The Conceptualisation of an Irrational Climate: The Development and Validation of the Perceived Irrational Climate Questionnaire for Athletes (PICQ-A)

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Abstract

Rational Emotive Behaviour Therapy (REBT) is the original cognitive behaviour therapy (CBT) and was developed by Albert Ellis in 1955. The premise of REBT suggests it is not the situation which causes emotional, cognitive, and behavioural dysfunction, but rather, the way in which one internalises what this situation says about them. Whilst climate-based research exists (e.g., motivational and perfectionist climates), no research has explored the influence of climates emphasising irrational or rational beliefs. Climate refers to the perception of signals sent by key individuals within an environment (Castro-Sánchez et al., 2018). Specifically, within sports, research has largely focused on motivational climates, with the theoretical underpinning of achievement goal theory (AGT; Nicholls, 1984). However, climate research has been more recently explored in the realm of perfectionism (e.g., Hill & Grugan, 2020). A perfectionistic climate is predicated on the underlying theory of AGT, much like a motivational climate. Therefore, there is a missing link between climate research and REBT, or any underlying theory other than AGT. Applying REBT to climate research allows for greater understanding of the underlying thoughts, feelings, and behaviours of those within a sporting environment. As a result, the present PhD introduces the concept of an irrational climate. To provide validity to the theory, there is a need for the concept to be measured. Although there is no current measure, given it is a new concept, this PhD proceeded to develop the perceived irrational climate questionnaire for athletes (PICQ-A). In order to do this, the guidelines for scale development by Boateng and colleagues (2016) which followed a process of item generation, item refinement, exploratory factor analysis, confirmatory factor analysis, criterion validity, and test re-test reliability. As a result, the 28-item PICQ-A was developed. The PICQ-A has two different factor models, the first is related to the irrational beliefs derived from REBT (Global evaluation of worth (GEW) and Demandingness, awfulising, frustration intolerance (DAFI)) and the other is related to the

key stakeholders identified as influencing sporting climates (coach, teammates, environment). The PICQ-A was found to be positively associated with measures of perfectionistic and motivational climate, as well as performance irrational beliefs. This suggests that the PICQ-A is a valid measure in relation to irrational beliefs and climate. Additionally, the PICQ-A was positively associated with several negative consequences or outcomes of irrationality, such as negative emotions (e.g., anger) and autocratic coaching styles. This suggests that an irrational climate is associated with unhelpful and dysfunctional emotional and behavioural consequences. Implications for applied practice and the contribution to theory were explored, along with limitations and recommendations for future research.

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Chapter 1

Thesis Overview

1.1 Introduction

Rational Emotive Behaviour Therapy (REBT) is the original cognitive behavioural therapy which posits that it is not the situation which causes unhelpful consequences, but the thoughts related to what this situation says about that individual. REBT has largely been applied to individuals within either one-to-one consultancy sessions (DiGiuseppe et al., 2015) or on the development of rationality of individuals within a team (e.g., Turner & Barker, 2013). From the extant literature, there is a large knowledge base for irrational and rational beliefs and the association with psychological outcomes, but it is not known how these beliefs can be influenced by others. There is some evidence showing that people (e.g., coaches) within a performance environment can communicate beliefs which in turn, can impact psychological outcomes (e.g., motivational climate; Duda & Balaguer, 2007). But whilst the coach is a key figure in a performance environment, the performance environment is much more than just the coach. Thus, research has yet to explore and understand an irrational climate.

As a result of this knowledge gap, this PhD introduces the concept of an irrational climate. An irrational climate predicates that key stakeholders and individuals of perceived importance, influence the beliefs of those within the environment, in particular, athletes. In order to explore this new concept empirically, there is a need to be able to measure an irrational climate, which currently is not possible. As a result, the perceived irrational climate questionnaire for athletes (PICQ-A) was developed. The development of the PICQ-A allows for further research to explore the nature of an irrational climate and how it may manifest within a sporting context.

Development of the PICQ-A followed the guidelines of Boateng et al. (2016) which is widely accepted as the gold standard for scale development. Initially, an extensive item list

was developed based on the four irrational beliefs of REBT (Demandingness, Awfulizing, Frustration Intolerance, Global Evaluation of Worth) and the key stakeholders identified by the extant research and applied experience of the PhD research team (Coach, Teammates, Environment). These items were then refined through the process of content and construct validity with the use of novice, expert, and intended users (e.g., coaches and athletes). Followed by the process of exploratory and confirmatory factor analysis, concurrent validity, and reliability testing to understand factor structures, validity and reliability of the PICQ-A.

1.2 Thesis Organisation

The present PhD initially reviewed the theory and research which underpins the concept of an irrational climate (Chapter 2 – Literature Review). The PhD then explored the mechanisms of an irrational climate culminating in a working model depicting the contributing factors and influencers within a sporting environment. The literature review focuses on the implications REBT and climate research have on the development of the irrational climate concept. Chapter 3 (Scale Development) then gives a comprehensive explanation of the processes involved in scale development, including the philosophical underpinnings, item generation, exploratory factor analysis, confirmatory factor analysis, criterion validity and reliability testing. Chapter 4 (General Discussion) brings together the results of the development of the PICQ-A and the irrational climate concept. The chapter explores the results from scale development in detail, offers a proposal of how to use the PICQ-A within applied settings, and offers suggestions for further research. A key element of Chapter 4 is the implications for theoretical contribution. In particular the possible modifications to the underlying philosophy of REBT.

