this pathway is evident when researchers use coach and parental pressure as regression-based predictors of perfectionism (as opposed to vice versa; e.g., Damian et al., 2013; Madigan et al., 2019). While this ordering of variables is well aligned with relevant theory and has gained consistent empirical support, it is important to consider whether the inverse of this pathway could also be plausible. That is, whether levels of sport-specific perfectionism could predict subsequent change in perceptions of the perfectionistic climate.

The importance of testing this relationship is important on at least two grounds. The first point is that that evidence in favour of one pathway should not preclude examinations of alternative

pathways. This is evident in longitudinal research showing that variables typically considered as outcomes of perfectionism (e.g., academic achievement, academic efficacy, and school satisfaction) have been found to be predictors of perfectionism (Damian et al., 2017; Stricker et al., 2019). The same may therefore be true when examining perfectionistic climate and perfectionism relationships. The second reason is that it is well-accepted that perfectionism has the capacity to shape the way in which an individual construes their social environment and relationships with others. In sport, this potential is supported by research showing that perfectionism is associated with perceptions of friendship quality (Ommundsen et al., 2005), coach satisfaction with goal attainment (Appleton et al., 2009), and team cohesion (Freire et al., 2022). There is also evidence that perfectionism may shape the way in which young people view and interpret the motivational climate.

In terms of motivational climate-based research, Nordin-Bates et al (2014) examined the relationship between dance-related perfectionism and perceptions of the teacher-initiated motivational climate over time. The two-wave longitudinal design employed allowed for tests of whether: (a) perfectionism predicts changes in motivational climate; (b) motivational climate predicts changes in perfectionism; or (c) the relationship between motivational climate and perfectionism is reciprocal. In this two-wave longitudinal study of dancers from UK Centres for Advanced Training, Nordin-Bates and colleagues found that perceptions of a task-involving climate led to increased perfectionistic strivings over time. However, the researchers also found that perfectionistic concerns led to increased perceptions of an ego-involving climate and decreased perceptions of a task-involving climate. This pattern of results highlights the potential for a reciprocal relationship. In this regard, the potential for perfectionism to predict perfectionistic climate should not be ignored in the current study.

One analytical framework that that provides a powerful approach to testing competing developmental hypotheses is *Latent Change Score* (LCS) modelling (also known as *Latent Difference Score* modelling; J. J. McArdle & Hamagami, 2001). This analytical approach has been widely employed in areas of developmental and cognitive psychology (Kievit et al., 2018).

However, it is an approach that has recently been introduced to research in sport and exercise psychology. The emergence of this approach is evident in research examining the dynamic interplay between perceived stress and injury risk (Clement et al., 2018), physical activity and psychological distress (Gucciardi et al., 2020), team satisfaction and life satisfaction (L. H. Chen et al., 2018), SDT-based motivational variables and well-being (Stenling et al., 2015), and athletic identify and athlete burnout (Chang et al., 2018). This approach has the capacity to model: (a) time-sequential changes in multiple variables; and (b) time-sequential relationships over time.

The potential capability and relevance of this modelling approach in sport and exercise psychology is best outlined by Stenling et al. (2017b). In this review of longitudinal analytical techniques often applied in sport and exercise psychology research, Stenling and colleagues argue that LCS modelling is ideally suited for testing dynamic processes emphasised in many theories used to guide research in this domain (Stenling et al., 2017b). To demonstrate the capability of this approach, the authors use example data on the constructs of cognitive functioning and physical functioning. The first recommendation the authors make is to run univariate LCS models to examine time-sequential change in each study variable. If any change is identified, the next step is to then run a bivariate LCS model to examine time-sequential relationships (i.e., whether change in one variable is a function of the starting level in another variable). In their research example, the authors found evidence for: (a) a mean decrease in cognitive functioning over time; and (b) a positive relationship between starting levels of physical functioning and change in cognitive functioning. This combination of results suggests that higher levels of physical functioning are associated with a lesser decline in cognitive functioning. This example demonstrates the utility of this approach when applied to multivariate repeated measures data.

The Present Research

The aim of this study is to examine the relationships between perfectionistic climate and performance perfectionism in sport. To do so, a three-stage analytical procedure will be adopted. The first stage will use ESEM analyses to examine whether the PCQ-S is sufficiently distinct from

the Performance Perfectionism Scale for Sport (PPS-S). The second stage will involve using structural equation modelling (SEM) to establish whether the PCQ-S can predict PPS-S dimensions. The final stage will then involve using a series of LCS models to examine a more complex and dynamic relationship between the PCQ-S and PPS-S dimensions.

Method

Participants

A convenience sample of 179 youth athletes (116 males; 63 females; M_{age} = 15.27 years, s = 1.72; age range = 12–18) volunteered to take part in the present longitudinal research project. Of this initial sample, 153 athletes completed the study questionnaire at both time points (85% completion rate). The participants were recruited from six independent secondary schools in the United Kingdom and represented various sports (e.g., football, rugby, netball, badminton, swimming, and athletics) and levels of competition (recreational = 2, club = 119, county = 15, regional = 19, semi-professional = 6, professional = 0, national = 8, international = 10). On average, athletes had been working with their current coach for 3.59 years (s = 3.06) and spent 5.22 hours per week (s = 2.94) with them during periods of training and competition. In comparison to other activities in their lives, athletes rated their sport as extremely important (M = 1.95, s = 0.98; 1 = *extremely important* to 9 = *extremely unimportant*).

Procedure

Following ethical approval from an institutional review board (see Appendix A.4), gatekeepers of secondary schools in the UK were contacted via e-mail (see Appendix B.1) and invited to participate in the study. The lead researcher made data collection arrangements with six schools expressing an interest in supporting the study. The study was longitudinal by design and involved participants at each school completing the same set of self-report measures on two separate occasions approximately three-months apart (M_{days} = 96.96, s = 7.73). On each occasion, the study participants were provided with information about the project and a hyperlink to access the online Qualtrics questionnaire (see Appendix C.4). In advance of data collection,

parental/guardian consent was gained from the parents of youth sport participants (< 16 years) who had volunteered to participate (see Appendix B.2). All participants also provided their informed consent prior to completing the below measures (see Appendix D.1).

Measurement

Perfectionistic Climate. The Perfectionistic Climate Questionnaire–Sport (PCQ–S) developed in chapter two and examined in chapters three and four was used to assess perfectionistic features of the coach-created climate in sport. This five-factor 20-item scale was administered and scored in the same way as the study outlined in the previous chapter.

Performance Perfectionism in Sport. The Performance Perfectionism Scale for Sport (PPS-S; Hill et al., 2016) was used to assess levels of performance perfectionism in sport. This 12-item scale includes three subscales assessing self-oriented performance perfectionism (SOPP; 4-items, e.g., "I put pressure on myself to perform perfectly"), socially prescribed performance perfectionism (SPPP; 4-items, e.g., "People criticise me if I do not perform perfectly"), and other-oriented performance perfectionism (OOPP; 4-items, e.g., "I am never satisfied with the performances of others"). The participants were informed that the list of items reflect beliefs athletes hold when taking part in sport. They were then instructed to think about their own sport involvement and rate the extent to which they agree or disagree with each statement using a 7-point (1 = *strongly disagree* to 7 = *strongly agree*) Likert scale (see Appendix E.7). Hill et al. (2016) have provided evidence supporting the three-factor structure and scale reliability of the PPS-S ($\alpha \geq .70$).

While there are various measures of sport-specific perfectionism, the PPS-S (Hill et al., 2016) was selected for this study. As outlined in the introduction to this chapter, the PPS-S is a sport-specific extension to Hewitt and Flett's (1991) model of multidimensional perfectionism. The first advantage of using the PPS-S is the fact that Flett, Hewitt, and colleagues (Flett et al., 2002; Hewitt et al., 2017) have provided a comprehensive theoretical framework that accounts for the various pathways to the development of each perfectionism dimension in this model. The same cannot be said for the dimensions of perfectionism incorporated within other measures of sport-

specific perfectionism. The second advantage is that, as per the PCQ-S, the PPS-S provides a specific focus on performance in sport (rather than multiple aspects of sport more broadly). This means that the PPS-S provides a highly suitable measure in context of the present study.

Data Analysis

Preliminary Analyses. The study analyses were carried out using IBM Statistics SPSS 26.0, M*plus* 8.1, and Ωnyx (von Oertzen et al., 2015). Ωnyx is a freely available graphical modelling software programme used to create and estimate structural equation models. In terms of the analytical procedure, the first step involved cleaning the raw data (Tabachnick & Fidell, 2014). Following this, descriptive statistics, bivariate correlations, and scale reliability estimates were computed. These preliminary analyses were then followed by three primary analyses.

Stage 1: ESEM Measurement Model Including PCQ-S and PPS-S Dimensions. An important aim in the present study is to examine whether the items and associated dimensions of the PCQ-S can be clearly delineated from the items and associated dimensions of the PPS-S. To test this aim, an ESEM approach was employed to examine the factorial validity of the PCQ-S and PPS-S items. Using T1 and T2 data, two eight-factor (five PCQ-S dimensions and three PPS-S dimensions) measurement models were examined in which: (a) items were permitted to load on all first-order factors; and (b) all latent factors were specified to covary. In both analyses, the WLSMV estimation method for categorical variables in M*plus* 8.1 was used. The evaluation of model fit and parameter estimates was guided by the same criteria previously identified in study one.

Stage 2: Structural Equation Models. The major aim in the present study is to examine the relationships between perfectionistic climate and performance perfectionism. This aim was initially examined by testing a series of SEM-based models. These analyses examined the relationships between variables within the same wave of data collection (T1 PCQ-S → T1 PPS-S dimension; T2 PCQ-S → T2 PPS-S dimension). The SEM models were carried out and evaluated using the same protocol as the SEM models in the previous study.

Stage 3 (Step 1): Univariate Latent Change Score Models. To examine the dynamic

relationships between perfectionistic climate and change in performance perfectionism over time, a

series of LCS-based analyses were required. The first step in this process was to examine change in

each variable over time using univariate LCS analyses. In total, four univariate LCS models were

estimated. In each case, the aim was to examine the nature of change in the variables under

examination (i.e., ΔPCQ-S, ΔSOPP, ΔSPPP, or ΔOOPP). The models will identify whether there is

reliable average change from T1 to T2. In the hypothesised model, this change is represented by a

latent change factor (shown as ΔPPS-S in Figure 4). The models will also estimate the extent to

which individuals differ in the change they manifest between T1 and T2. In the hypothesised model,

this variance is reflected by the bi-directional parameter $\sigma^2\Delta$PPS (shown in green in Figure 4). The

final piece of information the models will provide is an estimation of the extent to which change is

dependent, or proportional, to scores in the same variable at T1. In the hypothesised model, this

relationship is reflected by the unidirectional parameter β (shown in red in Figure 4).

In each model observed scores for perfectionistic climate, self-oriented performance

perfectionism, socially prescribed performance perfectionism, and other-oriented performance

perfectionism were used. This approach was adopted over a latent variable approach to maintain a

reasonable ratio of cases (i.e., participants) to estimated parameters in each model (i.e., model

complexity). The importance of keeping each model as simple as possible was required given the

modest sample size in the present study. The second noteworthy decision was the modelling

approach to examine perfectionistic climate. In keeping with evidence that the five perfectionistic

climate components can be used to model a hierarchal factor (presented in chapters two and three),

a total perfectionistic climate score was used. This analytical approach had the additional benefit of

reducing the number of models to be estimated (univariate LCS models = four *versus* eight;

bivariate LCS models = three *versus* 15).
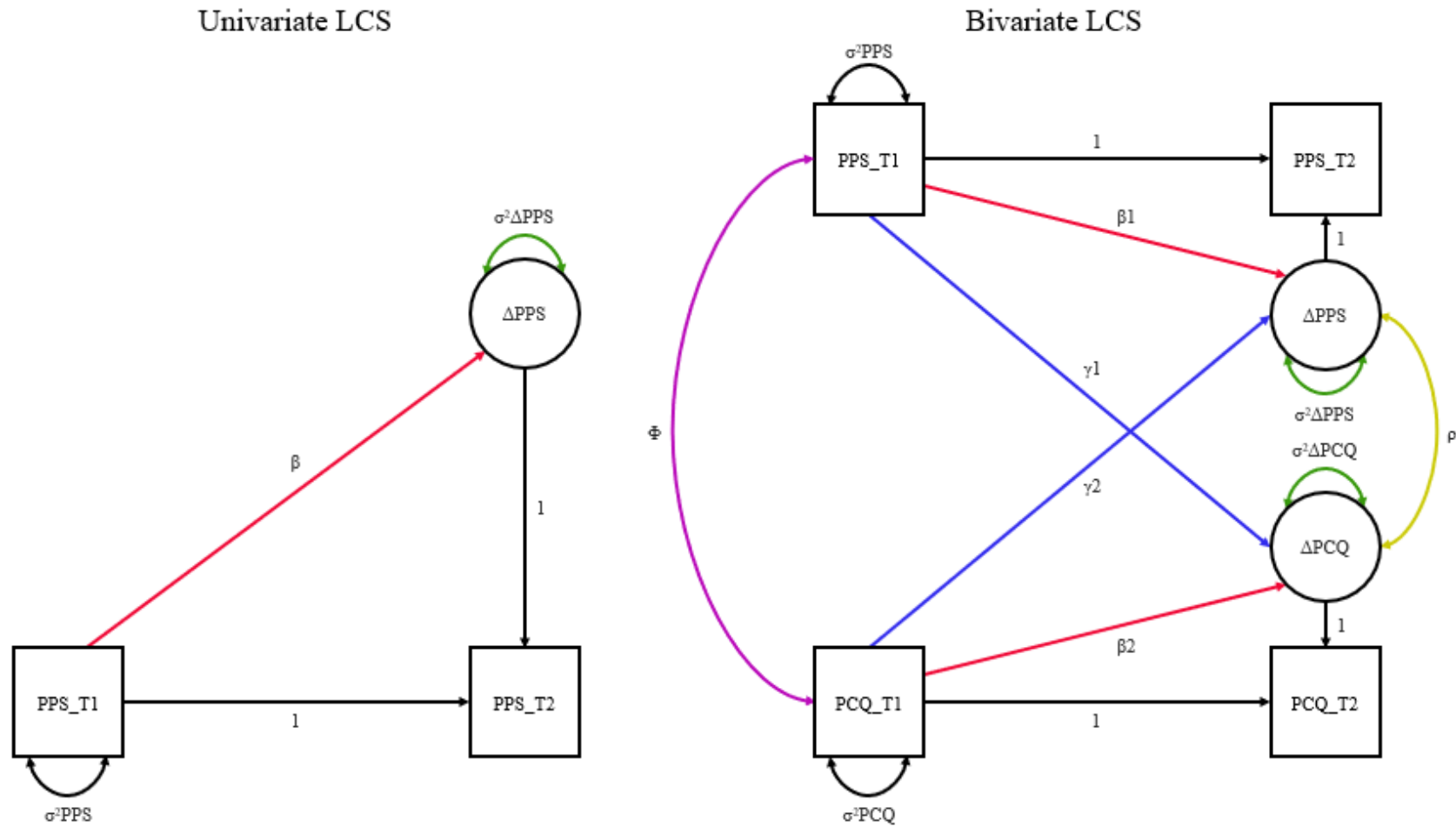
Figure 4. Hypothesised univariate LCS and bivariate LCS models. *Note*. PPS = Performance Perfectionism Scale for Sport dimension (i.e., SOPP, SPPP, or OOPP); PCQ = Perfectionistic Climate Questionnaire-Sport hierarchical dimension.

Stage 3 (Step 2): Bivariate Latent Change Score Models. The second step in the process of investigating the dynamic relationships between perfectionistic climate and change in performance perfectionism over time involved running a series of bivariate LCS models. In total, three bivariate LCS models were estimated. In each case, the overall aim was to examine whether changes in the specified performance perfectionism dimension scores (ΔSOPP, ΔSPPP, or ΔOOPP) between T1 and T2 were a function of T1 PCQ-S scores. In the hypothesised model, this relationship is captured by parameter $\gamma 2$ (shown in blue in Figure 4). The other parameters in the model focus on different relationships. For example, parameter $\gamma 1$ (also shown in blue in Figure 4) captures the extent to which changes in PCQ-S scores between T1 and T2 are a function of the specified T1 performance perfectionism dimension scores. As per the univariate LCS models, the other two unidirectional parameters (shown in red in Figure 4) capture the extent to which change in the specified performance perfectionism dimension scores ($\beta 1$) or change in PCQ-S scores ($\beta 2$) are dependent, or proportional, to the corresponding T1 scores. The bi-directional parameter Φ (shown in purple in Figure 4) captures the covariance between the two specified variables at T1. The other bi-directional parameter ρ (shown in yellow in Figure 4) captures the degree to which the specified performance perfectionism dimension and perfectionistic climate change scores co-occur after controlling for the cross-lagged (i.e., coupling) pathways (Kievit et al., 2018).