1.3 Thesis Aims and Objectives

1. Introduce and establish an understanding of an irrational climate.
2. Develop an understanding of how an irrational climate impacts members of sporting environments.
3. Develop a psychometric test that assesses the irrationality of the coach, teammates, and environment; the perceived irrational climate questionnaire for athletes (PICQ-A).
4. Examine the factor structure of the PICQ-A via confirmatory factor analyses.
5. Assess the criterion (concurrent and predictive) validity of the PICQ-A.
6. Determine the test-retest reliability of the PICQ-A.

Chapter 2

Literature Review

2.1 Theory of Rational Emotive Behavioural Therapy

2.1.1 Irrationality

The Collins dictionary defines irrational as the "quality of being illogical or unreasonable" (Collins, 2025). However, this definition only paints part of the picture from a psychological perspective. Ellis (1976, pg. 4) defined irrationality as "any thought, emotion or behaviour that leads to self-defeating or self-destructive consequences… that significantly interferes with the survival and happiness of organisms". The Collins dictionary definition hints at part of Ellis' definition by discussing 'being' illogical or unreasonable. However, Ellis's explanation includes the link between thoughts, emotions, and behaviours (or being). Conversely, rationality has been defined with the idea of reason in mind, for example, Brown (1995) defined rationality as "Beliefs on the basis of appropriate reason" (pg. 744). In a direct contradiction to the Collins definition of irrationality, which is based on being unreasonable, rationality is about being reasonable according to Brown (1995). Further definitions explore the intention of action from individuals and extend the concept of reason, "A rational explanation of an action done by A is to show that on the basis of A's beliefs, A did what he thought was most likely to realise his goals" (Newton-Smith, 1981, pg. 271). Within Newton-Smith's definition, the focus shifts from beliefs based on reason and extends this to incorporate goal-oriented behaviours. There are similarities between Ellis' (1976) definition of irrationality and rationality within the concept of achievement of goals, though they differ in terms of the likelihood of goal attainment. The concept of rational beliefs to achieve a goal was expressed by Pinker (2021) who posited that one cannot be considered rational if one attempts to act on beliefs to achieve a goal which is known not to be based on fact. Pinker (2021) then refined the definition of rationality to reflect this, "The ability to use knowledge

to attain goals" (Pinker, 2021, pg. 36). The use of *ability* within Pinker's definition suggests rationality is a skill to be able to utilise knowledge to create helpful beliefs, which can be learned. However, research has attested to the possibility of being predisposed to rationality and irrationality (See Ellis, 1976).

In his work, Ellis suggested there is biological basis for irrational and rational beliefs in humans. Ellis collated and listed all of the biological tendencies of irrationalities he had seen within his practice for many years (Ellis, 1976). As a result, Ellis established there were 27 sub-categories of irrationalities (e.g., ego-related, prejudice-related, and health irrationalities) and 259 specific irrationalities (e.g., desperate seek for status, dogma, avoidance of physicians) that negatively influenced one's happiness (the goal). Furthermore, Ellis (1976) proposed 19 reasons as to why irrationality was grounded in biological factors of humanity. Ellis (1976) argued that all the 259 irrationalities he identified are noticeable in all humans, irrespective of education and intellect, and shape the norms in social and cultural groups. Furthermore, Ellis (1976) emphasised the importance of cultural components to irrationality and explained that they tend to be perpetuated and reinforced within social groups, however, they are rarely actively taught. This then suggests that social learning takes place where people learn through modelling and reinforcement (Bandura 1969). Indeed, Ellis (1976) posited that humans learn irrationalities from social learning, mainly from parents, but do not challenge these beliefs later in life as one may do with other ideologies, such as political or religious ideologies. A final comment from Ellis (1976) postulates that irrationalities do not always have only negative connotations and could be seen as positive in some respects. However, the important distinction is that irrationalities result in unhelpful (rather than helpful) consequences. For example, one person could procrastinate all day and feel resultant shame or embarrassment that they are not able to complete the workload they would like to complete. On the other hand, a workaholic who gets all their work done may

feel shame and embarrassment that they are not able to spend as much time with their family as they would like. In both examples, the underlying feeling is shame and embarrassment, but procrastination may be seen as a negative behaviour (because the work is not completed), whilst being a workaholic may be seen as a positive behaviour (because the work is completed, and the person is more successful).

Rationality and irrationality play a pivotal role in the way in which one thinks, feels and behaves (Ellis & Dryden, 2007). Research suggests that rational beliefs promote helpful, adaptive, and appropriate feelings. In contrast, irrational beliefs promote unhelpful, maladaptive and inappropriate feelings (David et al., 2010). REBT distinguishes between the functional and dysfunctional nature of negative emotions and proposes that not all negative emotions result in dysfunctional emotions. For instance, negative emotions such as frustration, annoyance, and worry may not have dysfunctional, unhelpful or inappropriate consequences. The reason for this is due to the intensity of these emotions, as these emotions are less intense, they tend to lead to more rational beliefs. Other negative emotions may illicit negative consequences, such as anger, depression, and anxiety, due to these emotions resulting in a greater level of intensity (David et al., 2010). The concept of irrationality and the influence on individuals is a concept which has been explored by numerous philosophers' work.

2.1.2 History and Philosophy of Irrationality

In order to explore the history of irrationality, one must first travel two and a half thousand years (or more) back in time to ancient Greece and Rome. Irrationality has featured heavily within Stoicism. Stoicism gained its name from a part of a marketplace in Athens, the stoa, a place where the Stoics of the time would meet to discuss their ideas (Stellars, 2006). Whilst some ideas differ between Stoic philosophers, there are some consistent themes which

occur. For example, one consistent theme is the idea that individuals are responsible for their emotions and actions (Still & Dryden, 1999). In addition, the premise that unhelpful emotions are not caused by the supposed sources appears to be a consistent theme across Stoicism (Still & Dryden, 1999).