Results

Preliminary Analyses

The missing value analysis indicated that there were no missing cases with item non-response. The subscales were therefore computed and screened for univariate and multivariate outliers. Standardized z-scores greater than +/- 3.29 ($p < .001$, two-tailed) served as the indicator for univariate outliers, whereas a Mahalanobis distance greater than $\chi^2 (16) = 39.25$ ($p < .001$) was used as the criteria to identify multivariate outliers. These evaluations resulted in one case being removed from the study. In addition to the above, a further 14 additional cases were also removed prior to the next stage of the analytical procedure. This included five athletes who reported a change in main

sport between the two time points and nine athletes who reported that they had not worked with their main coach during the lag period (Final $N = 138$; male $n = 84$; female $n = 54$; $M_{age} = 15.14$; $s = 1.77$). Skewness and kurtosis values were then analysed. All variables were considered approximately univariate normal (absolute skewness values = .02 to 1.04; absolute kurtosis values = .01 to .82). The assumption of multivariate normality was also satisfied for the set of variables in each structural equation model examined in stage two of the analytical procedure (Mardia's normalised coefficient for multivariate kurtosis ≤ 2.50). The final stage of this procedure involved assessing the reliability of all scales. In line with recent recommendations for estimating scale reliability, McDonald's omega (ω) was adapted over the more traditional Cronabach's alpha (α). The ω estimates and corresponding 95% confidence intervals were calculated in M*plus* 8.1 (see Hayes & Coutts, 2020)

Descriptive Statistics, Bivariate Correlations, and Scale reliability. The descriptive statistics and bivariate correlation estimates are displayed in Table 10 (below). The bivariate correlations show positive intra-scale associations between the five PCQ-S components at each time point. The findings also show positive intra-scale associations between each of the three PPS-S dimensions at each time point (except for the non-significant relationship between SOPP and OOPP at time point one). In terms of the relationship between the PCQ-S and PPS-S dimensions, SOPP shared positive associations with a total PCQ-S score and most PCQ-S components at each time point (the exceptions were conditional regard at T1 and control at T2). By contrast, SPPP shared positive associations with a total PCQ-S score and all five PCQ-S components at each time point. The pattern of findings for OOP was less consistent. OOPP was positively associated a total PCQ-S score at each time point, two PCQ-S components at T1 (control and conditional regard) and all five PCQ-S components at T2. The scale reliability estimates and corresponding 95% confidence intervals for each subscale are also reported in Table 10 ($\omega = .59$ to .85).

Table 10. Descriptive statistics, bivariate correlations, and reliability estimates.

Subscale	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.		
Time Point 1																		
1. PCQ-S																		
2. EXP (PCQ-S)	.73***																	
3. CRIT (PCQ-S)	.68***	.38***																
4. CTRL (PCQ-S)	.72***	.37***	.38***															
5. CR (PCQ-S)	.73***	.38***	.25**	.55***														
6. ANX (PCQ-S)	.65***	.35***	.34***	.32***	.35***													
7. SOPP (PPS-S)	.31***	.29**	.23**	.23**	.16	.18*												
8. SPPP (PPS-S)	.62***	.46***	.44***	.45***	.49***	.32***	.33***											
9. OOPP (PPS-S)	.26**	.14	.10	.23**	.36***	.09	.14	.35***										
Time Point 2																		
10. PCQ-S	.69***	.48***	.46***	.49***	.55***	41***	20*	51***	17*									
11. EXP (PCQ-S)	.54***	.67***	.28**	.34***	.34***	.22**	.21*	.39***	.13	.76***								
12. CRIT (PCQ-S)	.54***	.29**	.65***	.34***	.31***	.29**	.18*	.45***	.13	.76***	.48***							
13. CTRL (PCQ-S)	.39***	.22*	.17*	.51***	.31***	.20*	.14	.33***	.12	.69***	.46***	.38***						
14. CR (PCQ-S)	.57***	.29**	.28**	.40***	.71***	.31***	.10	.40***	.16	.78***	.43***	.45***	.45***					
15. ANX (PCQ-S)	.53***	.30***	.32***	.30***	.39***	.56***	.12	.34***	.12	.78***	.46***	.52***	.40***	.60***				
16. SOPP (PPS-S)	.26**	.18*	.15	.20*	.21*	.18*	.39***	.26**	.09	.35***	.31***	.25**	.14	.31***	.30***			
17. SPPP (PPS-S)	.44***	.38***	.22**	.31***	.35***	.26**	.29**	.66***	.25**	.59***	.55***	.45***	.38***	.45***	.38***	.35***		
18. OOPP (PPS-S)	.16	.07	.10	.18*	.18*	.06	.18*	.31***	.58***	.34***	.22**	.30***	.32***	.20*	.23**	.20*	.43***	
M	2.62	2.67	2.86	1.94	2.84	2.77	5.10	3.68	2.61	2.61	2.57	2.87	1.92	2.82	2.86	5.08	3.81	2.69
s	0.59	0.94	0.91	0.67	0.94	0.72	1.00	1.24	1.15	0.62	0.89	0.89	0.70	0.86	0.76	0.96	1.21	1.10
ω	.74	.85	.81	.63	.82	.69	.66	.74	.80	.81	.84	.78	.69	.82	.78	.59	.79	.76
ω 95% LLCI	.62	.80	.75	.54	.76	.59	.52	.67	.73	.74	.78	.71	.59	.76	.71	.41	.71	.68
ω 95% ULCI	.81	.89	.86	.73	.87	.77	.77	.81	.85	.86	.88	.84	.78	.87	.83	.73	.84	.82

Note. EXP = Expectations; CRIT = Criticism; CTRL = Control; CR = Conditional regard; ANX = Anxiousness; PCQ-S = Perfectionistic Climate Questionnaire-Sport; SOPP = Self-oriented performance perfectionism; SPPP = Socially prescribed performance perfectionism; OOPP = Other-oriented performance perfectionism; PPS-S = Performance Perfectionism Scale for Sport; $N = 138$; *$p < .05$; **$p < .01$; ***$p < .001$, two-tailed.

Table 11. Standardised model results for the first-order ESEM model based on T1 data.

Measure	PCQ-S					PPS-S		
Subscale	F1: EXP	F2: CRIT	F3: CTRL	F4: CR	F5: ANX	F6: SOPP	F7: OOPP	F8: SPPP
EXP (it. 1)	**.82*** (.06)**	-.15* (.07)	-.05 (.06)	.18*** (.05)	-.01 (.06)	-.07 (.05)	-.12 (.06)	.08 (.06)
EXP (it. 17)	**.78*** (.05)**	.03 (.05)	-.03 (.05)	.10* (.05)	.11* (.05)	.04 (.05)	.03 (.05)	-.01 (.05)
EXP (it. 26)	**.75*** (.05)**	.18** (.06)	.08 (.06)	-.12* (.05)	-.01 (.05)	.02 (.05)	.00 (.06)	.08 (.05)
EXP (it. 29)	**.70*** (.05)**	.14** (.05)	.10 (.05)	-.02 (.04)	.08 (.05)	.03 (.05)	.04 (.06)	-.01 (.07)
CRIT (it. 12)	.11 (.06)	**.70*** (.06)**	.08 (.07)	-.07 (.05)	.12* (.05)	.03 (.07)	-.08 (.07)	.03 (.08)
CRIT (it. 15)	.09 (.07)	**.71*** (.06)**	.00 (.07)	.00 (.05)	.17* (.07)	.06 (.06)	.01 (.06)	.04 (.07)
CRIT (it. 20)	.07 (.06)	**.73*** (.06)**	.27*** (.07)	-.01 (.06)	-.01 (.06)	-.09 (.06)	.06 (.05)	.04 (.08)
CRIT (it. 34)	-.03 (.07)	**.67*** (.07)**	-.04 (.08)	-.07 (.06)	-.12 (.07)	.06 (.07)	-.02 (.07)	.22** (.08)
CTRL (it. 33)	-.13 (.08)	-.04 (.09)	**.27** (.10)**	<u>.40*** (.07)</u>	.04 (.07)	.10 (.09)	.03 (.08)	.18* (.08)
CTRL (it. 41)	.06 (.07)	.22** (.07)	**.64*** (.11)**	.19** (.07)	.05 (.05)	.13* (.06)	.00 (.06)	-.15* (.08)
CTRL (it. 50)	.18* (.08)	.17 (.09)	**.32** (.11)**	.23** (.09)	-.06 (.07)	.21** (.08)	.12 (.08)	-.21* (.09)
CTRL (it. 54)	.05 (.09)	.07 (.09)	**.37*** (.10)**	.12 (.08)	.08 (.07)	-.07 (.08)	.08 (.08)	.19* (.08)
CR (it. 45)	.20*** (.06)	-.21*** (.06)	.11 (.07)	**.67*** (.07)**	-.17** (.06)	.05 (.06)	.06 (.07)	.11 (.07)
CR (it. 48)	.02 (.06)	.07 (.05)	.15* (.07)	**.69*** (.05)**	.11* (.05)	.01 (.05)	.07 (.06)	.07 (.06)
CR (it. 52)	.06 (.05)	.09 (.06)	.27*** (.07)	**.62*** (.06)**	.15** (.05)	-.06 (.05)	.02 (.04)	.08 (.06)
CR (it. 53)	.03 (.06)	-.05 (.06)	.07 (.07)	**.63*** (.05)**	.13* (.05)	.00 (.06)	.12* (.06)	.16* (.06)
ANX (it. 6)	-.02 (.08)	.03 (.08)	.07 (.09)	.09 (.08)	**.42*** (.08)**	.01 (.08)	.04 (.07)	-.12 (.08)
ANX (it. 7)	.10 (.06)	.06 (.06)	-.31*** (.07)	<u>.34*** (.06)</u>	**.64*** (.10)**	.12 (.06)	.03 (.06)	-.09 (.07)
ANX (it. 9)	.00 (.06)	-.18*** (.04)	.25*** (.06)	-.27*** (.05)	**1.06*** (.12)**	-.08 (.04)	-.10** (.04)	.23** (.07)
ANX (it. 11)	.04 (.07)	<u>.32*** (.07)</u>	-.24* (.10)	.05 (.07)	**.47*** (.08)**	.07 (.07)	.10 (.07)	-.13 (.08)
SOPP (it. 1)	-.13 (.07)	.11 (.07)	.07 (.08)	.15* (.07)	-.03 (.07)	**.65*** (.08)**	-.17* (.07)	-.09 (.08)
SOPP (it. 4)	-.11* (.05)	-.16* (.07)	.06 (.07)	-.06 (.05)	.13** (.05)	**.84*** (.08)**	.05 (.05)	-.04 (.06)
SOPP (it. 10)	.11 (.09)	-.01 (.10)	-.07 (.10)	-.17* (.08)	-.08 (.08)	**.31** (.10)**	-.04 (.08)	.19* (.09)
SOPP (it. 11)	.10 (.06)	.01 (.07)	.07 (.07)	-.18** (.06)	-.06 (.06)	**.68*** (.07)**	.06 (.05)	.22*** (.06)
OOPP (it. 3)	.05 (.05)	-.04 (.05)	-.01 (.06)	-.04 (.07)	.07 (.05)	-.05 (.05)	**.94*** (.05)**	-.18** (.05)
OOPP (it. 5)	.02 (.05)	-.18*** (.05)	.06 (.06)	-.04 (.06)	-.03 (.05)	-.01 (.05)	**.88*** (.05)**	.02 (.05)
OOPP (it. 6)	-.09 (.07)	.21*** (.06)	.12 (.08)	-.05 (.06)	-.05 (.07)	-.04 (.07)	**.46*** (.06)**	.25** (.08)
OOPP (it. 8)	-.18** (.06)	.04 (.07)	-.08 (.08)	.11 (.07)	-.05 (.06)	.02 (.06)	**.73*** (.06)**	.11 (.06)
SPPP (it. 2)	.23*** (.06)	.21** (.06)	-.13* (.07)	<u>.30*** (.07)</u>	.00 (.06)	.06 (.07)	.11 (.06)	**.36*** (.09)**
SPPP (it. 7)	<u>.35*** (.05)</u>	-.12 (.06)	.08 (.07)	-.02 (.06)	.09 (.06)	.24*** (.06)	.14** (.05)	**.40*** (.07)**
SPPP (it. 9)	-.17* (.07)	.16* (.07)	-.01 (.07)	.21** (.07)	.12 (.06)	.01 (.06)	.00 (.06)	**.66*** (.07)**
SPPP (it. 12)	.06 (.08)	.20* (.08)	-.04 (.08)	.02 (.07)	.05 (.07)	.11 (.07)	.11 (.06)	**.43*** (.08)**

Note. Bold typeface denotes meaningful loading ($\geq$ .30) on target factor; Underlined typeface denotes meaningful cross-loading ($\geq$.30) on non-target factor; Standard errors reported in parentheses; it. = Item; $N = 138$. *** $p < .001$. ** $p < .01$. * $p < .05$.

Table 12. Standardised model results for the first-order ESEM model based on T2 data.

Measure	PCQ-S					PPS-S		
Subscale	F1: EXP	F2: CRIT	F3: CTRL	F4: CR	F5: ANX	F6: SOPP	F7: OOPP	F8: SPPP
EXP (it. 1)	**.83*** (.06)**	.02 (.06)	-.10 (.06)	.19*** (.05)	.00 (.06)	-.06 (.04)	.03 (.05)	.07 (.05)
EXP (it. 17)	**.83*** (.05)**	.13 (.06)	.08 (.06)	-.01 (.06)	.04 (.06)	.02 (.04)	.09 (.05)	-.20*** (.05)
EXP (it. 26)	**.50*** (.08)**	.02 (.09)	.29*** (.07)	-.14 (.07)	.11 (.08)	.04 (.07)	-.23*** (.06)	.27*** (.07)
EXP (it. 29)	**.67*** (.06)**	.06 (.07)	.04 (.06)	-.14* (.06)	.16** (.06)	.08 (.05)	-.04 (.05)	.27*** (.05)
CRIT (it. 12)	.07 (.07)	**.55*** (.10)**	<u>.38*** (.06)</u>	.10 (.07)	-.05 (.08)	.11 (.06)	.00 (.07)	-.12* (.06)
CRIT (it. 15)	.24*** (.06)	**.58*** (.07)**	.06 (.07)	-.04 (.07)	.14* (.07)	.08 (.07)	.07 (.06)	-.11 (.06)
CRIT (it. 20)	.00 (.07)	**.71*** (.07)**	-.11 (.07)	.20** (.06)	-.01 (.06)	-.04 (.07)	.00 (.05)	.14* (.06)
CRIT (it. 34)	-.05 (.07)	**.67*** (.07)**	-.12 (.08)	.02 (.07)	.05 (.06)	-.01 (.08)	.03 (.06)	.14* (.06)
CTRL (it. 33)	.03 (.08)	-.04 (.09)	**.45*** (.08)**	<u>.34*** (.06)</u>	.02 (.08)	-.02 (.08)	-.06 (.07)	-.05 (.07)
CTRL (it. 41)	.00 (.07)	.04 (.09)	**.74*** (.09)**	-.15** (.06)	.15 (.09)	.08 (.06)	.08 (.07)	-.07 (.07)
CTRL (it. 50)	.14* (.07)	.05 (.07)	**.63*** (.08)**	.08 (.07)	-.09 (.07)	-.05 (.07)	.22*** (.06)	.06 (.07)
CTRL (it. 54)	.19** (.09)	.23* (.09)	**.27* (.10)**	.15 (.08)	-.01 (.11)	-.21* (.09)	.02 (.07)	.25** (.09)
CR (it. 45)	-.01 (.05)	.10 (.06)	.22*** (.06)	**.69*** (.06)**	-.09 (.06)	.12* (.05)	-.06 (.05)	.22*** (.06)
CR (it. 48)	.08 (.06)	-.02 (.07)	.03 (.08)	**.43*** (.07)**	<u>.41*** (.06)</u>	.06 (.07)	.09 (.08)	-.10 (.07)
CR (it. 52)	-.02 (.06)	.04 (.06)	.15** (.05)	**.57*** (.07)**	.28*** (.06)	-.05 (.07)	.12* (.06)	.04 (.05)
CR (it. 53)	.00 (.06)	.18** (.06)	-.13* (.06)	**.75*** (.06)**	.09 (.06)	.04 (.05)	-.10* (.05)	.11* (.05)
ANX (it. 6)	.06 (.06)	-.15* (.07)	.00 (.07)	.18** (.07)	**.77*** (.08)**	.01 (.06)	-.02 (.07)	-.05 (.07)
ANX (it. 7)	.09 (.07)	<u>.31*** (.06)</u>	.05 (.08)	.20** (.06)	**.32*** (.09)**	<u>.32*** (.06)</u>	.07 (.06)	-.26*** (.07)
ANX (it. 9)	.21*** (.05)	.08 (.07)	-.04 (.06)	.11 (.08)	**.67*** (.08)**	-.09 (.08)	.04 (.06)	.04 (.06)
ANX (it. 11)	-.08 (.07)	.08 (.09)	.10 (.08)	.02 (.06)	**.58*** (.10)**	.02 (.07)	-.01 (.06)	.24** (.08)
SOPP (it. 1)	-.11 (.06)	.05 (.07)	.12 (.06)	-.10 (.07)	.11 (.07)	**.74*** (.07)**	-.13* (.06)	.12 (.07)
SOPP (it. 4)	-.13 (.06)	.21** (.08)	-.21*** (.06)	-.07 (.06)	.09 (.08)	**.70*** (.07)**	.09 (.05)	.06 (.05)
SOPP (it. 10)	.05 (.08)	-.12 (.09)	.10 (.09)	.28** (.09)	-.03 (.10)	**.29** (.10)**	.07 (.08)	-.16 (.08)
SOPP (it. 11)	.20** (.07)	-.16* (.08)	-.03 (.07)	.13* (.06)	-.16 (.08)	**.65*** (.07)**	.04 (.06)	.14 (.07)
OOPP (it. 3)	-.07 (.06)	-.19** (.06)	.08 (.06)	.12* (.05)	.04 (.05)	.06 (.04)	**.78*** (.05)**	.10 (.05)
OOPP (it. 5)	.00 (.05)	-.03 (.05)	-.07 (.05)	.04 (.05)	-.10 (.05)	.03 (.04)	**.99*** (.05)**	.01 (.05)
OOPP (it. 6)	.12 (.08)	.15* (.07)	.12 (.09)	-.10 (.08)	.05 (.09)	-.09 (.08)	**.38*** (.07)**	.01 (.08)
OOPP (it. 8)	-.15* (.06)	.23** (.07)	.14* (.06)	-.26*** (.06)	.06 (.07)	-.07 (.06)	**.61*** (.06)**	.19** (.07)
SPPP (it. 2)	.24*** (.06)	.10 (.06)	-.07 (.06)	.10 (.06)	-.12 (.06)	.18** (.06)	.10 (.05)	**.59*** (.07)**
SPPP (it. 7)	<u>.43*** (.07)</u>	-.06 (.08)	-.07 (.07)	-.03 (.07)	.01 (.08)	.24*** (.07)	.18** (.07)	**.30*** (.08)**
SPPP (it. 9)	-.02 (.07)	-.01 (.07)	.12* (.05)	.18** (.06)	.06 (.08)	-.03 (.05)	.13* (.06)	**.63*** (.07)**
SPPP (it. 12)	-.05 (.06)	.13 (.07)	.06 (.06)	.10 (.07)	.18** (.07)	.10 (.06)	.18*** (.05)	**.55*** (.07)**

Note. Bold typeface denotes meaningful loading ($\geq$ .30) on target factor; Underlined typeface denotes meaningful cross-loading ($\geq$.30) on non-target factor; Standard errors reported

in parentheses; it. = Item; $N = 138$. *** $p < .001$. ** $p < .01$. * $p < .05$.