Stoicism posits that emotional dysfunction is the result of mindless focus on aspects outside of one's control, such as external events, perceptions of others, wealth, and pleasure (Robertson, 2020). Stoicism also suggests that human beings project their feelings onto others. Furthermore, Stoicism suggests that humans should understand what is their own and what is not (Robertson, 2020). With respect to athletes, according to Stoicism, if an athlete experiences performance anxiety, for example, it is important to understand whether this emotion is derived from the upcoming performance or whether the coach, teammate, or other key stakeholder is feeling anxious and transferring those feelings onto the athlete. Therefore, it is conceivable that a key stakeholder may project their own feelings onto others, in particular, their athletes.

There are also some differences which manifest from the Stoicism literature. For example, Plato explored the distinction between reason, desire, and emotion. According to Plato, reason must be distinct from emotions as animals and children have emotions but not desire (Pappas, 2004): "We may observe even in young children that they are full of spirit [or passion] almost as soon as they are born, whereas some of them never seem to attain to the use of reason, and most of them late enough" (Plato 428-348BCE, Jowett 1970, pg. 150). On the other hand, Chrysippus argued that reason, desire, and emotion are part of an intrinsically linked system and we, as humans, use reason as a guide for morality (Dryden & Still, 1998). Regardless of the slight differences in ideas of each philosopher, the underlying themes within Stoicism can be seen in psychotherapy today.

Seneca acknowledged the role of thought processes and cognition in emotional regulation (Novaco, 2021). Seneca understood (or at least hypothesised) that one's cognitions around anger and anger-inducing situations could exacerbate or subdue the behavioural response (Novaco, 2021): "Isn't it possible that we ought to take on anger as an ally, even though it's not natural, because it has often been useful? It raises our spirits and spurs us on; without it, courage accomplishes nothing splendid in warfare: it needs that flame set to the kindling, that goad to stir the bold and send them into harm's way" (Seneca, 2010, pg. 47). A key aspect of present-day psychotherapy is the level of choice and control one has over their thoughts, feelings, and behaviours. Early Stoics were aware of this phenomenon and explored how people can 'unupset' themselves through reason and logic (Ellis, 2021). The concept of using logic and reason to manage and improve irrationality is a key component of Rational Emotive Behavioural Therapy (REBT; Ellis, 2004).

Many philosophers influenced Ellis when he developed REBT. As has become apparent from the present section, Ellis was influenced heavily by Stoicism. In particular, Epictetus was very influential to Ellis (Robertson, 2020). Epictetus has been quoted as saying "men are disturbed not by things, but by the views which they take of them" (Still & Dryden, 1999, P. 146). Within REBT, Ellis explains that people do not experience emotional responses to outside things, but by their "perceptions, attitudes, or internalised sentences about things or events" (Ellis, 1962, P. 54). Such philosophical views espoused by Epictetus reflect Stoicism (Robertson, 2020).

Despite Ellis' reference to stoicism and stoic philosophers, REBT is not considered a form of stoicism (DiGiuseppe et al., 2014). Some research suggests Stoicism aims to develop an immunity to all forms of feelings, whereas REBT posits that rational thinking can lead to thinking without resulting in dysfunctional consequences (DiGiuseppe et al., 2014). However, more recent stoic researchers feel this is a crude oversimplification of stoicism and

explain that the aim of stoicism is not to be void of all human emotion (Stellars, 2006). Evidence for this comes from Robertson's (2020) work where they established several areas which make direct links between REBT and Stoic philosophers, such as demands or value judgements (e.g., "I am only valued if I perform well"), catastrophic predictions (e.g., "losing is the worst thing imaginable"), and relative value (e.g., "Others are valued when they perform, therefore I must be valued if I perform well too"). Not only are these ideas heavily linked with REBT, but they also appear to be the underlying principles by which Ellis developed REBT.

2.1.3 Rational Emotive Behavioural Therapy (REBT)

Rational Emotive Behavioural Therapy (REBT) was initially developed by Albert Ellis in 1955 (DiGiuseppe et al., 2014). Ellis was initially trained in Rogerian person-centred therapy, though found it too passive and found it took too long to establish change (Ellis, 2021). Ellis was then trained in psychoanalytic therapy under Karen Horney (Diguiseppe et al., 2014) but again, became unenamoured with the psychoanalytic approach due to it not being as effective as he would have liked it to have been (Ellis, 2021). Ellis then turned to his love for philosophy and explored the early Stoic philosophers as well as more modern philosophers of his time and developed a new therapy style based on his reading. Initial iterations of REBT reflected Ellis's readings in philosophy and termed his new style of therapy *Rational Therapy* (DiGiuseppe et al., 2014). Later iterations of REBT were *Rational-Emotive Therapy* and finally *Rational Emotive Behaviour Therapy* due to how REBT evolved and emphasised the impact of the cognitions on emotions and the behavioural experiments Ellis tended to use with his clients (Corsini, 1994).

REBT uses the term irrationality interchangeably with the term irrational beliefs. Irrational beliefs are seen to be false and illogical beliefs that impede one's long-term

hedonistic goals or purpose (Dryden, 2005). In addition to the emotional consequences of irrationality, there also tend to be behavioural consequences. In their research, Szentagotai and Jones (2010) explored the behavioural consequences experienced as a result of irrational beliefs. These ranged from comfort eating and social avoidance to increased expression of anger and self-harm. More commonly seen behaviours as a consequence of irrational beliefs among athletes may be 'playing/performing within themselves' and avoiding perceived risk-taking behaviours (e.g., a more difficult pass). These behavioural consequences will be explored in more detail later in the PhD (see section 2.1.3.4).

REBT is the original cognitive behavioural therapy (CBT; David et al., 2005). REBT posits that it is not the event itself which causes adverse consequences (e.g., unhelpful anxiety, avoidant behaviour, and or, overthinking). Rather, it is the interaction with the situation and one's belief system which causes adverse consequences (Ellis & Joffe-Ellis, 2013). Ellis proposed an ABC(DE) model which sits at the centre of REBT (David et al., 2005). The ABC(DE) model is used to explore the way in which individuals interact with the environment around them and the drivers of thoughts, feelings, and behaviours within these situations. This has more recently been amended to incorporate the influence of goals on irrationality (see Figure 2.1). *A* refers to the activating event or adversity, which is some kind of difficult situation. *C* stands for consequences, which may be emotional, behavioural, or physical in nature. For example, *C* may be presented as anxiety, avoidant behaviour and feeling nauseous. *B* stands for beliefs. The premise of the ABC(DE) model is that A x B = C, in that it is the way in which one thinks (B) about the situations (A) will have either helpful or unhelpful consequences (C; DiGiuseppe et al., 2013).

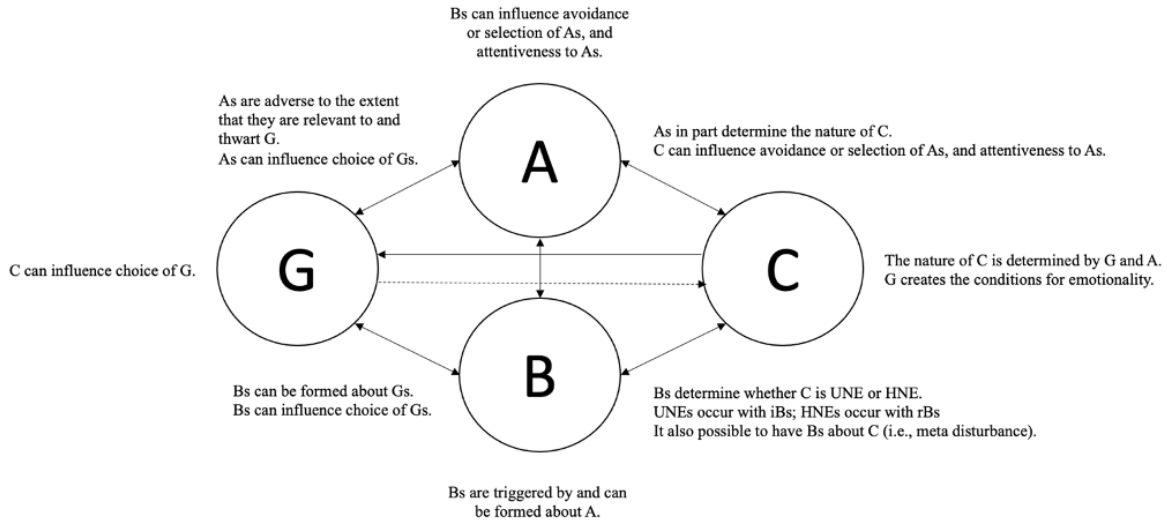


Figure 2.1

The GABCDE framework with explanations for the link between each component (Turner, 2022).

Our belief systems include functional and rational beliefs (RBs) or dysfunctional and irrational beliefs (IBs). *D* stands for disputing, which is the continuous challenging of IBs. There are three types of disputation: realism (e.g., "Do my current beliefs align with reality?"), logic, (e.g., "Do my current beliefs make sense?") and pragmatism (e.g., "Are my current beliefs helpful for me?"). Realistic disputation therefore relates to searching for the truth or gaining evidence for the IB. Logical disputation relates to whether the IB is logical. Pragmatic disputation relates to understanding the outcomes of the IB and whether the IB is helpful or harmful (Diguiseppe et al., 2020). *E* stands for effective new philosophy, which pertains to new rational beliefs that are functional, realistic and healthy.

The relationship between stoicism and REBT is evident from Ellis' ABC(DE) model and irrational beliefs, especially within the interdependence of reason and emotion, hedonism, self-preservation, and acceptance, among others (Still & Dryden, 1999). In

meditations, Marcus Aurelius (121–180 AD) wrote “Noting but what you get from first impressions. That someone has insulted you, for instance. That— but not that it’s done you any harm. The fact that my son is sick— that I can see. But “that he might die of it,” no. Stick with first impressions. Don’t extrapolate. And nothing can happen to you.” (Gil, 2021). This relates to Ellis’ ABC model by which A x B = C and given the speed of cognitions, individuals tend to have A to C thinking whereby the individual experiences adversity and then believes there is a consequence to this. Using the above quote as an example, Marcus Aurelius’ son is sick (A) and he begins to worry about it (C). However, there is a mediating factor of his belief (B) which drives the worry (C). For example, “he might die of it” creates greater emotional disturbance rather than using the knowledge gained from the situation itself. Referring back to an earlier definition of rationality, it is the ability to use knowledge to attain goals which create emotional stability (Pinker, 2021). However, goal attainment was not explicitly included in Ellis’ ABC model.