Primary Analyses

Stage 1: ESEM measurement model including PCQ-S and PPS-S dimensions

The ESEM model examined based on T1 data provided excellent fit ($\chi^2 = 369.57^{***}$, $df = 268$, CFI = .96, TLI = .93, RMSEA = .05 [.04, .07], SRMR = .04). In terms of parameter estimates (see Table 11 above), well-defined factors for the five PCQ-S and three PPS-S dimensions were evident. This was apparent in that 97% of items (31/32) provided a meaningful loading on the target factor (target $\lambda \geq .31$) and only 2% of parameter estimates (5/224) were flagged as cases of meaningful cross loading. In four of these instances, the items loaded higher on their target factor (target $\lambda = .36$ to .64; non-target $\lambda = .30$ to .35). In this model, the standardised factor correlations were positive, significant, and ranged from small to moderate in magnitude ($r = .12$ to .37).

The ESEM model examined based on T2 data also provided excellent fit ($\chi^2 = 340.07^{**}$, $df = 268$, CFI = .98, TLI = .95, RMSEA = .04 [.03, .06], SRMR = .03). In terms of parameter estimates (see Table 12 above), well-defined factors for the five PCQ-S and three PPS-S dimensions were evident. This was apparent in that 94% of items (30/32) provided a meaningful loading on the target factor (target $\lambda \geq .30$) and only 3% of parameter estimates (6/224) were flagged as cases of meaningful cross loading. In five of these instances, the target factor loading was the same magnitude or stronger than the non-target factor loading (target $\lambda = .32$ to .55; non-target $\lambda = .31$ to .41). In this model, the standardised factor correlations were positive and ranged from small to moderate in magnitude ($r = .06$ to .40).

Stage 2: Structural equation models

Hypothesised Models. The results reported in Table 13 show the relationships between a latent perfectionistic climate variable and latent variables for each performance perfectionism dimension. The results are ordered so that the first row (for each dimension) focusses on relationships between T1 variables (T1 PCQ-S → T1 PPS-S dimension), while the second-row focusses on relationships between T2 variables (T2 PCQ-S → T2 PPS-S dimension). In these models, the exogenous perfectionistic climate variable was measured using the five manifest PCQ-S

subscale scores as indicators. The endogenous performance perfectionism variable was modelled using item-level indicators ($N = 4$ per latent variable). The measurement models, in which the corresponding latent variables were specified to covary, provided acceptable fit to the data in each case.

SEM models for SOPP. The models for self-oriented performance perfectionism both provided acceptable fit to the data (T1 = χ^2 / df = 1.46, CFI = .95, TLI = .93; RMSEA = .06, 90% CI = .00 to .10, SRMR = .05; T2 = χ^2 / df = 1.88, CFI = .93, TLI = .90; RMSEA = .08, 90% CI = .04 to .11, SRMR = .06). In these models, perfectionistic climate accounted for 21-23% of variance in self-oriented performance perfectionism. The results in Table 13 show that perfectionistic climate shared a significant positive relationship with self-oriented performance perfectionism in model one (β = .47, SE = .11, p < .001) and model two (β = .46, SE = .10, p < .001). In each model, standardised factor loadings from indicators to relevant latent variables were all meaningful ($\lambda \geq$ .30) and significant (p < .05).

SEM models for SPPP. The models for socially prescribed performance perfectionism provided reasonable fit to the data (T1 = χ^2 / df = 2.15, CFI = .91, TLI = .88; RMSEA = .09, 90% CI = .06 to .12, SRMR = .05; T2 = χ^2 / df = 2.62, CFI = .90, TLI = .87; RMSEA = .11, 90% CI = .08 to .14, SRMR = .06). In these models, perfectionistic climate accounted for 51-73% of variance in socially prescribed performance perfectionism. The results in Table 13 show that perfectionistic climate shared a significant positive relationship with socially prescribed performance perfectionism in model one (β = .86, SE = .06, p < .001) and model two (β = .72, SE = .08, p < .001). In each model, standardised factor loadings from indicators to relevant latent variables were all meaningful ($\lambda \geq$ .30) and significant (p < .001).

SEM models for OOPP. The models for other-oriented performance perfectionism provided reasonable fit to the data (T1 = χ^2 / df = 1.61, CFI = .95, TLI = .93; RMSEA = .07, 90% CI = .02 to .10, SRMR = .06; T2 = χ^2 / df = 1.80, CFI = .94, TLI = .92; RMSEA = .08, 90% CI =

.04 to .11, SRMR = .06). In these models, perfectionistic climate accounted for 11% of variance in other-oriented performance perfectionism. The results in Table 13 show that perfectionistic climate shared a significant positive relationship with other-oriented performance perfectionism in model one (β = .34, SE = .12, p < .01) and model two (β = .33, SE = .12, p < .01). In each model, standardised factor loadings from indicators to relevant latent variables were all meaningful ($\lambda \geq$ .30) and significant (p < .01).

Stage 3 (Step 1): Univariate LCS models

The four univariate LCS models examined revealed three major findings pertaining to each variable examined. The first finding was evidence of significant mean increases in each variable from T1 to T2: ΔSOPP (M = 3.18, se = .39, p < .001), ΔSPPP (M = 1.44, se = .24, p < .001), ΔOOPP (M = 1.26, se = .19, p < .001), and ΔPCQ-S (M = .71, se = .18, p < .001).

The second finding was evidence of variability. Significant variance was identified in the T1 scores for all variables: SOPP (σ^2 = .99, se = .12, p < .001), SPPP (σ^2 = 1.52, se = .18, p < .001), OOPP (σ^2 = 1.32, se = .16, p < .001), and PCQ-S (σ^2 = .34, se = .04, p < .001). In addition, significant variance was also evident in the change scores computed in each model: ΔSOPP (σ^2 = .78, se = .09, p < .001), ΔSPPP (σ^2 = .83, se = .10, p < .001), ΔOOPP (σ^2 = .80, se = .10, p < .001), and ΔPCQ-S (σ^2 = .20, se = .02, p < .001). This parameter captures the extent to which individuals differ in the change they manifest over time (i.e., between-person differences in within-person change; Kievit et al., 2018).

The third finding was that increases in each variable were less pronounced for those with greater initial levels of that variable: T1 SOPP → ΔSOPP (β = -.63, se = .08, p < .001), T1 SPPP → ΔSPPP (β = -.36, se = .06, p < .001), T1 OOPP → ΔOOPP (β = -.45, se = .06, p < .001), and T1 PCQ-S → ΔPCQ-S (β = -.28, se = .07, p < .001).

Table 13. Predictive ability of perfectionistic climate in relation to performance perfectionism.

Path	R^2	Standardised β coefficient
Self-oriented Performance Perfectionism		
T1 Perfectionistic climate → T1 Self-oriented perfectionism	.23**	.47***
T2 Perfectionistic climate → T2 Self-oriented perfectionism	.21*	.46***
Socially Prescribed Performance Perfectionism		
T1 Perfectionistic climate → T1 Socially prescribed performance perfectionism	.51***	.86***
T2 Perfectionistic climate → T2 Socially prescribed performance perfectionism	.73***	.72***
Other-oriented Performance Perfectionism		
T1 Perfectionistic climate → T1 Other-oriented perfectionism	.11	.34**
T2 Perfectionistic climate → T2 Other-oriented perfectionism	.11	.33**

Note. $N = 231$. *$p < .05$; **$p < .01$; ***$p < .001$, two-tailed.

Stage 3 (Step 2): Bivariate LCS models

PCQ-S and SOPP. The first model examined changes between PCQ-S and SOPP at T1 and T2. In this model, the bi-directional parameter Φ, which captures the covariance between SOPP and PCQ-S at T1, was positive and significant ($\Phi = .18$, se $= .05$, $p < .001$). This shows that SOPP scores at T1 positively correlated with PCQ-S scores at T1. The bi-directional parameter ρ, which captures the degree to which SOPP and PCQ-S score changes co-occur after controlling for the cross-lagged (i.e., coupling) pathways in the model, was positive and significant ($\rho = .10$, se $= .03$, $p < .01$). This result shows that youth athletes with greater gains in levels of SOPP were, on average, youth athletes with greater gains in levels of PCQ-S after controlling for the other dynamic parameters in the model.

In terms of the central hypothesis of interest, no support was found for PCQ-S scores at T1 predicting change in SOPP scores between T1 and T2 ($\gamma 2 = .25$, se $= .13$, $p = .06$). The inverse of this relationship was also non-significant ($\gamma 1 = -.01$, se $= .04$, $p = .82$). That is, SOPP scores at T1 did not predict change in PCQ-S scores between T1 and T2. As per the relevant univariate LCS models, the change scores in this model (i.e., ΔSOPP and ΔPCQ-S) were only influenced by prior levels of each corresponding T1 score ($\beta 1 = -.67$, se $= .08$, $p < .001$; $\beta 2 = -.27$, se $= .07$, $p < .001$).

PCQ-S and SPPP. The second model examined changes between PCQ-S and SPPP at T1 and T2. In this model, the bi-directional parameter Φ, which captures the covariance between SPPP and PCQ-S at T1, was positive and significant ($\Phi = .45$, se $= .07$, $p < .001$). This shows that SPPP scores at T1 positively correlated with PCQ-S scores at T1. The bi-directional parameter ρ, which captures the degree to which SPPP and PCQ-S score changes co-occur after controlling for the cross-lagged (i.e., coupling) pathways in the model, was positive and significant ($\rho = .17$, se $= .04$, $p < .001$). This result shows that youth athletes with greater gains in levels of SPPP were, on average, youth athletes with greater gains in levels of PCQ-S after controlling for the other dynamic parameters in the model.

In terms of the central hypothesis of interest, no support was found for PCQ-S scores at T1 predicting change in SPPP scores between T1 and T2 ($\gamma 2 = .07$, se $= .04$, $p = .07$). The inverse of this relationship was also non-significant ($\gamma 1 = .10$, se $= .17$, $p = .54$). That is, SPPP scores at T1 were not found to predict change in PCQ-S scores between T1 and T2. As per the relevant univariate LCS models, the change scores in this model (i.e., ΔSPPP and ΔPCQ-S) were only influenced by prior levels of each corresponding T1 score ($\beta 1 = -.39$, se $= .08$, $p < .001$; $\beta 2 = -.37$, se $= .08$, $p < .001$).

PCQ-S and OOP. The third model examined changes between PCQ-S and OOPP at T1 and T2. In this model, the bi-directional parameter Φ, which captures the covariance between OOPP and PCQ-S at T1, was positive and significant ($\Phi = .15$, se $= .04$, $p < .001$). This shows that OOPP scores at T1 positively correlated with PCQ-S scores at T1. The bi-directional parameter ρ, which captures the degree to which OOPP and PCQ-S score changes co-occur after controlling for the cross-lagged (i.e., coupling) pathways in the model, was positive and significant ($\rho = .18$, se $= .06$, $p < .01$). This result shows that youth athletes with greater gains in levels of OOPP were, on average, youth athletes with greater gains in levels of PCQ-S after controlling for the other dynamic parameters in the model.

In terms of the central hypothesis of interest, no support was found for PCQ-S scores at T1 predicting change in OOPP scores between T1 and T2 ($\gamma 2 = -.00$, se $= .03$, $p = .90$). The inverse of this relationship was also non-significant ($\gamma 1 = .03$, se $= .14$, $p = .85$). That is, OOPP scores at T1 were not found to predict change in PCQ-S scores between T1 and T2. As per the relevant univariate LCS models, the change scores in this model (i.e., ΔOOPP and ΔPCQ-S) were only influenced by prior levels of each corresponding T1 score ($\beta 1 = -.45$, se $= .07$, $p < .001$; $\beta 2 = -.28$, se $= .07$, $p < .001$).

Discussion

The study outlined in this chapter examined the relationships between perfectionistic climate and performance perfectionism in sport using a three-stage analytical procedure. The first stage in this process involved examining whether the PCQ-S measure can be distinguished from the PPS-S measure. This aim was examined using an ESEM-based approach. Once evidence for the distinction between these two measures (and associated constructs) was established, the focus of the study shifted toward an examination of the relationships between perfectionistic climate and performance perfectionism. In stage two of the analytical procedure, these relationships were examined using a series of structural equation models. This stage was conducted to establish whether a cross-sectional relationship exists between perfectionistic climate and each performance perfectionism dimension. Once this stage was complete, in stage three of the analytical procedure, the potential for a more complex and dynamic relationship between perfectionistic climate and performance perfectionism was examined using a series of LCS-based models. The findings from each of these analyses are discussed in detail below.

Perfectionistic Climate (PCQ-S) and Performance Perfectionism (PPS-S) Measurements

The first aim in present chapter was to examine whether the items and associated dimensions of the PCQ-S (i.e., expectations, criticism, conditional regard, and anxiousness) can be clearly delineated from the items and associated dimensions of the PPS-S (i.e., self-oriented, socially prescribed, and other-oriented performance perfectionism). This aim was examined by testing two measurement models including PCQ-S and PPS-S items. The results of the analyses conducted provided strong evidence for the distinction between the PCQ-S and PPS-S. This was evident in the strong model fit and pattern of parameter estimates associated with each model. Specifically, in each model, five well-defined and discernible PCQ-S factors were identified and found to be distinct from three well-defined and discernible PPS-S factors. This evidence is important as it supports the distinction between the construct of sport-specific performance perfectionism (which captures the extent to which athletes' experience extreme and irrational

requirements for perfect performances in sport; Hill et al., 2016) and the construct of perfectionistic climate in sport (which captures the extent to which athletes' experience behaviours that shape an environment in which only perfect performances are acceptable; Grugan et al., 2021).

The most important finding relates to the distinction identified between socially prescribed performance perfectionism and the component dimensions of perfectionistic climate. This is because the construct of perfectionistic climate and socially prescribed performance perfectionism both capture a sense of *external pressure to be perfect*. Importantly, however, there are two key factors that differentiate between the two constructs at a conceptual level. The first key factor is that the construct of perfectionistic climate (as captured by the PCQ-S) measures experiences of pressure to be perfect specifically from the coach. By contrast, socially prescribed performance perfectionism (as captured by the PPS-S) measures a more generalised sense of pressure to be perfect from others in sport. Indeed, in the instructions to the PPS-S, athletes are informed that some items refer too *other people*. For these items, athletes are instructed to think about the people involved in their sport participation whose opinion they value. While this may include the coach, athletes are also likely to think about others who are important such as their parents and peers. In this regard, socially prescribed performance perfectionism captures a slightly broader sense of external pressure to be perfect in sport.

The second key factor that sets perfectionistic climate apart from socially prescribed performance perfectionism–and other perfectionism variables capturing external pressure to be perfect–is that it focusses on the pressure from a specific significant other toward the people (plural) in a specific context (e.g., "The coach criticises *performances* that are not perfect") rather than the individual specifically. This differs from socially prescribed performance perfectionism (e.g., "People view even *my best performances* negatively") and coach pressure to be perfect (e.g., "My coach is disappointed *in me* if *my performance* is not perfect"). This is a further example of a difference that helps to distinguish the perfectionistic climate construct from socially prescribed performance perfectionism. When the two factors above are considered, perfectionistic climate

captures experiences of pressure to be perfect at a *climate level* rather than an individual *personality level*. This is important as all individuals–regardless of their own levels of perfectionism–can experience the consequences of pressure to be perfect in the social environments they encounter.

Relationships Between Perfectionistic Climate and Performance Perfectionism

The second aim in the present study was to examine the relationships between perfectionistic climate and performance perfectionism. This aim was initially examined using structural equation modelling. This analytical step was employed to establish whether a cross-sectional relationship exists between perfectionistic climate and each performance perfectionism dimension. In the first models examined, perfectionistic climate positively predicted self-oriented perfectionism (T1 PCQ-S → T1 SOPP; T2 PCQ-S → T2 SOPP). In context of theory on perfectionism development, this relationship provides support for the role that the environment may play in giving rise to self-oriented aspects of striving for perfection. When athletes experience a highly perfectionistic climate in which the coach is extremely demanding and unsupportive, they may feel as if they aren't good enough, need to improve, and must be perfect to gain any sense of approval. This sense of inadequacy may give rise to the high personal standards, extreme self-expectations, and self-critical tendences that characterise self-oriented performance perfectionism. This potential link is also supported by other cross-sectional evidence linking coach pressure to be perfect with striving for perfection in young athletes (Madigan et al., 2019).

The next structural equation models examined the relationships between perfectionistic climate and socially prescribed performance perfectionism. In both models, perfectionistic climate positively predicted socially prescribed performance perfectionism (T1 PCQ-S → T1 SPPP; T2 PCQ-S → T2 SPPP). Once again, this relationship lends support to the idea that experiences of socially prescribed perfectionistic pressure may stem from the social environments experienced by young athletes. In this case, experiences of a highly perfectionistic climate may give rise to a view of the coach as uninterested and unsupportive, and of the self as incapable and helpless. This might then feed into a sense of vulnerability that young athletes deal with by trying to be perfect so that

they can please the coach and others around them. This link is supported in previous research showing that coach pressure to be perfect is a strong and consistent predictor of socially prescribed performance perfectionism in young athletes (Hill et al., 2016). In line with this evidence, in the present study, the pathways between perfectionistic climate and socially prescribed perfectionism were stronger than for self-oriented and other-oriented dimensions of performance perfectionism.