More recent iterations of REBT, particularly within sport, have seen the GABC(DE) model evolve. The addition of the aspect of goal attainment plays a pivotal role in REBT, though had not been included within the original framework proposed by Ellis. Figure 2.1 reflects the newer version of the GABC(DE) model, which includes the aspect of goal attainment and also shows the interconnected nature of the model. Still (2010) suggested the ABC(DE) model was never intended to be a linear process, and, in fact, each component of the model was intended to be dependent on the others. The addition of goal attainment is crucial to the understanding of REBT as one’s goals drive the desires expressed by individuals (Turner, 2023). The interaction between goal attainment and situation (A) is vital to understanding the interaction of the remaining components of the framework. If it is felt that a goal is impeded by a situation, then it may be more likely that irrational beliefs become more prevalent and unhelpful consequences occur. For example, if a football team want to

win a cup final (G), but in the early stages of the match one if their players is sent off (A), other players within the team may experience irrational beliefs (B; e.g., “We must win this match, losing a player is awful and I cannot stand this feeling’), which may result in unhelpful anger and aggressive behaviours (C; e.g., stronger tackles being made, confrontational behaviours).

2.1.3.1 Rational Beliefs (RBs) and Irrational Beliefs (IBs)

REBT distinguishes between irrational beliefs (IBs) and rational beliefs (RBs). Irrational beliefs are absolutistic, rigid, illogical, and inconsistent with reality and unhelpful in the pursuit of goals, whereas RBs are flexible, logical, consistent with reality, and helpful in the pursuit of goals (Turner et al., 2019). RBs tend to include preferences or *wants* (e.g., “I *want* to perform well in today’s match”), whereas IBs tend to include absolutistic thought processes (e.g., “I *must* perform well in today’s match; Ellis & Joffe-Ellis, 2013). As discussed in section 2.1.3.3, emotional dysfunction and maladaptive behavioural responses occur as part of one’s cognitions about a situation. The concept of irrational and rational beliefs is based on several hypotheses (Ellis et al., 2010):

1. Humans have free will. However, this free will is controlled by biological and social factors.
2. People have many goals and purposes
3. There is a reciprocal interaction between thoughts, feelings, and behaviours.
4. People’s desires begin with preferences (e.g., “I want”, “I would like”). However, people’s desires may also begin with demands (e.g., “should”, “have to”, “need”)
5. Preferences tend to lead to healthy adaptive behaviours, whereas demands tend to lead to unhealthy and maladaptive behaviours.

6. When desires are not met, one tends to feel motivated and behave in a manner which makes meeting the desires more likely. However, when demands are not met, one tends to experience unhelpful thoughts and feelings.

There are four irrational beliefs: demandingness, frustration intolerance, awfulizing, and global evaluation of human worth (Ellis & Joffe-Ellis, 2013). Demandingness is the unrealistic expectation of events, these tend to be characterised using words or phrases, such as “must”, “should”, and “absolutely have to” (DiGiuseppe et al., 2020). An example of demandingness in a sporting context would be “I *must* perform perfectly”. Awfulising is the exaggeration of the negative outcomes of an event and may be characterised as the situation being “completely awful” or as if it is the “worst thing in the world”. For example, an athlete who awfulizes losing a match or competition may emphasise the belief that “It is awful when I/we lose”. Frustration intolerance is related to a severe dislike (intolerance) of discomfort. For example, an athlete who is intolerant to frustration emphasises the belief that “I cannot stand losing”. Finally, global evaluation of human worth relates to the view of ourselves or others on a rating system as some may be less worthwhile or valuable than others (e.g., “losing means that I am worthless as a person”).

Table 2.1
Shows the characteristics of rational and irrational beliefs

Rational Beliefs	Irrational Beliefs
Logical	Illogical
Flexible	Rigid
Pragmatic	Dogmatic
Helpful	Unhelpful
Non-extreme	Extreme

Awfulizing, frustration intolerance and global evaluation of worth are said to be derivates of demandingness. For example, an athlete may have a demanding thought about their performance (e.g., “I must perform perfectly”). This thought then may be amplified by the other IBs (e.g., Awfulizing: “It is awful if I do not perform perfectly”; Frustration Intolerance: “I cannot stand not performing perfectly”; Global Evaluation of Human Worth: “I am worthless if I do not perform perfectly”). These derivative thought processes then lead to emotional dysfunction (DiGiuseppe & David, 2015).

The prevalence of demandingness serves to help understand the link between irrational beliefs and adverse consequences. For example, a soccer player who makes a mistake which leads to a goal may have the irrational belief of “I made a mistake, making a mistake is awful and making mistakes means I am not good enough”. There are multiple demanding implications within this one belief. Firstly, “I must not make mistakes”. Secondly, “it is awful to make a mistake”. Finally, “making a mistake must mean I am not good enough”. Within this example, demandingness appears three times within a single thought. This may then lead to experiencing a derivate IB. For example, the soccer player may not be able to stand the feeling of their coach thinking they are not good enough (frustration intolerance). It may feel, or they might think like it is the worst thing in the world to make a mistake or for their coach to disapprove of their actions (awfulizing). Finally, the player may internalise the proof that they are not good enough because they made a mistake, and they may begin to believe the statement (global evaluation of worth). In turn, these irrational beliefs may have adverse emotional and behavioural consequences.

Table 2.2
Shows the differences between the four rational and irrational beliefs

Rationality	Type of Belief	Description	Example
Rational	Preferences	Based on desires and wants of an individual and negation of demand	"I really want to perform well, but it doesn't mean I must"
	Anti-awfulizing	Understanding and accepting that even though a situation may be bad, it is not completely bad or awful	"I really want to perform well, but it if I don't it won't be awful"
	Frustration Tolerance	Being able to experience happiness in difficult situations and being able to manage and endure possible failures	"I really want to perform well, but I can tolerate it if I don't"
	Unconditional Self-Acceptance	An understanding that one cannot be judged or valued based a single event	"If I do not perform well, then it does not mean I am completely bad and I accept I am a fallible human being"
Irrational	Demands	Unrealistic and absolute demands on desire, by demand words (e.g., must, should, have to, need to, and ought to)	"I really want to perform well, therefore I must perform well"
	Awfulizing	An evaluation of a situation being more than completely bad or the worst possible thing which could happen	"If I don't perform well, it will be the worst thing in the world"
	Frustration Intolerance	A belief of not being able to cope, endure, or tolerate discomfort	"I cannot stand not performing well"
	Global Evaluation of Worth	Human beings can be rated, and some people are more valuable than others.	"If I don't perform well, it must mean I am a complete failure"

In contrast to irrational beliefs, rational beliefs are reality-based beliefs that contribute to the creation of appropriate and healthy emotions (see table 2.3). They are non-demanding and include wants and preferences. They encompass unconditional acceptance of self, others, and life. They are based on truth and facts, take a healthy, non-exaggerated view, and include high frustration tolerance, and are flexible, logical and pragmatic (Turner, 2022). Similarly to irrational beliefs, there are four core rational beliefs, full preferences, frustration tolerance, anti-awfulizing, and unconditional self-acceptance (Turner, 2022). Preferences underpin rational beliefs and are the antithesis of demandingness. Preferences are based on wants and desires and there is an understanding that just because an individual wants something it does not mean they must have it or must be able to do it. Anti-awfulizing refers to being able to see that a situation is bad but not terrible and even though it feels bad at the time, the level of

badness for the situation is realistic or that the situation is completely awful. Frustration tolerance refers to an individual being able to manage and cope with adversity to a point where it is tolerable. Here the individual is able to accept and understand that adversity may come with the feeling of discomfort but does not allow this discomfort to perpetuate unhelpful negative emotions. Unconditional self-acceptance (USA) refers to one fully accepting oneself regardless of whether one behaves competently or incompetently (e.g., performs well or badly), or in spite of adversity (e.g., not being selected for a squad; Davies, 2008).

2.1.3.2 REBT and Cognitive Appraisals

As mentioned in section 2.1.3, there is an element of choice in the way in which one responds to situations. For example, consider two soccer players competing in a cup final. Player A is experiencing performance anxiety and a behavioural consequence of 'playing within himself' (e.g., playing simple passes, not taking risks, not actively trying to impose themselves in the game). All this player is able to focus on is not making a mistake and may have an irrational thought process of "I must not make a mistake, making a mistake will mean we lose and that is an unbearable thought". Player B is experiencing nerves but is able to perform as they want to and express their creativity on the pitch. An example of their rational belief may be "I really want to win this match, but if we don't then this will not be the end of the world and will not define my worth". These examples demonstrate that responses to stressful situations or adversity is generally idiosyncratic in that one person may have a completely different response to another. Therefore, the way in which a person evaluates or interprets these signals will impact their behavioural or cognitive responses. A possible reason for this may be due to how athletes appraise the situation.

Lazarus and Folkman (1984) developed the transactional stress theory in order to understand and explain stress appraisals. Cognitive appraisal is a process of evaluation of the likelihood of a situation impacting well-being, and in what manner (Lazarus et al., 1986). Lazarus and Folkman's (1984) theory includes two stages. Firstly, primary appraisal functions as a cost-benefit analysis of the situation at hand. Secondary appraisal refers to the resources one has to be able to overcome or prevent harm from occurring. These resources may include taking themselves away from the situation, accepting the situation for what it is, or seeking to gain more information (Lazarus, et al, 1986). These primary and secondary appraisals then determine whether one assesses the situation as something which could be harmful (a threat) or something which could benefit them and develop themselves (a challenge).

Transactional stress theory has gained traction within sport in recent years. The theory of challenge and threat in athletes (TCTSA; Jones et al., 2009) utilised Lazarus and Folkman's theory of cognitive appraisals to explain the way athletes may perceive competition. The TCTSA comprises four main components: (1) demand appraisals and motivation states, (2) resource appraisals, (3) physiological responses, and (4) emotional consequences. Demand appraisals refer to the perception of danger, uncertainty, and required effort of a situation. For example, a diver may perceive they need to perform a dive of high difficulty from the 10-metre board to be able to compete for a medal. This may be perceived as demanding as there is a high level of danger (performing a difficult skill from height), there is uncertainty as the athlete is unsure how they will perform and if the dive will be enough to get a medal, and will take a high level of physical and mental effort to complete the skill to the best of their ability. Resource appraisals refer to one's ability to cope with the demands presented to them, such as skills, knowledge, abilities, personality characteristics, and support networks. For instance, the diver may perceive their high-pressure dive as a

challenge, may have completed the same dive numerous times, have high levels of self-efficacy, and have a supportive coach. However, they may experience a threat state if they have seldom practiced the skill.