The final structural equation models examined the relationships between perfectionistic climate and other-oriented perfectionism. In both models, perfectionistic climate positively predicted other-oriented performance perfectionism (T1 PCQ-S → T1 OOPP; T2 PCQ-S → T2 OOPP). While these relationships were weaker in magnitude than the previous pathways discussed, they still lend some credence to theory on perfectionism development. Specifically, in line with Hewitt et al.'s (2017) developmental framework, highly perfectionistic climates may make young athletes feel neglected, invisible, and resentful toward the coach. This experience is relevant as it may give rise to tendencies which deflect attention away from personal shortcomings and reflect attempts to regain power and control in a such chaotic environment. In context of the present findings, this may include the outwardly directed need for others to be perfect that characterises other-oriented performance perfectionism. While this finding and the findings discussed above are highly insightful, they are based on cross-sectional data. As such, it is very difficult to make any strong inferences regarding causality.

To build on the basic cross-sectional relationships identified above, a series of LCS-based models were specified and examined. This series of analyses were important for examining: (a) performance perfectionism change over the two measurement occasions; and (b) whether initial PCQ-S scores at T1 predicted such change (after controlling for the influence accounted for by the corresponding T1 PPS-S dimension scores). The first results from this process come from the univariate LCS models examining time-sequential change in each performance perfectionism dimension. These models revealed three key findings. The first finding from these analyses was evidence for increases in SOPP, SPPP, and OOPP over the three month-study period. From a

personality perspective, this evidence is consistent with the idea that traits are not completely static and changes to personality are especially variable between later childhood ($\sim$ age 10) and adolescence ($\sim$ age 18; Allen et al., 2013). This evidence is also consistent with previous research on perfectionism. That is, researchers investigating perfectionism over time have found evidence of change over similar periods (e.g., one-to-three months; Damian et al., 2013; Domocus & Damian, 2018; McGrath et al., 2012). This evidence therefore fits in with the notion that childhood and adolescence are particularly important periods in the development of perfectionism. (Hewitt et al., 2017).

The second finding in the univariate LCS models was evidence of significant variability in the changes identified. This means that, while evidence of mean increases in each dimension were identified, there was significant between-person differences in individual change. This finding is important as it suggests that some participants may have shown more change and others may have shown significant decreases or no change at all. This potential for groups and levels of individual change patterns to exist is in-keeping with recent research on perfectionism development. Using a four-wave longitudinal design over two years (five-to-six months between each measurement occasion), Damian et al. (2022) identified differing developmental trajectories for specific perfectionism dimensions. For example, using a growth mixture modelling approach, three latent classes were identified for self-oriented perfectionism (LC1: adolescents with low initial levels that showed a linear decrease over time; LC2: adolescents with medium initial levels that showed a non-linear decrease over time; LC3: adolescents with high initial levels that were stable across time). This research shows that perfectionism change over the life course is complicated and differs between groups of individuals. To build on the present study, researchers could examine change in sport-specific perfectionism over time and analyse whether perceptions of perfectionistic climate are associated with latent class membership.

The final key finding in the univariate LCS models was that change in each performance perfectionism dimension was negatively predicted by the T1 performance perfectionism dimension

score in each model. This indicated that athletes with higher initial levels of performance perfectionism were–perhaps due to a ceiling effect–less likely to report as much increase in performance perfectionism. This finding also suggests that the athletes who are most susceptible to increases in performance perfectionism are those who have lower initial levels of performance perfectionism. This finding is important is it indicates that athletes who have not already developed a highly perfectionistic personality may end up becoming more perfectionistic throughout childhood and adolescence. This is why, when it comes to the prevention of perfectionism in young people, it is important to deliver universal approaches that are delivered to all youth regardless of risk status or current perfectionism level (Wade, 2018).

The next stage of the study involved conducting three bivariate LCS models to investigate whether the changes in performance perfectionism outlined above were predicted by perceptions of the perfectionistic climate reported at T1. In the first model, T1 PCQ-S scores were unrelated to changes in self-oriented performance perfectionism. This finding was contrary to the hypothesis identified based on relevant theory. In line with the discussion of cross-sectional evidence above, it was assumed that perceptions of a highly perfectionistic climate would, over time, give rise to a sense of pressure and vulnerability that lays the foundation for the development of self-oriented performance perfectionism. While no support for this theoretical link was identified in the present study, it is important to mention that the effect for this relationship was the largest of the three dimensions (SOPP = .25; SPPP = .07; OOPP = -.00) and was close to reaching significance (p = .06). It would therefore be interesting to see whether a significant relationship would emerge under different conditions (e.g., with a larger sample size).

In the second model, T1 PCQ-S scores were found to be unrelated to changes in socially prescribed performance perfectionism. This finding was also contrary to the hypothesis identified based on relevant theory. In line with the discussion of cross-sectional evidence above, it was assumed that perceptions of a highly perfectionistic climate would, over time, give rise to core beliefs that underpin the development of socially prescribed performance perfectionism. This

includes beliefs regarding the self as unworthy, invisible, or flawed and others as unavailable, uninterested, or uncommitted. These beliefs are important as they underpin a sense of vulnerability that is fundamental to the development of socially prescribed pressure to be perfect (Hewitt et al., 2017). However, only a small (non-significant) positive relationship was identified. This finding is inconsistent with evidence that coach pressure to be perfect typically shares a more consistent relationship with socially prescribed performance perfectionism (*versus* self-oriented performance perfectionism; Hill et al., 2016) and perfectionistic concerns (*versus* perfectionistic strivings; Madigan et al., 2019). The relative influence that perfectionistic climate has on each of these core aspects of perfectionism is therefore an important issue that warrants further examination.

In the final bivariate LCS model, T1 PCQ-S scores were found to be unrelated to changes in other-oriented performance perfectionism. This finding was again contrary to the hypothesis identified based on relevant theory. In line with the discussion of cross-sectional evidence above, it was assumed that perceptions of a highly perfectionistic climate would, over time, give rise to feelings that underpin the development of other-oriented performance perfectionism. This includes feeling unconnected, neglected, and powerless. These feelings are relevant as they can lay a foundation for interpersonal hostility, callous traits, and a requirement for others to be perfect (Hewitt et al., 2017). It is difficult to compare this finding with previous research focussing on the development of sport-specific perfectionism as most studies have ignored this unique dimension of perfectionism. However, one study outside of sport did retain this dimension in their examination of perfectionism development. In this study, Damian et al. (2022) identified links between parental psychological control and other-oriented perfectionism. This finding is in-keeping with the correlational results in the present study and suggests that controlling practices (i.e., perfectionistic control and conditional regard) are particularly important in the development of this unique dimension. This is a relationship that therefore warrants further investigation.

The three bivariate LCS models outlined above also included cross-coupling pathways from performance perfectionism to perfectionistic climate. While this ordering of variables is at odds

with theory pertaining to perfectionism development, there is evidence that perfectionism may colour the way athletes view their social environment and relationships with others. This is apparent in research examining perfectionism in relation to friendship quality, coach satisfaction with goal attainment, and team cohesion (Appleton et al., 2009; Freire et al., 2022; Ommundsen et al., 2005). Evidence for this pathway is also evident in longitudinal research on perfectionism and motivational climate perceptions. That is, Nordin-Bates et al. (2014) found evidence for a reciprocal relationship between perfectionism and motivational climate in dance. However, in the present study, no evidence was found for perfectionism influencing change in perfectionistic climate over time. This evidence should not preclude the potential for a complex relationship between these two constructs over time. To uncover this potential complexity, researchers could examine the potential for change in perfectionism over time (e.g., ΔSPPP from T1 to T2) to predict subsequent change in perfectionistic climate over time (e.g., ΔPCQ-S from T2 to T3). This pathway is known as a dual-change (or change-change) relationship that can be examined using bivariate LCS models with three or more time points (Stenling et al., 2017b).

Critical Reflection

The findings in the bivariate LCS models are contrary to the hypothesised relationships. It is therefore important to reflect whether the null findings are a function of theoretical or methodological inconsistencies (or both). The first point that is important to note in this regard is that the hypothesised models are grounded in well-established theories of perfectionism development (Flett et al., 2002; Hewitt et al., 2017). In keeping with the major premise identified in these models, there are several studies that provide evidence for the role that specific socialisation experiences play in the development of perfectionism. This includes support for the role of coach pressure (Madigan et al., 2019), parental expectations and criticism (Curran & Hill, 2022), and controlling coach behaviour (Barcza-Renner et al., 2016) as key developmental predictors. This evidence shows that the hypotheses in the present study were both theoretically and empirically

grounded. It is therefore important to reflect on methodological factors that may have contributed to the observed results.

This reflection on methodological factors may help to identify issues regarding the longitudinal study of perfectionistic climate in sport for future research. The first methodological factor to reflect on is the sample of athletes who participated in the present study. In line with previous research on perfectionism development, a young sample was employed. This methodological choice was grounded in the idea that late childhood and adolescence are key periods in the development of perfectionism (Hewitt et al., 2017). In keeping with this idea, research in sport and education has found that perfectionism is particularly variable during adolescence (e.g., Damian et al., 2013; Domocus & Damian, 2018; Madigan et al., 2019). Based on this evidence, the methodological choice to recruit young athletes rather than adult athletes is well supported and is unlikely to have contributed to the unexpected findings.

The second methodological factor to reflect on is statistical power. Using some of the model parameters identified in the present study, it was possible to run a post-hoc analysis to evaluate the adequacy of statistical power in the present study. In this analysis, estimates from the bivariate LCS model examining PCQ-S and SOPP scores were entered into a web-based interface for LCS-based power analyses (http://psychstat.org.blcsm; Zhang & Liu, 2018). This model was chosen as it included a cross-coupling pathway (PCQ-S $\rightarrow$ ΔSOPP = .25) that was close to reaching significance (p = .06). Based on the power analysis with 138 participants and two measurement occasions, the power to detect the above specified pathway is .929. This shows that the sample size of 138 likely provided sufficient power for this parameter. However, this was not the case for all parameters (some power estimates were less than .080) and researchers have recommended sample sizes closer to 200 for LCS-based analyses (Chiba et al., 2021). While it is unclear whether this study failed to detect important relationships based on statistical power, future research should aim to recruit a larger sample to improve statistical power and the trustworthiness of the results.

The third methodological factor to reflect on is the duration of time between the data collection points for each participant. In the present study, a period of three-months was selected on the basis that perfectionism is a relatively enduring personality trait (Hewitt et al., 2017). It was therefore important to select a period spanning several months rather than days or weeks. In terms of previous longitudinal research, the time in which perfectionism changes have been observed varies from one-month to one-year and beyond (Damian et al., 2021). In addition to this evidence, researchers have found that perceptions of coach and parental behaviour can predict longitudinal changes in perfectionism over periods of three-months and beyond (Domocus & Damian, 2018; Madigan et al., 2019) While this evidence supports the potential for longitudinal effects over three-months, it is important to acknowledge that this period may not be optimum for accurately observing or predicting perfectionism change. This is based on recent research examining perfectionism development over longer periods (e.g., five-to-six months; Damian et al., 2022) and evidence of stronger predictive ability over periods of time beyond three-months (e.g., Madigan et al., 2019). Based on this evidence, it is possible that a longer duration of time was needed to effectively capture any potential for perfectionistic climate to predict changes in perfectionism.

The final point of reflection pertains to the timing of assessment for each athlete across the two waves of data collection. In the present study, participants were recruited from a wide range of sports and the timing of assessment differed across the six independent secondary schools where data collection took place. This is significant as the time of the season in which each participant completed the two assessments varied considerably (e.g., some participants completed T1 assessment in pre-season, whereas others completed T1 assessment in off-season). This presents a potential problem that may have contributed to the unexpected results. Specifically, the two study variables (i.e., perfectionistic climate and performance perfectionism) may vary as function of timing across the season. This is particularly relevant to perfectionistic climate on the basis that: (a) perceptions of coach-created climates have been found to differ between the start and end of a competitive season (Sage & Kavussanu, 2006); and (b) more time in the season spent with the

coach may lead to more accurate perceptions of the coach-created climate (S. L. Smith et al., 2005). With these issues in mind, the predictive ability of perfectionistic climate perceptions may have been influenced by periodisation-based variability in the timing of assessment. To overcome this potential issue in the future, researchers should focus on sports that share the same athletic season and initiate data collection when athletes are able to make accurate appraisals of the coach-created climate (e.g., mid-season; Ntoumanis et al., 2012).

Conclusion

The study outlined in this chapter had two major aims. The first aim was to examine whether the PCQ-S can be distinguished from the PPS-S. In the ESEM-analyses conducted, five well-defined and discernible PCQ-S factors were identified and found to be distinct from three well-defined and discernible PPS-S factors. This evidence is important as it shows that the PCQ-S (and associated components) are distinct from the dimensions of performance perfectionism in sport. The second aim was to examine the relationships between perfectionistic climate and performance perfectionism. This aim was initially examined using structural equation modelling. These analyses helped to show that perceptions of perfectionistic climate positively predict self-oriented, socially prescribed, and other-oriented dimensions of performance perfectionism. To build on this cross-sectional evidence and examine the potential for a more complex and dynamic set of relationships between perfectionistic climate and levels of performance perfectionism over time, a series of LCS models were tested. The results of the associated analyses show that changes in perfectionistic climate and each performance perfectionism dimension were evident over the three-month study period. However, contrary to the study hypotheses, the changes in performance perfectionism were not predicted by initial levels of perfectionistic climate (or vice versa). To identify factors that may have contributed to these unexpected findings, several methodological considerations pertaining to the adopted longitudinal research design were identified and discussed. These discussions reflect key aspects of project planning and management that, if appropriately considered, may increase the quality of data collected in future longitudinal studies of perfectionistic climate.

Chapter 6 – General Discussion

Purpose of the Thesis

The broad aim of the current thesis was to apply the model of perfectionistic climate to sport and develop the first psychometric scale to measure perfectionistic climate: Perfectionistic Climate Questionnaire (PCQ-S). The four empirical chapters presented in the thesis underpinned this broad aim by each addressing important issues pertaining to the relevance and operationalisation of perfectionistic climate in sport.

Summary of the Findings

The introductory chapter of the thesis presented a generalised model of perfectionistic climate. In study one, outlined in chapter two, this model was applied to sport. The first step of this application involved developing the conceptual framework for a sport-specific model of perfectionistic climate. Specifically, from the outset, it was important to specify which key social agent would be the focus of this sport-specific model, how the construct of perfectionistic climate relates to and helps complement existing models of perfectionism, and which component behaviours of perfectionistic climate are relevant to sport. In considering these key issues, evidence was presented to provide support for: (a) the role of the coach as a principal figure responsible for shaping perfectionistic climates in this context; (b) the role that perfectionistic climate plays in helping to refine and re-conceptualise the phenomenon of coach pressure to be perfect; and (c) the applicability of all five component behaviours of perfectionistic climate in a sport-specific model. These proposals were crucial in helping to guide the subsequent scale development project.

With the conceptual framework for a sport-specific model of perfectionistic climate in place, the next step of the application involved conducting a multi-stage scale development project. The first stage of this project, outlined in part one of the method and results, involved developing and then subsequently refining an initial item pool. Using the key definitions and characteristics of each perfectionistic climate component as a guide, an initial item pool of 50 items were developed. This item pool was then refined to 54 items via feedback provided by academics ($N = 5$), sport coaches

($N = 7$), and youth athletes ($N = 20$). The next stage of this project, outlined in part two of the method and results, was to examine the factor structure and psychometric properties of the retained items using data collected from young athletes ($N = 243$). The results of the exploratory factor analyses conducted provided support for a five-factor 20-item scale. The final stage of this project, outlined in part three of the method and results, was to further examine the structure of the model identified in part two using data collected from an independent sample of young athletes ($N = 244$). The results of the CFA, ESEM, and ESEM-within-CFA techniques applied at this stage provided further support for the 20-item PCQ-S.

One important consideration following the initial scale development project outlined above was whether the PCQ-S can be distinguished from "near-neighbour constructs" (Clark & Watson, 2019, p. 1413). In line with the conceptual foundations for perfectionistic climate, the PCQ-S was considered as being most closely related to coach climate models informed by AGT (e.g., R. E. Smith et al., 2008) and SDT (e.g., Bartholomew et al., 2010). The more disempowering components of these models (i.e., ego-involving and controlling coach behaviour dimensions) were considered most relevant. In study two, to test whether perfectionistic climate can be clearly delineated from these measures and associated constructs, data were collected from young athletes ($N = 223$) using the PCQ-S and various AGT- and SDT-based coach climate measures. The empirical relationships between the coach climate variables under investigation were then examined using traditional (i.e., EFA) and more contemporary (i.e., network analysis) analytical approaches. In both analyses, evidence for a three-dimensional structure differentiating between perfectionistic, disempowering, and empowering coach climate constructs was identified. The overall results supported two important and related points: (a) a climate that is disempowering is not necessarily perfectionistic; and (b) a climate that is perfectionistic is experienced differently than a climate that is disempowering.

The data collected for study two was also used to help examine two further research aims. The first aim involved examining the factor stability of the PCQ-S models examined in study one

using an independent data set. Therefore, as per study one, three alternative models were tested. In terms of results, the first-order CFA and first-order ESEM model specifications again provided strong support for the five-factor 20-item PCQ-S. This support was based on both model fit information and the pattern of parameter estimates associated with each analysis. The hierarchical ESEM model specification examined also provided further support for a hierarchical perfectionistic climate construct. In these regards, the results provided further support that the five component behaviours of the PCQ-S can be examined individually or used to examine a hierarchical perfectionistic climate factor. The second additional research aim in study two was to examine the measurement invariance of the PCQ-S using a collapsed data set ($N = 710$). The analysis of measurement invariance provided evidence for the generalisability of the five-factor 20-item PCQ-S across male *versus* female and younger (i.e., ≤ 14 years) *versus* older (i.e., ≥ 15 years) youth athlete groups.

The next important consideration that warranted an empirical investigation was whether the PCQ-S could predict important outcomes in young athletes. The two outcomes selected were athlete burnout and athlete engagement. This selection was made on the basis that these two outcomes represent very different (perhaps even opposite) sporting experiences and are both regarded as potential outcomes of sport-specific trait perfectionism (Hill et al., 2020b; Jowett et al., 2016, 2021). To test these relationships, in study three, four structural equation models were examined using data provided by young athletes ($N = 246$). In the first two models, a hierarchal perfectionistic climate factor was found to predict total athlete burnout (model one) and two (out of three) symptom dimensions of athlete burnout (model two). By contrast, in the third and fourth models, the same hierarchical perfectionistic climate factor was unrelated to total athlete engagement (model three) and the four dimensions of athlete engagement (model four). These findings are noteworthy as they indicate that perfectionistic climate has the capacity to contribute to distress in the form of athlete burnout. However, perfectionistic climate may not undermine or contribute to levels of athlete engagement experienced by young athletes.