The TCTSA follows the Biopsychosocial model to aid the description of the physiological changes which occur within challenge and threat states. For example, a threat state results in an increase in adrenaline and cortisol (the stress hormone), an increase in blood pressure, reduced blood flow, and fuel availability to the brain and muscles (McHugh et al., 2010). Whereas, in a challenge state, there is an increase in heart rate (similar to a threat state), but coupled with vasodilation, allowing for greater blood flow and energy absorption by muscles (Jones et al., 2009). With respect to the emotional consequences, the TCTSA suggests that an athlete within a challenge state will typically experience more positive emotions and will also perceive their emotions (whether positive or negative) as helpful for performance. Conversely, an athlete within a threat state will experience more negative emotions and perceive these emotions to be unhelpful for performance.

A key aspect of challenge and threat research is that there is a relationship between a goal-relevant situation and challenge and threat states, meaning that if one perceives there to be a risk to their goals then a challenge or threat state occurs. Whether the situation is appraised as a challenge or threat is determined by the mechanisms described above. Interestingly, the more important a goal, the more intense the experience of challenge or threat state. This is important within the context of the current PhD as goals, function of emotions, and appraisal of emotional states are important characteristics of REBT and the development of rational and irrational beliefs. Recent research has been developed to explore this interaction between challenge and threat and REBT. Chadha and colleagues (2019) researched approximately 500 golfers who either had an important golf competition coming up or took part in an imagined golf competition to explore the difference in cognitive

appraisal, challenge and threat states, irrational beliefs between the two conditions, and anticipatory pre-competition affect. The findings showed that a golfer with high irrational beliefs and low cognitive appraisal experiences a threat state leading to a competition and, as a result, experiences higher levels of negative emotions. Although rigorous in its design and analysis, the study's use of imagined and future competitive situations leads to questions about the authenticity of participants' responses, and having real-time, in-competition data may show more relevant data. However, Chadha et al. (2019) showed there is an interaction between cognitive appraisals, challenge and threat states, and irrational beliefs.

2.1.3.3 Emotional Consequences of Rational and Irrational Beliefs

There is a synergy between the effect of rational and irrational beliefs on behavioural consequences and emotional consequences. Emotional distress is predicated by irrational thought processes, although it is important to understand that REBT does not consider all negative emotions to result in dysfunctional outcomes (DiGiuseppe et al., 2013). REBT distinguishes between negative emotions which are either helpful negative emotions (HNEs) or unhelpful negative emotions (UNEs; MacLaren et al., 2016). Ultimately, UNEs are posited to be dysfunctional for performance, whereas HNEs are functional. UNEs and HNEs are also characterised as performance-inhibiting thoughts (PITs) or performance-enhancing thoughts (PETs) respectively (Palmer & Szymanska, 2014) which may be a better characterisation of negative emotions within sport, as this perspective encompasses the functionality of the negative emotions. PITs lead to emotions such as rage, depression, anxiety, shame, guilt, jealousy, and hurt. PITs tend to have negative impacts on performance as the focus for performance moves from the performance itself to placating the unhelpful negative emotions. For example, a football (soccer) player may experience shame when they give the ball away which leads to an opposition goal. This player may then hide within the game and avoid

difficult situations in order to reduce the risk of making another mistake. Whereas PETs are theorised to lead to emotions such as annoyance, frustration, concern, sorrow, regret, sadness, and disappointment. In contrast, if another football (soccer) player makes the same mistake and they have a PET of regret, they may understand that the mistake was bad, but it does not mean the rest of the game was bad and it may motivate them to perform better and focus on the performance rather than the mistake. In this example, two players in a comparable situation experience different thought processes and different behavioural outcomes as a consequence.

The extant research within REBT has established a clear relationship between irrational beliefs and maladaptive coping strategies and rational beliefs (or less irrational beliefs) with more functional coping strategies. A meta-analysis, using data from 83 studies, explored the relationship between irrational beliefs and several unhelpful negative emotions, such as anxiety, depression, anger, and guilt (Visla et al., 2015). Visla and colleagues (2015) found that irrational beliefs moderated the propensity for and intensity of unhelpful negative emotions and global psychological distress. Interestingly, the moderation of irrational beliefs on psychological distress was consistent across different cohorts, populations, countries, and cultures. A further meta-analysis showed that REBT was effective in reducing the emotional consequences of irrational beliefs, such as anxiety, depression, anger, and distress (David et al., 2016)

Within research, the emotional consequences of rational beliefs are less documented and tend to have a clinical psychology focus (Turner, 2016). Turner (2016) explored research associated with rational beliefs and showed that an increase in rational beliefs can help in many walks of life, such as managing life stress, job stress, and bereavement. Furthermore, Turner (2016) identified that rational self-talk statements were associated with lower levels of anxiety during a pressurised task. Conversely, irrational self-statements were associated with

higher levels of anxiety. Therefore, it can be surmised that irrational and rational speech is influential in the development of helpful or unhelpful negative emotions and behavioural consequences. Indeed, Evans and colleagues (2018) explored the role of rational and irrational team talks from coaches among soccer players. An interesting finding from the research suggested that there was no difference between rational and irrational team talk on motivation. However, there were significantly fewer negative cognitive appraisals made by those who were given a rational team talk by their coach. Such findings support the notion that rational beliefs result in healthy, adaptive behaviours and cognitions. Perhaps more importantly, for this PhD, is that perceived rational or irrational speech influenced the soccer players' challenge or threat appraisal. Therefore, it could be possible that the coach's team talk could have influenced the individual players' rational or irrational beliefs.