The next important consideration investigated in the thesis was whether the component behaviours of the PCQ-S can be clearly delineated from the dimensions of performance perfectionism. This aim was tested in study four using data from youth athletes ($N = 179$) participating in a two-wave longitudinal research project. To test this aim, two ESEM measurement models including all PCQ-S and all PPS-S items were examined using data from time point one (i.e., in model one) and time point two (i.e., in model two). In both cases, model fit was acceptable, and the pattern of parameter estimates provided support for the distinctiveness of all dimensions. That is, five well-defined and discernible PCQ-S factors were identified and found to be distinct from three well-defined and discernible factors for self-oriented performance perfectionism, socially prescribed performance perfectionism, and other-oriented performance perfectionism. The most important point discussed based on these results was the distinction between perfectionistic climate and socially prescribed performance perfectionism. The key factor that distinguishes perfectionistic climate from this construct is that it focusses on experiences of pressure to be perfect at a *climate level* (i.e., rather than an individual level). That is, the perfectionistic climate construct focusses on the role of *the coach* (as opposed to *generalised others in sport*, which could also include parents and peers) and *behaviours directed toward the people (plural) in that social environment* (as opposed to the self-in-isolation from others in that social environment).

Once evidence for the distinction between perfectionistic climate and performance climate was established, the final consideration investigated in the current thesis could be examined. That is, whether perfectionistic climate could predict perfectionism in young athletes. Given that the model of perfectionistic climate is grounded in models of perfectionism development, it was proposed that perceptions of perfectionistic climate ought to be highly relevant to perfectionism development. This assertion was put to the test using the same longitudinal dataset described above. The first step in this process involved examining a series of cross-sectional relationships between perfectionistic climate and performance perfectionism using structural equation modelling. This set of analyses identified that PCQ-S scores positively predicted dimensions of performance

perfectionism reported within the same measurement occasion (T1 PCQ-S → T1 SOPP, SPPP, and OOPP; T2 PCQ-S → T2 SOPP, SPPP, and OOPP). This evidence is important as it provides preliminary support for a relationship between perfectionistic climate and performance perfectionism.

To build on the basic cross-sectional relationships identified above, a series of LCS-based models were specified and examined. This series of analyses were important for examining the dynamic relationships between PCQ-S scores and levels of performance perfectionism over a three-month period. The univariate LCS models revealed that increases in PCQ-S and PPS-S scores were evident across the two time points. However, contrary to expectations, prior levels of perfectionistic climate did not significantly predict changes in performance perfectionism (or vice versa). The findings of this study were discussed in relation to theory, research, and potential methodological challenges and issues. The major factors that may have contributed toward the unexpected findings included statistical power, duration of time between the two waves of data collection and, perhaps most importantly, the timing of assessment for each athlete across the two waves of data collection.

Thesis Contribution to the Literature

The introduction of perfectionistic climate to sport (and associated development of the PCQ-S) is intended to be a catalyst for new thinking, practices, and research in sport and exercise psychology. In this section of the general discussion, the aim is to outline the contribution that the research in this thesis offers to existing theory and research practice. The three major areas that will be touched upon include: (a) the study of the coach-created climate; (b) the study of perfectionism; and (c) intervention practices focussed on reducing (or preventing) the development of perfectionism and associated mental health problems in young people. While these areas have briefly been discussed previously in the thesis, the current discussion provides a more comprehensive account of the ways in which the study of perfectionistic climate advances each area of study.

Advancing Coach Climate Research. The first point to emphasise is that the introduction of the PCQ-S offers another way of studying the coach-created climate in sport. In sport and exercise psychology, researchers have relied almost exclusively on studying AGT- and SDT-based climate models. As outlined throughout the thesis, research guided using these theoretical approaches has helped us to better understand the experiences and consequences of various climates in sport. However, the two frameworks (even when integrated under a hierarchical model) do not adequately cover the full range of practices that shape how athletes may experience their environment in sport. This issue is emphasised by Morgan (2017) who argues that there is a need to re-conceptualise the phenomenon of motivational climate in physical education and sport. In his article, Morgan emphasises that the duopoly dominating psychological climate research limits the theoretical understanding of climate experiences. To break this duopoly, researchers should consider other psychological, pedogeological, and sociological theories that are useful in explaining the practices that shape different types of climate experience.

The argument forwarded throughout this thesis is that theory relating to the development of perfectionism is an important framework required to expand the study of coach climates in sport. This framework is required on the basis that the social psychological environments emphasised within it reflect an experience that is not sufficiently captured by existing climate constructs. For example, while many ego-involving climate constructs capture expectations (e.g., a requirement to win and outperform others), criticism (e.g., punishment for mistakes), conditional regard (e.g., recognition for more talented performers), and anxiousness (e.g., worry-conducive behaviour), perfectionistic climate captures more extreme behaviours in each of these climate components. For example, when it comes to expectations, the level of expectations in a perfectionistic climate transcends the need to simply outperform others and win. The expectations in a perfectionistic climate are rigid, unrealistically high, and focussed on perfect performance. In a similar sense, perfectionistic climate emphasises a style of criticism that differs from the more routine criticism that shapes an ego-involving climate. The distinction is in the fact that perfectionistic criticism is

harsh, unreasonable, and unrelenting. Based on these examples, it is possible to see how a perfectionistic climate differs from an ego-involving climate.

While many controlling climate constructs capture the use of externally controlling contingencies (e.g., rewards and punishment) and manipulation of support and approval based on performance (e.g., negative conditional regard), perfectionistic climate captures more extreme and specific motivational strategies in each of these climate components. That is, perfectionistic climate captures controlling practices that pressure performers to feel, think, and behave *in line with a specific requirement for perfection*. This differs from the more general controlling practices emphasised in SDT-based climate models. This is evident in Bartholomew's (2010) model of controlling coach behaviour which emphasises controlling practices that encourage athletes to 'do well', 'train harder', and 'stay focussed'. These outcomes are much broader than the controlling practices that pressure athletes to 'stop mistakes in performances' and 'make performances perfect' (Grugan et al., 2021). Based on these examples, it is possible to see how a perfectionistic climate differs from a controlling climate.

The major point to emphasise is that, in comparison to established motivational climate constructs, perfectionistic climate ultimately captures a sense of pressure that is altogether more extreme and specific to the requirement for perfection. The advent of the PCQ-S is therefore important on the basis that the experience of perfectionistic climates in sport is likely to differ from the experience of ego-involving or controlling climates in sport. The key consequences associated with perfectionistic climate experiences may therefore also differ. While the study of AGT and SDT-based climates are highly relevant to conceptions of competence, motivation, and well-being related factors, perfectionistic climate may uniquely predict some of the more negative and debilitating outcomes experienced by athletes. This includes the development of irrational and extreme requirement for perfection from the athlete themselves, as well as other forms of intense psychological pain emphasised in theory on perfectionism development (Hewitt et al., 2017).

The advent of perfectionistic climate is also significant as it marks a tangible addition to the climate scales that have dominated research in sport and exercise psychology. To further advance the study of climate-based constructs in this area of research, other theoretical frameworks, models, and measures could be considered. This is already evident to some extent in sport and exercise psychology. For example, Backhouse et al. (2018) have described a *dopogenic environment* in sport. This term is used to describe features of the sporting environment that promote anti-doping rule violations. If the coach behaviours that shape a dopegenic environment are not sufficiently captured by existing climate models in sport, it could be important to use relevant theory and research on doping to create a dopogenic climate questionnaire. This is just one of many new constructs that may follow the development of the PCQ-S. They key point to emphasise is that researchers will need to clearly articulate that the introduction of any new construct is sufficiently distinct from existing constructs and would make a significant difference in predicting real world outcomes (Clark & Watson, 2019).

Advancing Perfectionism Research. The second point to emphasise is that the introduction of the PCQ-S offers a new and alternative way to study the experience of pressure to be perfect. As described in detail in the introduction chapter to the thesis, the Comprehensive Model of Perfectionistic Behaviour (CMPB) provides a broad framework for outlining how perfectionism (and the associated experience of pressure to be perfect) is currently conceptualised. The model emphasises that the experience of pressure to be perfect operates at various levels and is best operationalised using a variety of constructs. This includes trait perfectionism (i.e., capturing the extent to which individuals are characterised by specific perfectionistic traits; Hewitt & Flett, 1991), perfectionistic cognitions (i.e., capturing the extent to which individuals experience negative perfectionism-themed ruminations), and perfectionistic self-presentation (i.e., capturing the extent to which individuals feel pressure to appear perfect to others).

One of the issues highlighted when reflecting on the CMPB is that it considers perfectionism exclusively as a characteristic or quality of the individual. That is, the CMPB outlines

what aspects of perfectionism may characterise an individual's personality and how an individual typically expresses their perfectionism. The requirement to extend our focus beyond the individual has been recommended by several perfectionism researchers (Hewitt et al., 2017; Hill & Grugan, 2019; M. M. Smith et al., 2022a). One of the most important reasons that it is important to look beyond the individual is because some individuals–regardless of how perfectionistic they are themselves–have the misfortune of encountering specific individuals and environments that are highly perfectionistic. This point is emphasised by Hewitt et al. (2017) who highlight that some employees work for a boss that is impossible to please. While these individuals should be distinguished from individuals who are highly perfectionistic in their own personality, it is important not to trivialise or ignore the perfectionistic pressure they experience.

The introduction of perfectionistic climate provides a focus on this experience of perfectionistic pressure from an individual's immediate social environment. The introduction of this new construct provides a new guise or face of perfectionism that both extends and compliments existing constructs in the CMPB. In line with previous research testing multiple components of the CMPB in athlete samples (e.g., Donachie et al., 2019; Hill et al., 2011, 2015), researchers should incorporate perfectionistic climate alongside other established components when examining important outcomes in sport. This research will be fundamental for understanding which components of perfectionism are most important to consider when researching specific outcomes in youth sport. For example, it is possible that perfectionistic pressure experienced at the climate level will better account for certain outcomes in youth sport (in comparison to existing components of the CMPB; and vice versa). Disentangling this complex issue has potentially important implications when it comes to identifying appropriate intervention strategies in youth sport (e.g., designing strategies targeting adults who shape the environment *versus* individual athletes experiencing perfectionistic issues).

In addition to examining perfectionistic climate *versus* other perfectionism constructs as independent and competing variables, the advent of perfectionistic climate offers an opportunity to

examine important interactions between such variables. In the same way that it is possible for researchers to examine within-person combinations of different perfectionism dimensions (Guadreau & Thompson, 2010), researchers can now examine interactions between perfectionistic climate and other constructs in the CMPB. This idea is built on the premise that athletes will differ in both their levels of a specific perfectionism construct (e.g., perfectionistic cognitions) and their perceptions of the perfectionistic climate in sport. Guided by Guadreau and Thompson's (2010) 2 x 2 model, researchers would be able to create four subtypes of perfectionistic pressure (e.g., low PCI scores in combination with low PCQ-S scores; high PCI scores in combination with low PCQ-S scores; low PCI scores in combination with high PCQ-S scores; high PCI scores in combination with high PCQ-S scores). The likely consequences associated with each sub-type could then be examined. This type of analysis would help us to better understand the complex interaction between an athlete's perfectionistic personality and their perception of the perfectionistic climate in sport.

A further matter that the application of perfectionistic climate to sport helps to solve is the confounding of etiological aspects of perfectionism with core components of perfectionism. This is an issue with measures of sport-specific perfectionism that incorporate both aspects of perfectionism alongside one another (e.g., Sport-MPS; Dunn et al., 2002, 2006). As discussed in the opening two chapters of the thesis, the inclusion of developmental aspects of perfectionism alongside core characteristics of perfectionism has the potential to interfere with the interpretation of results and cause confusion regarding the perfectionism personality trait (Rhéaume et al., 2000). The introduction of the PCQ-S is significant as it clearly positions pressure to be perfect from a specific other as an external and more objective source of perfectionistic pressure that shapes highly perfectionistic climates. This will help to ensure that researchers conceptualise coach pressure as an important antecedent of perfectionism (e.g., Madigan et al., 2019) as opposed to an indicator of higher-order perfectionism constructs (e.g., Pacewicz et al., 2018).

Educational Programmes to Reduce Perfectionism. The third point to emphasise is that the study of perfectionistic climate has potentially important implications are far as primary

prevention and intervention to help manage perfectionistic problems in sport are concerned. This area of research is of high importance given evidence that: (a): young and highly perfectionistic sport participants are potentially vulnerable to (among other things) experiences of burnout, depression, and anxiety (Hill et al., 2018; Jowett et al., 2016; E. P. Smith et al., 2018); and (b) perfectionism levels among young people in the United Kingdom and North America have been on the rise over the last three decades (Curran and Hill, 2019). With this evidence in mind, it is no surprise that the International Olympic Committee have identified perfectionism as a risk factor for mental health difficulties among athletes and expressed concerns that youth athletes are increasingly being exposed to perfectionistic demands and expectations (Beregon et al., 2015; Reardon et al., 2019).

In terms of current research focussing on psychological intervention, there is evidence from outside of sport that brief cognitive behavioural therapy interventions have the potential to significantly reduce perfectionism levels in individuals who have clinical levels of perfectionism. For example, Lloyd et al. (2015) identified and meta-analysed eight studies ($N = 239$) examining psychological interventions for targeting perfectionism in individuals with psychiatric disorders associated with perfectionism and/or elevated levels of perfectionism. In all studies, some form of cognitive behaviour therapy was employed. Although the specific format (e.g., number of sessions) of the interventions varied, Lloyd and colleagues found evidence to support the efficacy of cognitive behaviour interventions in reducing perfectionism on an individual basis. In addition to reducing perfectionism, this study also found some evidence for intervention-enabled reductions in problems commonly associated with perfectionism (e.g., anxiety, depression, and eating disorders). These findings provide important promise for individuals who are suffering with clinically relevant levels of perfectionism.

The evidence on perfectionism intervention in sport is more limited. Until recently, there were only four studies examining interventions targeting perfectionism in sport (De Petrillo et al., 2009; Kaufman et al., 2009; Mosewich et al., 2013; R. W. Thompson et al., 2011). Of these four

studies, Mosewich et al. (2013) provided the only examination which involved a control group, randomisation, and a post-intervention follow-up. This study examined the effectiveness of a self-compassion intervention in reducing perfectionism. In this study of self-identified perfectionistic athletes, Mosewhich and colleagues found evidence that a psychoeducational session and series of writing modules (completed over a 7-day period) was effective in reducing three key outcomes: perfectionistic concern over mistakes, self-criticism, and rumination. This study is important as it helped to build on previous studies that were mixed in terms of methodological quality and findings regarding intervention effectiveness (Donachie et al., 2020).

The most recent study in this area of research is provided by Donachie et al. (2020). This study was grounded in evidence from outside of sport showing that psychoeducational and self-help book interventions can be effective in reducing perfectionism. To test this potential in sport, Donachie and colleagues recruited a sample of 115 football players who self-identified as perfectionistic athletes. The participants were randomly assigned to an experimental group ($n = 55$) or a control group ($n = 60$). The experimental group were given a self-help book and asked to read it and engage in the enclosed activities independently over an 8-week period. By contrast, the control group were not provided with any reading materials or activities. In analysing the data provided by participants over three waves of data collection (i.e., pre-intervention, post intervention, and 5-week post-intervention follow-up), Donachie and colleagues found evidence of moderate-to-large between group differences in socially prescribed perfectionism, perfectionistic cognitions, and anxiety at the 5-week follow up time point. This study provides promising evidence for the use of self-help books in reducing athlete levels of perfectionism and associated issues among athletes.

While this evidence regarding interventions targeting perfectionism is promising, it is important to highlight that some clinicians have emphasised that brief intervention strategies may be insufficient in the long-term effective treatment of perfectionism (Hewitt et al., 2017). With this problem in mind, researchers often recommend for preventative interventions aimed at reducing the

future incidence of perfectionism in young people (Wade, 2018). In line with the recommendations

of Flett and Hewitt (2014), such intervention strategies should aim to encourage young people to

adopt achievable standards, view failure as a key part of growth, success, and development, and

become more self-compassionate. In line with current prevention practices, the target is the children

themselves. This currently involves delivering educational workshops and supporting children in

learning activities. While this focus on children is important, the advent of perfectionistic climate

means that intervention efforts could also target the key social agents that contribute to

perfectionism development (e.g., coaches, teachers, and parents).

The aim in this alternative intervention practice would be to deliver educational activities

that reduce perfectionism development by manipulating the social environments created by key

social agents. Using theory and research on perfectionistic climate as a guide, reflective tasks,

worksheet activities, and media-rich presentations could be used to help leaders to learn more

about: (a) the nature of perfectionism in young people; (b) what behaviours, practices, and relational

styles contribute to experiences of highly perfectionistic climates for young people; and (c) how to

reduce perfectionistic pressure in the social environments of young people. The initial target in

working toward this longer-term aim is to design relevant resources, package them together in an

educational programme, and pilot test the intervention in a relevant group of key social agents (e.g.,

youth sport coaches). The subsequent aim will be to evaluate the efficacy of the intervention using

an experimental research design.

The potential for a climate-based intervention for reducing perfectionism is particularly

promising given that intervention work of this kind has taken place. Guided by key tenets of AGT

and SDT, researchers have designed and delivered educational interventions aimed at leaders

involved in the provision of training, education, and care of young people (e.g., Braithwaite et al.,

2011; Cheon et al., 2018). These efforts have involved manipulating the social environment by

promoting more task-involving (*versus* ego-involving) and autonomy-supportive (*versus*

controlling) behaviours in leaders. The studies in this area have provided evidence to support the

efficacy of such intervention strategies. This is apparent both in terms of how such interventions have evidenced change in behaviours of social agents (e.g., teachers and coaches) and individual level outcomes experienced by those in the environment (e.g., less anxiety, more enjoyment, and less likely to dropout). It is therefore plausible that similar interventions would be useful in reducing perfectionism among young athletes.

Advancing Research on Perfectionistic Climate

In this section of the general discussion, avenues for research that will advance the line of research initiated in the present thesis will be discussed. In total, four key areas of research are outlined that will help to: (a) develop an improved understanding of the perfectionistic climate phenomenon; (b) generate a broader evidence base on which the construct validity of the PCQ-S can be assessed; (c) identify key issues and considerations that need to be considered when collecting and analysing data using the PCQ-S; and (d) make the study of perfectionistic more accessible to researchers across domains.

Expanding the Nomological Network of Perfectionistic Climate. One of the most immediate aims in future research should be to expand the nomological network of perfectionistic climate. Researchers should review relevant theoretical frameworks and empirical research with the aim of identifying potential outcomes associated with the perfectionistic climate construct. Once potential outcomes have been specified, researchers should collect data using relevant measures and examine whether empirical relationships match the theoretical relationships proposed in the nomological network. This process of expanding and testing the nomological network of perfectionistic climate will help to build our understanding of the perfectionistic climate phenomenon and provide important validity information for the PCQ-S. For example, if strong evidence for a proposed relationship is identified, support for the interpretation of test scores on the PCQ-S will be provided. By contrast, if weak or contradictory evidence for a proposed relationship is identified, the PCQ-S (or the underpinning theory itself) may need to be revised. In either case, the data provided is essential for the advancement of research on perfectionistic climate.

In terms of identifying important outcomes that may occupy a central position in the nomological network of perfectionistic climate, it is important to draw upon theory relating to the development of perfectionism. One important source in this regard is Hewitt et al.'s (2017) overview of the development of perfectionism. In this chapter, the authors highlight that the development of perfectionism is typically associated with experiences of intense psychological pain. This includes feelings of aloneness, shame, anxiety, and depressive symptomology (Hewitt et al., 2017). In terms of the current discussion, these affective states all provide potential outcomes that may warrant investigation alongside perceptions of the perfectionistic climate. The outcomes are relevant as perceptions of a highly perfectionistic climate are likely to confer vulnerability to a sense of low self-worth, disconnection from others, and abandonment in the world (Hewitt et al., 2017).

In addition to such negative emotional outcomes, it may also be worth studying the relationship between perfectionistic climate and feelings of satisfaction. The idea here is that, in addition to conferring vulnerability to negative affect, highly perfectionistic climates may constrict the ability of young people to experience satisfaction. This is emphasised in theory on the development of perfectionism. Specifically, Hewitt et al. (2017) emphasise that environments of extreme perfectionistic pressure thwart experiences of joy, exhilaration, and satisfaction. Emphasis is placed on the fact that even when young people experience objective success and accomplishments, they may struggle to derive any sense of positive emotion. This is because they have developed in an environment where key specific others reserve any signal of approval for the rare occasions in which perfection is achieved. This means that young people who develop in such an environment learn to dismiss, ignore, and supress any feelings of satisfaction. In this regard, perfectionistic climate may function in the same way and negatively predict sport-based feelings of personal satisfaction.

A further source that researchers may want to draw upon when identifying potential outcomes is research on the construct of coach pressure to be perfect. While the construct of coach

pressure to be perfect is not synonymous with the construct of perfectionistic climate, it does share some level of conceptual overlap (as discussed in detail in chapter two). The available evidence on such constructs (e.g., "*Perceived coach pressure*" subscale of the "*Sport Multidimensional Perfectionism* Scale" and "*Perceived pressure from coach*" subscale of the "*Multidimensional Inventory for Perfectionism in Sports*") therefore provides a good starting point for identifying central outcomes in the nomological network of perfectionistic climate. Using the subscale labels and corresponding measure titles (in italics above) in a systematic search of literature would help to build such an evidence base. The key would be to identify correlates of coach pressure to be perfect that may be worthy of further examination in context of the perfectionistic climate construct.

In research identified using the search strategy outlined above, coach pressure to be perfect has been found to be negatively associated with outcomes including self-esteem, optimism, body satisfaction, grit, and mental toughness (Dunn et al., 2011, 2020; Fawver et al., 2020; Gotwals et al., 2009). By contrast, positive associations have been found with basic psychological need thwarting, fear of failure, worry, body image concerns, athlete burnout, and avoidant coping (Dunn et al., 2011, 2020; Mallinson & Hill, 2011; Pacewicz et al., 2018; Sagar et al., 2009). These outcomes represent viable options to consider in the future study of perfectionistic climate. In some cases, the outcomes listed are also implicated in theory on perfectionism development, and therefore represent especially important candidate outcomes. For example, the accounts of perfectionism theorists describe young people in highly perfectionistic environments as being extremely self-conscious, worried about experiencing humiliation, and fearful of letting others down (Burns, 1980; Hamchek, 1978; Hollender, 1965). In this regard, studying perfectionistic climate in relation to fear of failure offers an interesting avenue for future research. This construct is especially relevant given that it captures specific fears that are likely to be invoked in highly perfectionistic environments (e.g., fear of experiencing shame and embarrassment, fear of devaluing one's self-estimate, fear of important others losing interest, and fear of upsetting important others; Conroy et al., 2002).

Incremental Predictive Ability. In addition to expanding the nomological network of perfectionistic climate, researchers should look to further assess the distinction between the PCQ-S and existing coach climate measures. In the current thesis, most attention has been paid to articulating and establishing evidence that the perfectionistic climate construct (and associated scale) are sufficiently distinct from well-established coach climate constructs (and their associated scales). This was the major focus of chapter three in which evidence was provided supporting the distinction between perfectionistic, disempowering, and empowering climate dimensions. The important point that this finding served to emphasise was that: (a) a climate that is disempowering is not necessarily perfectionistic; and (b) a climate that is perfectionistic is experienced differently than a climate that is disempowering. While this finding was extremely important, the next step in the validation of the PCQ-S is to establish whether the PCQ-S adds significantly to the prediction of outcome variables over and above what can be predicted by established measures of coach climate (Clark & Watson, 2019).

There are serval issues need to be considered in this line of research. For example, it is important to consider the measure of coach climate researchers should use to examine the incremental validity of the PCQ-S against. In the present study, perfectionistic climate was assessed in relation to multiple measures and dimensions of the coach-created climate (i.e., ego-involving, task-involving, autonomy-supportive, and controlling coach climate dimensions). However, given evidence in the present thesis that AGT- and SDT-based coach climate dimensions are best represented under a hierarchical model, it may be most appropriate to compare the PCQ-S against the Empowering and Disempowering Motivational Climate Questionnaire (Appleton et al., 2016). The major aim will be to examine whether the PCQ-S can 'outperform' the disempowering climate dimension of this model in the prediction of various outcomes.

The specific outcome variables to select represents another issue that warrants close attention. One solution to this issue might be to select a series of outcomes that have previously been linked to research guided by AGT (e.g., anxiety, enjoyment, and confidence), SDT (e.g.,

vitality, flourishing, and psychological wellbeing), and models of perfectionism development (e.g., shame, guilt, and embarrassment). This study will provide a network of relationships that can be evaluated for similarities and differences between each climate construct. The aim will be to 'pinpoint' where the introduction of perfectionistic climate may have the most utility. In line with the candidate outcomes for expanding the nomological network of perfectionistic climate, the PCQ-S may provide stronger and more unique relationships with outcomes that represent more negative sporting experiences and outcomes (e.g., fear of failure, depressive symptomology, and anxiety).

In addition to setting the PCQ-S against established measures of coach motivational climate, an important aim will be to examine the incremental predictive ability of the scale against established measures of trait perfectionism. In the current thesis, evidence was provided supporting the distinction between components of perfectionistic climate and dimensions of performance perfectionism (i.e., self-oriented performance perfectionism, socially prescribed performance perfectionism, and other-oriented performance perfectionism). While this finding provides an important first step in establishing construct validity evidence, further research is required to establish whether the PCQ-S adds significantly to the prediction of outcome variables over and above what can be predicted by trait dimensions of perfectionism. To gain the most information about the PCQ-S, researchers should compare the PCQ-S against multiple measures of perfectionism (e.g., MIPS, Stoeber et al., 2006; Sport-MPS, Dunn et al., 2002, 2006; PPS-S, Hill et al., 2016).

The aim should be to examine perfectionistic climate against outcomes that have previously been linked with sport-specific trait perfectionism. Based on a recent meta-analytical review of the perfectionism literature in sport, this includes various motivational, well-being-related, and performance-based outcomes (Hill et al., 2018). In some cases, the outcomes identified in the section on expanding the nomological network of perfectionistic climate have previously been linked with sport-specific perfectionism. This includes anxiety, fear of failure, and depression (Hill et al., 2018). Once again, these outcomes represent especially important candidate outcomes for

examining the incremental predictive ability of perfectionistic climate over and above sport-specific perfectionism. The importance of this line of research is that it will help to identify what type of perfectionistic pressure (i.e., personality-based *versus* climate-based) best accounts for specific outcomes in sport.

Perfectionistic Climate as a Group-Level Construct. One important issue that researchers examining perfectionistic climate will need to consider is the structure of data they collect using the PCQ-S. When athletes are nested within groups that share the same coach, it may be important for researchers to adopt an approach that accounts for group membership. This is especially important given that many researchers argue that climate-based constructs are inherently group-level constructs. This argument is clearly articulated by Papaioannou et al. (2004) who emphasise that climate data are based on responses about the overall group climate created by a single person (e.g., the coach) for all group members. This means that athletes can (and should where possible) be clustered into higher-level administrative units (e.g., teams who share the same coach). The reason that this group-based assignment is important is because athletes who share the same coach are more likely to have a shared climate experience. This shared experience means that it may be inappropriate to pool responses of athletes without regard to potential group-based differences.

In keeping with the discussion above, researchers with PCQ-S data should consider adopting an approach that allows them to model perfectionistic climate as both an individual characteristic and a group-level characteristic (Lüdtke et al., 2008). This could be achieved by using a multilevel modelling approach that examines both individual PCQ-S scores (i.e., athlete-level climate perceptions) and within-group aggregations of PCQ-S scores (i.e., team-level climate perceptions). This multilevel approach is beneficial as it helps to decompose an observed relationship (e.g., perfectionistic climate predicting burnout) into within-group and between-group effects. In doing so, researchers can examine how the perfectionistic climate operates at the individual level and the group level. This is important as there could be fundamental differences in how the construct operates (Lüdtke et al., 2008).

This approach has recently been applied when examining motivational climate constructs informed by AGT (Álvarez et al., 2019). In this study, Álvarez et al. (2019) recruited a sample of 625 Spanish youth adolescent football players. This sample of athletes were nested within 50 unique teams. At the team-level, the researchers found evidence that team perceptions of coach transformational leadership positively predicted team perceptions of a coach-created task-involving climate. In turn, team perceptions of a coach-created task-involving climate positively predicted team-level perceptions of coach-induced effort, coach effectiveness, and satisfaction with coach. At the individual-level, the researchers found a similar, but not identical pattern of relationships. The key difference was that individual perceptions of a coach-created task-involving climate positively predicted perceptions of coach-induced effort and coach effectiveness but not satisfaction with coach. The influence of the coach-created task-involving climate on the outcome variables was also much weaker at the individual level. This study therefore showcases the potential for differences in how climate-based constructs operate depending on how they are operationalised.

This multilevel approach has also recently been applied when examining motivational climate constructs informed by SDT (Cheon et al., 2022). In this study, Cheon et al. (2022) recruited a sample of 1,487 Korean secondary-grade students. This sample of students were nested within 49 unique classes. Using a randomised control trial design, the teachers of each class were randomly assigned to participate (or not participate) in an autonomy-supportive teaching intervention (25 teachers in experimental condition, 24 teachers in control condition). Over the course of the semester, the growth of class-level autonomy support was greater in the experimental condition versus the control condition. This autonomy-supportive teaching intervention also led to high class-level perceptions of need-satisfaction and low class-level perceptions of need frustration in mid-semester. However, these class-level intervention-enabled changes did not predict class-levels of antisocial behaviour at the end of semester. This differs from the student-level perceptions of need satisfaction and need frustration in the mid-semester which did predict induvial-levels of

antisocial behaviour at the end of semester. This study provides another example of examining climate-based constructs at both a group and individual level.

In line with the studies above, it will be important for researchers to adopt a multilevel approach when examining perfectionistic climate. This approach will open new and important questions about the perfectionistic climate construct. For example, it will be possible to examine whether effects vary from one group to another and identify group characteristics that may account for such variation (e.g., sport type, level of competition, or gender of athletes). In addition to this aim, adopting a multilevel modelling framework would provide a further (and robust) examination of construct validity. That is, it would be possible to examine the degree of similarity in PCQ-S responses from members in the same group. The idea here is that a reasonable level of agreement about the perfectionistic climate would be expected. This is because, in theory, the external objective reality being assessed is the same (or at least very similar) for all athletes who have that coach (Morin et al., 2014). If there is reasonable agreement about perfectionistic climate among athletes on the same team, then support for the construct validity of the PCQ-S scores will be provided. This is very similar to the idea that a reasonable degree of agreement in items designed to measure the same construct provides support for the construct validity of a measure (Papaioannou, 2004).

New Perfectionistic Climate Measures. In addition to the above areas of development, an important line of research to help advance the study of perfectionistic climate will involve developing and validating new perfectionistic climate measures. In line with the development of existing climate-based constructs, perfectionistic climate is likely applicable in all contexts where the performance of young people is highly valued. This includes family contexts, educational contexts, and dance contexts. In this regard, the study of perfectionistic climate would benefit greatly from self-report measures tailored toward each of these specific contexts (e.g., Perfectionistic Climate Questionnaire-Dance; PCQ-D). When developing such a measurement, it will be important for researchers to ensure that the scale items align with the specific aspects and

characteristics of the context in question. An appropriate start point in this process may involve creating an initial item pool reflecting ways in which each component of perfectionistic climate typically manifests in that specific domain. Once this initial item pool is developed, researchers can follow the recommended scale development procedures outlined in the present thesis.

In addition to developing measures of perfectionistic climate that extend beyond sport, researchers should focus on creating measures that capture different sources of perfectionistic pressure in the sport domain. In terms of the PCQ-S developed in the present thesis, the focus is on the role of the coach. This choice was based primarily on evidence that coach-related factors are extremely important in the development of sport-specific perfectionism (Appleton & Curran, 2016). However, while this may be the case, this does not mean that others are not also critical in terms of influencing the development of perfectionism in young athletes. One source of pressure that is particularly important in terms of both shaping the climate experience of young athletes and influencing the development of perfectionism comes from parents.

This potential for parents to influence their child's perfectionism in sport comes from both theory and research. In line with the initial models of perfectionism development (i.e., social expectations, social reactions, anxious rearing, and social learning models; Flett et al., 2002), researchers in sport initially focussed on the role parents play in the development of sport-specific perfectionism. For example, Appleton et al. (2010) found support for perceptions of other-oriented perfectionism in parents significantly predicting athlete socially prescribed perfectionism. This finding provided initial support for the applicability of the social expectations model of perfectionism development in sport. This finding has since been further substantiated by researchers in sport. This is evident in studies that have identified positive relationships between athlete perfectionism and parental-related behaviours (e.g., parental expectations, parental criticism, parental pressure to be perfect, and parental conditional regard; Curran et al., 2018; Madigan et al., 2019; S. McArdle & Duda, 2008). With this evidence in mind, a Parental Perfectionistic Climate

Questionnaire-Sport (Parental-PCQ-S) should be a priority for the future study of perfectionistic climate.

A further important addition to the measurement of perfectionistic climate lies in the development of an observational tool. As perfectionistic climate is conceptualised as a more external and objective experience of pressure to be perfect in the immediate social environments of athletes, it should be possible to systematically record and analyse perfectionistic coach interactions. This idea has good potential considering that established climate constructs have associated observational tools. This includes measures grounded in AGT (e.g., Observational Checklist for the Motivational Climate; Boyce et al., 2013), SDT (e.g., MPOWER Autonomy Support Observation System; Webster et al., 2013), and Duda's (2013) hierarchical model (Multidimensional Motivational Climate Observation System; N. Smith et al., 2015). Developing the Observational Perfectionistic Climate Questionnaire-Sport (OPCQ-S) will help to evaluate whether athlete perceptions of perfectionistic climate are consistent with actual coach behaviour. This could have implications for identifying where best to intervene in perfectionism development.

Limitations and Future Research Directions

The limitations in the current thesis must be considered. In study one, outlined in chapter two, the revised pool of 56 PCQ-S items were reviewed in three focus groups. The limitation of this process was that each group consisted of only youth footballers. In other scale development research focussing on youth athletes, researchers typically recruit participants from a range of sports (e.g., netball, swimming, football, rugby union, and gymnastics; Hill et al., 2016). The benefit of recruiting from multiple sports is that it is possible to assess whether the item content is applicable across a variety of different sport settings (e.g., team *versus* individual sports, closed *versus* open skills sports, and aesthetic *versus* non-aesthetic sports). While this limitation is important to highlight, it is worth considering that: (a) the sport coaches employed to review items in the item refinement stage proceeding the focus groups represented various team and individual sports (e.g., netball, basketball, and tennis); and (b) coach ratings of item applicability were all high. This helped

to offset the limitation of only recruiting athletes from one sport for the subsequent focus group stage of item refinement.

The next point to highlight relates to the Likert scale adopted for the PCQ-S. In line with other climate-based measures, we adopted the anchors "*strongly disagree*" to "*strongly agree*" (e.g., Appleton et al., 2016; Bartholomew et al., 2010). In this regard, athletes who rate items using the lowest end of the scale strongly disagree that their coach engages in the behaviour captured by the specific PCQ-S item, while athletes who rate items using the highest end of the scale strongly agree that their coach engages in the behaviour captured by the specific PCQ-S item. One potential drawback to this *agreement style* response scale is that it may not capture the psychological meaning of the specific coach behaviours in each PCQ-S item. With this issue is mind, some researchers have adopted a *potency style* response scale intended to capture the pervasiveness, intensity, or expression of specific climate behaviours (e.g., "*not at all potent*" to "*strong potency*"; Smith et al., 2015). In other cases, researchers have adopted a *frequency style* response scale to assess how often others engage in specific climate behaviours (e.g., "*never occurs*" to "*always occurs*"; Harwood et al., 2019). In further testing the PCQ-S, researchers may want to test (and compare) the psychometric and functional differences between alternative methods.

A further important point to highlight relates to the data used to examine the factorial structure of PCQ-S items in study one. In this study, outlined in chapter two, the PCQ-S was created based on data provided by a heterogenous and moderate-to-large sample of youth athletes ($N = 487$). This sample was split into two samples to provide a sample for the initial EFA ($N = 243$) and follow up CFA and ESEM analyses ($N = 244$). While this approach is a recommended scale development practice (e.g., Fabrigar & Wegener, 2012; DeVellis, 2017), one of the associated limitations is that the two samples are not fully independent due to shared characteristics. To counter the potential negative consequences of this issue in the development of the PCQ-S, in study two, outlined in chapter three, the factor structure of the PCQ-S was examined using data provided by a fully independent sample ($N = 223$). This combination of analyses ultimately provided strong

evidence for the factorial validity and stability of the PCQ-S. Nevertheless, it is important for researchers to continue to examine the hypothesised five-factor structure in diverse samples of youth athletes.

An important goal in future research will be for researchers to apply the growing PCQ-S database to a meta-analytical synthesis. It is possible to apply meta-analytical structural equation modelling (MASEM) techniques to examine the factor structure of scales using data from multiple samples (Cheung & Hong, 2017). For example, Wedderhoff et al. (2021) applied MASEM to data on the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). The need for a robust analysis of the PANAS was evident given mixed and conflicting evidence regarding its underlying latent structure. In this study, PANAS data from 57 studies ($N = 54,043$) were pooled across subsamples. The MASEM technique identified that the two factor-model previously proposed by Zevon and Tellegen (1982) exhibited the best fit. In terms of the PCQ-S, once there is sufficient data available, MASEM would provide an appropriate and robust technique for clarifying the structural properties among the PCQ-S items and variables. It would also allow for additional tests of measurement invariance across groups within the pooled data set.

In the present thesis, PCQ-S data pooled across the first two empirical studies, outlined in chapters two and three allowed for tests of measurement invariance across meaningful subgroups defined based on their gender and age. However, as alluded to above, it will be important to test model generalisability of the PCQ-S across other important groups evident in sport research. For example, researchers often examine measurement invariance across sport type, expertise, and athlete status (e.g., Chiu et al., 2016; Boardley & Kavussanu, 2008; Vaughan et al., 2019). In the current investigation, another limitation was that only metric and scalar invariance were examined. Future research is required to examine the invariance of important structural parameters associated with the PCQ-S model. For example, it is possible to examine the invariance of factor variance and covariance parameters. This analysis would allow researchers to determine whether the relationships underlying factors remain unchanged in different groups (Kueh et al., 2018). It is also

possible to examine the invariance of factor mean parameters. This analysis would allow researchers to examine the factor mean differences between specified groups (Kueh et al., 2018). These additional tests of invariance were not part of the primer on measurement invariance for ESEM models followed in the present research (see Jin, 2020).

The additional tests of measurement invariance outlined above are also noteworthy on the basis that they could help to identify groups with higher perfectionistic climate scores (e.g., higher PCQ-S responses in elite athletes *versus* grassroots athletes, or vice versa). Identifying specific athletes or groups of athletes who are more likely to experience highly perfectionistic climates in sport is an important area of future research. This research will have implications for researchers designing future studies on perfectionistic climate in sport. For example, it will help researchers to identify which groups would benefit most from climate-based interventions aimed at reducing perfectionistic cues in the social environment. While tests of measurement invariance across athlete subgroups is one method that could address this area of study, other analytical designs are also important to highlight. For example, in line with research on burnout in sport, researchers could test whether sociocultural factors (e.g., sport type, sport level, and age) moderate the relationships between perfectionistic climate and important outcomes (e.g., Davis et al., 2019).

An important consideration in the thesis is the level at which the PCQ-S is statistically modelled. Based on the evidence presented in the first two studies, it is possible to either: (a) model the PCQ-S components (i.e., expectations, criticism, control, conditional regard, and anxiousness) as independent factors; or (b) model the components as indicators of a broader higher-order perfectionistic climate factor. This provides researchers with modelling flexibility in that they can examine the relative influence of each PCQ-S factor or examine the broader influence of an overall perfectionistic climate factor (Myers et al., 2014). When it comes to studying established coach climates that involve multiple components (e.g., controlling coach behaviour; Bartholomew et al., 2011), researchers often adopt an approach that examines a total climate score (e.g., Gucciardi et al., 2017; Curran et al., 2016; Stebbings et al., 2015). This approach was also adopted when

examining the influence of perfectionistic climate in study three and four within the present thesis. An important aim in future research will be to adopt both strategies with aim of identifying when it most appropriate to adopt a total PCQ-S *versus* independent PCQ-S factors approach.

In addition to modelling and psychometric-based limitations, it is important to consider important research design limitations in the present thesis. One such issue pertains to the reliance on self-report measures within each study. The limitation associated with this methodological approach is the potential for mono-method bias (also known as common method variance). A common method approach to measurement can have a systematic influence on the observed associations among variables and make research findings ambiguous (Podsakoff et al., 2003). To help alleviate this issue and improve validity, researchers should consider using alternative sources of measurement. For example, in addition to using self-report measures, it could be useful to obtain reports from significant others (e.g., coach reports of athlete burnout; Madigan, 2021) and use observational tools to assess coach-created climates in sport.

Another limitation relates to the cross-sectional design employed across the first three studies in the thesis. This issue is perhaps most relevant to the study examining the predictive ability of the PCQ-S in relation to athlete burnout and athlete engagement. The hypothesised relationships in this study were grounded in theory and reflected in the construction of four hypothesised structural equation models. However, the cross-sectional design means that it was inappropriate to make strong inferences regarding causality. For example, it was not possible to determine from the results reported if perceptions of the perfectionistic climate led to burnout in young athletes (or vice versa). As highlighted in chapter five, variables typically considered as outcomes of perfectionism (e.g., academic achievement, academic efficacy, and school satisfaction) have been found to be predictors of perfectionism (Damian et al., 2017; Stricker et al., 2019). An important step for future research will therefore be to test relationships using a longitudinal research design. In doing so, further clarity regarding the antecedents, consequences, and reciprocal effects of perfectionistic climate will be uncovered.

The final study in this thesis, outlined in chapter five, did employ a more rigorous longitudinal study design. This was an important feature of the study given that it was focussed on the development of perfectionism–a personality trait that unfolds over time. However, while a multiple time-point design was employed in this study, there were various methodological decisions that could be improved in future research. This includes the number of time points adopted to measure the study variables, duration of the period over which the study variables were measured, and timing of the competitive season in which the study was initiated for each study participant. In terms of the first two points, it will be important for researchers to examine the influence of perfectionistic climate across a longer period and over three (or more) waves of data collection. While two waves are data are better than one, models with more time points allow for more fine-grained dynamic processes to be examined (Kievit et al., 2018). In terms of the duration of the study, previous research shows that a period greater than three-months results in stronger predictive ability when examining factors that influence perfectionism development (e.g., Madigan et al., 2019). In line with recent longitudinal examinations of perfectionism, a period of five-to-six months may be more appropriate (Damian et al., 2022).

In terms of the final point highlighted above, researchers examining perfectionistic climate longitudinally will need to appropriately consider the timing of assessment for each athlete across the study period. In study four, outlined in chapter five, there was considerable variability in the season time point at which each participant initiated (T1) and completed their involvement (T2) in the study. This was identified as an important issue as perceptions of perfectionistic climate may vary as a function of timing across the season. With evidence that coach-climate perceptions differ between the start and end of a competitive season (Sage & Kavussanu, 2006), it will be important for researchers to initiate data collection at a fixed time point across the entirety of the sample. In line with existing longitudinal research on coach climate constructs in sport, this may involve focussing on one sport and tracking change across the competitive season (e.g., Curran et al., 2016). In terms of when to initiate data collection, it may be worth collecting data a few weeks into the

season rather than during the off-season. This is based on the idea that athletes need time with the coach before they can make accurate appraisals of the coach-created climate (S. L. Smith et al., 2005).

Conclusion

In line with the narrative introduced in this thesis, pressure for athletes to be perfect is ubiquitous at all levels of sport. However, when it comes to existing models of perfectionistic pressure, the focus has traditionally been on the individual. What such models fail to consider is that all individuals–regardless of their own levels of trait perfectionism–can experience pressure to be perfect in the specific social environments they experience. One recently introduced construct that provides a focus on this more objective and external experience of pressure to be perfect is the model of perfectionistic climate (Hill & Grugan, 2019). In the present thesis, this model has been applied to sport with a focus on the role of the coach as a key figure responsible for shaping perfectionistic climates in this context. The aim was to develop and validate (across a series of four inter-related studies) a measure associated with this model of perfectionistic climate in sport.

The outcome of this research was a five-factor 20-item scale with evidence supporting its factor structure, factor stability, construct validity, scale reliability, scale readability, and measurement invariance. This support was provided across the first two studies of the thesis in which the PCQ-S was developed (i.e., items generated, refined, and tested using EFA, CFA, and ESEM-based modelling techniques) and examined in relation to established coach climate measures (i.e., compared in relation to AGT- and SDT-based coach climate measures using EFA and network analysis). The third and fourth studies in the thesis provided additional validity evidence for the PCQ-S. This included evidence that the PCQ-S can be differentiated from performance perfectionism and predict important outcomes in youth athletes (e.g., athlete burnout). While this evidence provides a solid foundation to support the introduction of the PCQ-S, it is important to remember that the validation of a psychometric instrument is an ongoing and multidimensional

process. It is therefore important to build an even stronger evidence base on which the validity of the PCQ-S can be evaluated.

In the final section of the thesis the significance of the perfectionistic climate construct (and associated PCQ-S) was highlighted. The main points emphasised in this regard are that the study of perfectionistic climate has the potential to complement existing climate research, extend perfectionism research, and inform the development of novel strategies for preventing the development of perfectionism. In addition to these key points, several research questions and areas required to advance the study of perfectionistic climate were highlighted. This included highlighting research required to expand the nomological network of perfectionistic climate, establish evidence of incremental predictive ability, study perfectionistic climate as a group-based construct, and create new perfectionistic-climate based measures. The final section of the thesis provided an overview of relevant limitations to the research included in the thesis. Following the ideas and recommendations in this final chapter will help to ensure the future study of perfectionistic climate is high-quality and impactful.

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Appendix A: Research Ethics Committee Approval

A.1 Ethical Approval Letter for Research in Chapter 2

York St John University

Faculty of Health and Life Sciences
Lord Mayor's Walk YORK YO31 7EX
Tel: (01904) 876734
Fax: (01904) 876500

20/04/2017

Nathalie Noret
Chair of the Cross School
Research Ethics Committee
Direct Line 876311
E-mail: n.noret@yorksj.ac.uk

Dear Andy,

RE: Development and validation of the Perfectionistic Climate
Questionnaire (PCQ) in Youth Sport

REF: 05042017_Hill2

The research ethics committee has approved, without reservation, the above
research ethics submission of 5th April, 2017.

Yours sincerely

A.2 Ethical Approval Letter for Research in Chapter 3

York St John University,
Lord Mayors Walk,
York,
YO31 7EX

02/07/2018

York St John University Cross School Research Ethics Committee
(Health Sciences, Sport, Psychological and Social Sciences and Business)

Dear Michael,

Title of study: The Perfectionistic Climate in Youth Sport Questionnaire (PCQ): A Nomological Network
Ethics reference: 110018171/05102018
Date of submission: 05/10/2018

I am pleased to inform you that the above application for ethical review has been reviewed by the Cross School Research Ethics Committee and I can confirm a favourable ethical opinion on the basis of the information provided in the following documents:

Document	Date
Ethics form	02/07/2018
Responses to feedback	05/10/2018

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval, including changes to recruitment methodology or accompanying documentation. All changes must receive ethical approval prior to commencing your study.

Yours sincerely,

Nathalie Noret

A.3. Ethical Approval Letter for Research in Chapter 4

York St John University

York St John University,
Lord Mayors Walk,
York,
YO31 7EX

18th February, 2019

York St John University Cross School Research Ethics Committee
(Health Sciences, Sport, Psychological and Social Sciences and Business)

Dear Michael,

Title of study: The Perfectionistic Climate, Burnout, and Engagement in Youth Sport.
Ethics reference: Grugan_18022019_2
Date of submission: 17/01/2018

I am pleased to inform you that the above application for ethical review has been reviewed by the Cross School Research Ethics Committee and I can confirm a favourable ethical opinion on the basis of the information provided in the following documents:

Document	Date
Application for ethical approval form	13/02/2019
Responses to feedback form	13/02/2019

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval, including changes to recruitment methodology or accompanying documentation. All changes must receive ethical approval prior to commencing your study.

Yours sincerely,

Nathalie Noret

A.4 Ethical Approval Letter for Research in Chapter 5

York St John University,
Lord Mayors Walk,
York,
YO31 7EX

18th February, 2019

York St John University Cross School Research Ethics Committee
(Health Sciences, Sport, Psychological and Social Sciences and Business)

Dear Michael,

Title of study: The Perfectionistic Climate and the Development of Perfectionism in Youth Sport
Ethics reference: Grugan_18022019_1
Date of submission: 17/01/2018

I am pleased to inform you that the above application for ethical review has been reviewed by the Cross School Research Ethics Committee and I can confirm a favourable ethical opinion on the basis of the information provided in the following documents:

Document	Date
Application for ethical approval form	12/02/2019
Responses to feedback form	12/02/2019

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval, including changes to recruitment methodology or accompanying documentation. All changes must receive ethical approval prior to commencing your study.

Yours sincerely,

Nathalie Noret
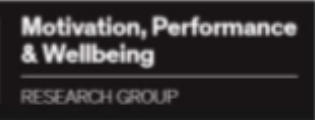
Appendix B: Gatekeeper and Parent Information / Parental Consent

B.1 Example Gatekeeper Letter for Research in Thesis[1]

B.2 Example Parent Information Sheet / Parental Consent Form[1]

YORK ST JOHN UNIVERSITY Est. 1841

Motivation, Performance & Wellbeing RESEARCH GROUP

Parent Information Sheet

We would like to invite your child to take part in a research project. Please read the following information carefully before deciding whether you are willing to allow us to ask your child to take part. Please ask us if there is anything that is not clear or if you would like more information.

Research Team: The research is being conducted by members of the Motivation, Performance, and Well-being (MPaW) research group at York St. John University: Michael Grugan (PhD Student), Dr Sarah Mallinson-Howard, Dr Robert Vaughan; and Professor Andrew Hill (Project Supervisors).

Purpose of the study: We are interested in examining how youth athletes think coaches behave in the sport environment. The purpose of the current project is to find out whether the extent to which youth athletes think that their coach pressures athletes to perform perfectly influences their own experiences in sport.

Why have I been chosen? / Do I have to take part? You have been asked to consider allowing us to invite your child to take part as they are a youth sports participant. It is up to you to decide whether you would be willing to allow us to ask your child to take part. With your permission, they will then be asked to participate. Whether they agree to take part is entirely up to them – participation must be completely voluntary.

What will your child be asked to do if they take part? Participation involves completing a short questionnaire. The questionnaire includes statements about the coach (e.g., The coach expects perfect performance) and the athlete (e.g., I have fun in my sport). Participants are instructed to rate their level of agreement or disagreement with each statement. The questionnaire should take approximately 15 minutes and will be completed in club time (e.g., before or after training or competition).

What are the possible advantages or disadvantages/risks of taking part? We do not consider there to be any probable disadvantages or risks.

Will my taking part in this project be kept confidential? Participant names are NOT required. The information that we do collect during the research will be kept confidential. Only members of the research team are permitted to see the questionnaire responses. Coaches are required to maintain this level of confidentiality.

How to withdraw? Participants can withdraw from the research project up until four weeks after completing the questionnaire. If your child would like to withdraw, this is possible by contacting the project director.

What will happen to the data and results of the research project? The anonymised data/results will be reported in the PhD Thesis of the Project Director and may be published as part of a scientific study. The anonymous data will be digitised and stored securely in the York St John University Research Data Repository. Hard copy data will then be safely and securely destroyed. Please feel free to contact us (details below) to request a summary of the project findings.

WHAT NEXT?

If you are willing to allow us to ask your child to take part in this project, you do not need to do anything.

If you would rather your child **DID NOT** participate in this project, please contact the project director (m.grugan@yorksj.ac.uk); or alternatively, complete, cut out, and return this **WIHDRAWAL SLIP** to the coach

Parent Name:_____   Childs Initials:_____

Sports Club:_____   Date: _____

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[1] The document above is the Parent Information Sheet / Parental Consent Form associated with the study in Chapter 5. The parental information sheets / parental consent forms associated with the studies in other chapters of the thesis are the same except for the "purpose of the study" section of the document which is specific to each study.

Appendix C: Participant Information

C.1 Participant Information Sheet for Research in Chapter 2[1]

Athlete Information Sheet

We would like you to take part in a research project. Before you decide whether you would like to, you need to understand why the research is being done and what it will involve. Please read this sheet and ask questions if there is anything that is not clear.

- -

Research Team: The research is being conducted by the School of Sport at York St John University.

Purpose of the study: We are interested in examining how youth athletes think coaches behave in the sport environment.

Why have I been chosen? You have been asked to take part because you are a youth athlete.

Do I have to take part? You do not need to take part if you do not want to and you can stop at any time.

What do I have to do if I take part? You will be asked to take part in a focus group. This should take about one hour and will be competed at your club or school. The focus group will involve reading out and discussing statements about coach behaviour in your sport.

What are the possible advantages or disadvantages/risks of taking part? We do not consider there to be any probable disadvantages or risks of participating. An advantage of the study is that you will be offered a small gift to thank you for your participation in the project.

Will my questionnaire be shared with others? No one except the research team will have access to your responses. The data collected will not be shared with others.

How to withdraw? You can withdraw from the research project at any time prior to anonymising the data (without having to provide a reason). If you want to withdraw, this is possible by contacting the project director (see contact information below).

What will happen to the results of the research project? We will use your responses to help create a new questionnaire about coach behaviour. However, you will not be identifiable. We will store all data securely at York St John University and destroy it after we report the findings.

- -

If you have any questions/concerns, during or after the investigation, please contact:

Michael Grugan	Andrew Hill
E-mail: M.grugan@yorksj.ac.uk	E-mail: A.hill@yorksj.ac.uk

If you have any questions/concerns and wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Natalie Noret (Chair of the Cross-School Research Ethics Committee, York St. John University)
N.noret@yorksj.ac.uk

Thank you for taking the time to read this information (this is for you to keep)!

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[1] The document outlined above is the participant information sheet associated with part one of the methods and results in chapter 2 (focus group research). The participant information sheet associated with parts two and three of the methods and results in chapter 2 (questionnaire research) was the same except for the "What do I have to do if I take part?" section of the document: "You will be asked to complete a short questionnaire. The questionnaire includes statements about the coach (e.g., The coach expects perfect performance). You will be asked to rate how much you agree or disagree with each statement. This should take about 15 minutes and will be completed at the club."

C.2 Participant Information Sheet for Research in Chapter 3

Athlete Information Sheet

We would like you to take part in a research project. Please read the following information carefully before deciding whether you are willing to take part. Please ask us if there is anything that is not clear or if you would like more information.

Research Team: The research is being conducted by members of the Motivation, Performance, and Well-being (MPaW) research group at York St. John University: Michael Grugan (PhD Student), Dr Sarah Mallinson-Howard, Dr Robert Vaughan; and Professor Andrew Hill (Project Supervisors).

Purpose of the study: We are interested in examining how youth athletes think coaches behave in the sport environment. The overall aim of this project is to compare athletes' thoughts on different coaching behaviours.

Why have I been chosen? / Do I have to take part? You have been asked to take part because you are a youth athlete. You do not need to take part if you do not want to and you can stop at any time.

What do I have to do if I take part? You will be asked to complete a short questionnaire. This should take about 15 - 20 minutes and will be completed at the club.

What are the possible disadvantages and risks of taking part? We do not consider there to be any disadvantages or risks of participating.

Will my questionnaire be shared with others? No one will see the content of your questionnaire except the research team.

How to withdraw? You can withdraw from the research project at any time prior to anonymising the data (without having to provide a reason). If you want to withdraw, this is possible by contacting the project director (see contact information below).

What will happen to the results of the research project? We may use your responses when reporting the findings of the study. However, you will not be identifiable. We will store all data securely at York St John University and destroy it after we report the findings.

If you have any questions/concerns, during or after the investigation, please contact:

Michael Grugan (Project Director)	
E-mail: M.grugan@yorksj.ac.uk ; Work (Tel.): 01904 876512	
Dr Sarah Mallinson-Howard (Project Supervisor)	Robert Vaughan (Project Director)
E-mail: S.mallinson-howard@yorksj.ac.uk	E-mail: R.vaughan@yorksj.ac.uk

If you have any questions/concerns and wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Natalie Noret (Chair of the Cross-School Research Ethics Committee, York St. John University)
N.noret@yorksj.ac.uk

Thank you for taking the time to read this information (this is for you to keep)!

C.3 Participant Information Sheet for Research in Chapter 4

Athlete Information Sheet

We would like you to take part in a research project. Please read the following information carefully before deciding whether you are willing to take part. Please ask us if there is anything that is not clear or if you would like more information. **This information is for you to keep.**

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*Research Team***:** The research is being conducted by members of the Motivation, Performance, and Well-being (MPaW) research group at York St. John University: Michael Grugan (PhD Student), Dr Sarah Mallinson-Howard, Dr Robert Vaughan; and Professor Andrew Hill (Project Supervisors).

Purpose of the study: We are interested in examining how youth athletes think coaches behave in the sport environment. The overall aim of this project is to find out whether how athletes think their coach behaves can influence their own experiences of sport.

Why have I been chosen? / Do I have to take part? You have been asked to take part because you are a youth athlete. You do not need to take part if you do not want to and you can stop at any time.

What do I have to do if I take part? You will be asked to complete a short questionnaire. The questionnaire includes statements about the coach (e.g., the coach expects perfect performance) and you (e.g., I have fun in my sport). You will be asked to rate how much you agree or disagree with each statement. This should take about 15 minutes and will be completed in school time.

What are the disadvantages/risks of taking part? We do not consider there to be any probable disadvantages or risks of participating.

Will my questionnaire be shared with others? No one will see the content of your questionnaire except the research team.

How to withdraw? You can withdraw from the research project up until four weeks after completing the questionnaire (without having to provide a reason). If you want to withdraw, this is possible by contacting the project director.

What will happen to the results of the research project? We may use your questionnaire when reporting the findings of the study. However, you will not be identifiable. We will store all data securely at York St John University. Please feel free to contact us (details below) to request a summary of the project findings.

Further Reading: If you are interested in this project, please visit the following weblink for further information on perfectionism and how to cope with it in everyday life:
file:///E:/PhD/Study%203/Perfectionism%20fact%20sheet.pdf

If you have any questions/concerns, during or after the investigation, please contact:

Michael Grugan (Project Director)
E-mail: M.grugan@yorksj.ac.uk; Work (Tel.): 01904 876512

If you have any questions/concerns and wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact Natalie Noret (Chair of the Cross-School Research Ethics Committee, York St. John University)

N.noret@yorksj.ac.uk

C.4 Participant Information Sheet for Research in Chapter 5

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We would like you to take part in a research project. Please read the following information carefully before deciding whether or not you are willing to take part. Please ask us if there is anything that is not clear or if you would like more information.

Research Team: The research is being conducted by members of the Motivation, Performance, and Well-being (MPaW) research group at York St. John University: Michael Grugan (PhD Student), Dr Sarah Mallinson-Howard, Dr Robert Vaughan; and Professor Andrew Hill (Project Supervisors).

Purpose of the study: We are interested in examining how youth athletes think coaches behave in the sport environment. The overall aim of this project is to find out whether how athletes think their coach behaves can influence how they themselves think about sport and sport performance.

Why have I been chosen? / Do I have to take part? You have been asked to take part because you are a youth athlete. You do not need to take part if you do not want to and you can stop at any time.

What do I have to do if I take part? You will be asked to complete an online questionnaire on two different occasions (approximately 3 months apart). The questionnaire includes statements about the coach (e.g., the coach expects perfect performance) and you (e.g., "I put pressure on myself to perform perfectly"). You will be asked to rate how much you agree or disagree with each statement. This should take about 15 minutes and will be completed in school time.

What are the possible advantages or disadvantages/risks of taking part? We do not consider there to be any probable disadvantages or risks of participating. An advantage of the study is that if you fill in the questionnaire on both occasions, you will be offered a small gift to thank you for your participation in the project.

Will my questionnaire be shared with others? No one will see the content of your questionnaire except the research team.

How to withdraw? You can withdraw from the research project up until four weeks after completing the questionnaire (without having to provide a reason). If you want to withdraw, this is possible by contacting the project director (see contact information below).

What will happen to the results of the research project? We may use your questionnaire when reporting the findings of the study. However, you will not be identifiable. We will store all data securely at York St John University. Please feel free to contact us (details below) to request a summary of the project findings.

If you have any questions or concerns, during or after the investigation, please contact:

Michael Grugan (Project Director): E-mail: m.grugan@yorksj.ac.uk;

Dr Sarah Mallinson-Howard (Project Supervisor): E-mail: s.mallinson-howard@yorksj.ac.uk; or

Dr Robert Vaughan (Project Supervisor): E-mail: r.vaughan@yorksj.ac.uk

If you have any questions or concerns and wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Natalie Noret (Chair of the Cross-School Research Ethics Committee, York St John University):

→

Appendix D: Participant Consent

D.1 Athlete Consent Form for Research in Thesis

Athlete Consent Form

Please tick all boxes to provide consent to participation:

A. I confirm that I have read and understood the information sheet for the above study and understand what is expected of me ☐

B. I confirm that I have been given the opportunity to ask questions regarding the study and, if asked, my questions were answered to my full satisfaction ☐

C. I understand that my participation is voluntary. I also understand that I may withdraw from the research up until four weeks after completing the questionnaire (without needing to give a reason and without penalty) ☐

D. I understand that all information about me will be treated in strict confidence and that I will not be named in any written work arising from this study ☐

E. I give my consent for the analysis of my answers from the questionnaire ☐

F. I understand that data collected about me during my participation in this study will be stored on a password-protected computer and that any files containing information about me will be made anonymous ☐

Appendix E: Study Questionnaires

E.1 Perfectionistic Climate Questionnaire–Sport (PCQ–S)

Listed below are some statements regarding your coach. Please read each statement and decide how much you agree or disagree with each statement. If you have more than one coach, think about the coach that you spend most of your time with.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree			
1	2	3	4	5			

1. The coach expects performances to be perfect at all times.	1	2	3	4	5
2. The coach is friendlier when performances are perfect.	1	2	3	4	5
3. The coach is nervous that things will not go perfectly during performance.	1	2	3	4	5
4. The coach criticises all mistakes no matter how small.	1	2	3	4	5
5. The coach withholds rewards if performances are not perfect.	1	2	3	4	5

6. The coach is less approving when performances are not perfect.	1	2	3	4	5
7. The coach expects nothing less than perfect performance.	1	2	3	4	5
8. The coach criticises performances that are not perfect.	1	2	3	4	5
9. The coach is tense when mistakes are more likely to happen during performances.	1	2	3	4	5
10. The coach uses threats to try to stop mistakes in performances.	1	2	3	4	5

11. The coach is anxious about the possibility of even small mistakes when performing.	1	2	3	4	5
12. The coach is less friendly when performances are not perfect.	1	2	3	4	5
13. The coach expects performances to include no errors.	1	2	3	4	5
14. The coach uses punishment to try to make performances perfect.	1	2	3	4	5
15. The coach criticises performances all the time.	1	2	3	4	5

16. The coach is kinder when no mistakes are made when performing.	1	2	3	4	5
17. The coach criticises even the best performances.	1	2	3	4	5
18. The coach is concerned about mistakes during performance.	1	2	3	4	5
19. The coach expects performances to be perfect.	1	2	3	4	5
20. The coach uses his/her position unfairly to try to make performances perfect.	1	2	3	4	5

E.2 Motivational Climate Scale for Youth Sports (MCSYS)

Listed below are some statements regarding your coach. Please read each statement and decide how much you agree or disagree with each statement. If you have more than one coach, think about the coach that you spend most of your time with.

Not at all true		Somewhat true		Very True				
1	2	3	4	5				

	1	2	3	4	5
1. Winning games is the most important thing for the coach.	1	2	3	4	5
2. The coach makes players feel good when they improve a skill.	1	2	3	4	5
3. The coach spends less time with the players who are not as good.	1	2	3	4	5
4. The coach encourages us to learn new skills.	1	2	3	4	5
5. The coach tells us which players on the team are the best.	1	2	3	4	5
6. The coach tells players to help each other get better.	1	2	3	4	5

	1	2	3	4	5
7. The coach tells us that trying our best is the most important thing.	1	2	3	4	5
8. The coach pays most attention to the best players.	1	2	3	4	5
9. The Coach says that teammates should help each other improve their skills.	1	2	3	4	5
10. Players are taken out of games if they make a mistake.	1	2	3	4	5
11. The coach says that all of us are important to the team's success.	1	2	3	4	5
12. The Coach tells us to try to be better than our teammates.	1	2	3	4	5

E.3 Controlling Coach Behaviour Scale (CCBS)

Listed below are some statements regarding your coach. Please read each statement and decide how much you agree or disagree with each statement. If you have more than one coach, think about the coach that you spend most of your time with.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. My coach tries to motivate me by promising to reward me if I do well.	1	2	3	4	5	6	7
2. My coach only rewards/praises me to make me train harder.	1	2	3	4	5	6	7
3. My coach only uses rewards/praise so that I stay focused on tasks during training.	1	2	3	4	5	6	7
4. My coach only uses rewards/praise so that I complete all the tasks he/she sets in training.	1	2	3	4	5	6	7
5. My coach is less friendly with me if I don't make the effort to see things his/her way.	1	2	3	4	5	6	7

6. My coach is less supportive of me when I am not training and competing well.	1	2	3	4	5	6	7
7. My coach pays me less attention if I have displeased him/her.	1	2	3	4	5	6	7
8. My coach is less accepting of me if I have disappointed him/her.	1	2	3	4	5	6	7
9. My coach shouts at me in front of others to make me do certain things.	1	2	3	4	5	6	7
10. My coach threatens to punish me to keep me in line during training.	1	2	3	4	5	6	7

11. My coach intimidates me into doing the things that he/she wants me to do	1	2	3	4	5	6	7
12. My coach embarrasses me in front of others if I do not do the things he/she wants me to do.	1	2	3	4	5	6	7
13. My coach expects my whole life to centre on my sport participation.	1	2	3	4	5	6	7
14. My coach tries to control what I do during my free time.	1	2	3	4	5	6	7
15. My coach tries to interfere in aspects of my life outside of my sport	1	2	3	4	5	6	7

E.4 Sport Climate Questionnaire–Short Form (SCQ-SF)

Listed below are some statements regarding your coach. Please read each statement and decide how much you agree or disagree with each statement. If you have more than one coach, think about the coach that you spend most of your time with.

Do not Agree at all	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Completely Agree
1	2	3	4	5	6	7

1.	I feel that my coach provides me with choices and options.	1	2	3	4	5	6	7
2.	I feel understood by my coach.	1	2	3	4	5	6	7
3.	My coach conveys confidence in my ability to do well at my sport.	1	2	3	4	5	6	7
4.	My coach encourages me to ask questions.	1	2	3	4	5	6	7
5.	My coach listens to how I would like to do things.	1	2	3	4	5	6	7
6.	My coach tries to understand how I see things before suggesting a new way to do things.	1	2	3	4	5	6	7

E.5 Athlete Burnout Questionnaire (ABQ)

The following items are concerned with how you feel at the moment about your sport. Please read each of the statements listed below and indicate how much you personally agree with each one. Remember, there are no right or wrong answers.

Almost Never	Rarely	Sometimes	Frequently	Almost Always				
1	2	3	4	5				

1. I'm accomplishing many worthwhile things in sport.	1	2	3	4	5
2. I feel so tired from my training that I have trouble finding energy to do other things.	1	2	3	4	5
3. The effort I spend in sport would be better spent doing other things.	1	2	3	4	5
4. I feel overly tired from my sport participation.	1	2	3	4	5
5. I am not achieving much in sport.	1	2	3	4	5

6. I don't care as much about my sport performance as I used to.	1	2	3	4	5
7. I am not performing up to my ability in sport.	1	2	3	4	5
8. I feel "wiped out" from sport.	1	2	3	4	5
9. I'm not into sport like I used to be.	1	2	3	4	5
1. I feel physically worn out from sport.	1	2	3	4	5

11. I feel less concerned about being successful in sport than I used to.	1	2	3	4	5
12. I am exhausted by the mental and physical demands of sport.	1	2	3	4	5
13. It seems that no matter what I do, I don't perform as well as I should.	1	2	3	4	5
14. I feel successful at sport.	1	2	3	4	5
15. I have negative feelings toward sport.	1	2	3	4	5

E.6 Athlete Engagement Questionnaire (AEQ)

Read the following items and indicate how often you have felt that way in the last four months by circling the

appropriate number (e.g., ③), that corresponds with your view.

Almost Never	Rarely	Sometimes	Frequently	Almost Always
1	2	3	4	5

1. I believe I am capable of accomplishing my goals in sport.	1	2	3	4	5
2. I am dedicated to achieving my goals in sport.	1	2	3	4	5
3. I feel energised when I participate in my sport.	1	2	3	4	5
4. I feel excited about my sport.	1	2	3	4	5

5. I feel capable of success in my sport.	1	2	3	4	5
6. I am determined to achieve my goals in sport.	1	2	3	4	5
7. I feel energetic when I participate in my sport.	1	2	3	4	5
8. I am enthusiastic about my sport.	1	2	3	4	5

9. I believe that I have the skills/technique to be successful in my sport.	1	2	3	4	5
1. I am devoted to my sport.	1	2	3	4	5
11. I feel really alive when I participate in my sport.	1	2	3	4	5
12. I enjoy my sport.	1	2	3	4	5

13. I am confident in my abilities.	1	2	3	4	5
14. I want to work hard to achieve my goals in sport.	1	2	3	4	5
15. I feel mentally alert when I participate in my sport.	1	2	3	4	5
16. I have fun in my sport.	1	2	3	4	5

E.7 Performance Perfectionism Scale-Sport (PPS-S)

Below are a number of statements that reflect beliefs that athletes hold when taking part in sport. Some of the beliefs

refer to other people. For these, think about the people involved in your sport participation whose opinion you value.

Please read each statement, and then select a response to show how much you agree or disagree. There are no right or

wrong answers.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree		Strongly Agree	
1	2	3	4	5	6		7	

1. I am tough on myself when I do not perform perfectly.	1	2	3	4	5	6	7
2. People always expect more, no matter how well I perform.	1	2	3	4	5	6	7
3. I have a lower opinion of others when they do not perform perfectly.	1	2	3	4	5	6	7
4. I put pressure on myself to perform perfectly.	1	2	3	4	5	6	7
5. I think negatively of people when they do not perform perfectly.	1	2	3	4	5	6	7
6. I am never satisfied with the performances of others.	1	2	3	4	5	6	7

7. People always expect my performances to be perfect.	1	2	3	4	5	6	7
8. I criticise people if they do not perform perfectly.	1	2	3	4	5	6	7
9. People view even my best performances negatively.	1	2	3	4	5	6	7
1. I only think positively about myself when I perform perfectly.	1	2	3	4	5	6	7
11. To achieve the standards I have for myself I need to perform perfectly.	1	2	3	4	5	6	7
12. People criticise me if I do not perform perfectly.	1	2	3	4	5	6	7