2.1.3.4 Behavioural Consequences of Rational and Irrational Beliefs

The exploration of the consequences or symptoms experienced by individuals who experience rational and irrational beliefs has, for the most part, been explored within the clinical space. The consequences experienced as part of the GABC model (see section 2.1.3) are a result of the cognitions within B. Szentagotai and Jones (2010) explored the different behavioural consequences experienced following irrational beliefs, from the perspective of each irrational belief. However, the behavioural consequences tend to show a lot of overlap between the irrational beliefs, except for some more nuanced behavioural responses. For example, across all four irrational beliefs, Szentagotai and Jones (2010) identified demandingness, awfulizing, and frustration intolerance, the researchers found that individuals engaged in a variety of maladaptive and unhelpful behaviours, such as comfort eating, increased expression of anger, social withdrawal, self-harm, overspending, procrastination, and marital problems (Szentagotai & Jones, 2010). Some behaviours seemed to be specific to

the type of irrational belief. For example, global evaluation of worth showed an increase in anger suppression and defensiveness, while people who awfulized more tended to have a submissive interpersonal style (Szentagotai and Jones, 2010).

Recent research has also shown that there are gender differences in the tendency for the prevalence of maladaptive behaviours. For instance, men tend to express anger more than women (Gündoğdu et al., 2018). Gündoğdu and colleagues (2018) attributed this to the socialisation of the patriarchal stereotype that men being aggressive is a sign of masculinity, whereas women who are seen to be aggressive may see societal sanctions. However, the prevalence of irrational beliefs across adolescent males and females tends not to show much difference (Uzun & Gübeş, 2021). Further research has established the gender differences in self-acceptance, frustration intolerance, and realistic expectations among a cohort of eating disorder (ED) patients (Tecuta et al., 2025). Tecuta and colleagues (2025) found that female ED patients tended to experience lower levels of self-acceptance and frustration tolerance than male ED patients. However, the results lacked statistical significance when a more severe psychopathology was exhibited and females tended to have greater severity of ED psychopathology (Tecuta et al., 2025). This may suggest a difference in genders in terms of how individuals act based on irrational beliefs. Additionally, it is conceivable that the same would be true for rational beliefs and it is possible that if women are less likely to react in an aggressive manner, the more likely they are to react in a functional and rational manner.

Behavioural consequences as a result of rational beliefs tend to lead to more functional outcomes. Within the domain of academia, research has shown that the more rational beliefs one exhibits, the less one procrastinates and the more time one spends studying (Balkis et al., 2013). Balkis and colleagues (2013) surmised that the more students exhibited rational beliefs and functional behaviours, the better the students' academic performance. Although there was no direct link explored between rational beliefs and

academic success, there was a relationship which suggests that rational beliefs lead to positive behavioural outcomes. Specifically, within the realm of sport, Nejati and colleagues (2024) explored the result of an REBT intervention on performance outcomes in soccer. Nejati et al. (2024) developed a randomized control study and established a performance under pressure protocol by which soccer players were rated based on the completion of several skills performed (e.g., pass, control, and ball retention). To induce pressure, the players were told that coaches would be observing them to establish if they were suitable to play at a higher level of soccer, and the more they exhibited a higher score on the performance metric, the more likely they were to be selected to play at a higher level. Equally, the lower they scored on the performance metric, the less likely they were to be selected for the higher level of competition. Nejati et al. (2024) found that the fewer irrational beliefs the players had, the better they performed under pressure. Again, there was no direct link shown between rational beliefs and performance under pressure. Although, there is evidence that fewer irrational beliefs (and more rational beliefs) are behaviourally expressed as more functional and successful behavioural outcomes. Further research has explored the link between rational and irrational beliefs and functional and dysfunctional behavioural outcomes.

Urfa and Aşçı (2024) explored the relationship between primary and secondary rational and irrational beliefs and prosocial and antisocial behaviours among teammates and opponents. Urfa and Asci (2024) collected data from 124 elite athletes who compete in team sports. The participants were tested using the irrational performance belief scale and the prosocial and antisocial behaviour in sport scale. Broadly speaking, Urfa and Asci (2024) concluded that low irrational beliefs were associated with prosocial behaviours and high levels of irrational beliefs were associated with antisocial behaviours. More specifically, low levels of prosocial behaviours were associated with those with high levels of awfulizing and

frustration intolerance. However, the results showed that antisocial behaviours were directed towards only opponents with respect to frustration intolerance, and high levels of frustration intolerance were associated with low levels of antisocial behaviour towards teammates. This was unexpected to the researchers, and they rationalised this by suggesting that irrational beliefs could be facilitative at times and therefore have positive consequences. Additionally, high levels of demandingness and depreciation were associated with high levels of antisocial behaviour towards teammates. An interesting finding from this study was that no significant relationship between irrational beliefs and antisocial behaviours towards opponents was found. Within the present PhD, the influence of teammates on the creation of an irrational climate is examined. The study by Urfa and Aşçı (2024) helps to construct a greater understanding as to how these relationships between teammates may manifest behaviourally and, in particular, how these antisocial behaviours may influence the perception of irrationality within the performance environment.

2.1.4 REBT in Sport

REBT's application to sport and exercise psychology is relatively new. The first mention of REBT being used within this sector was by Bernard (1985), who examined an REBT-informed mental training programme with professional athletes. Bernard (1985) explored several psychological concepts (concentration, confidence, commitment, consistency, and calmness under pressure) in order to aid performance anxiety and stress in an Australian Football Team. With the use of REBT, Bernard (1985) explored negative thoughts and taught athletes to have more useful and positive thoughts that were more conducive to performance. Following this, several publications using REBT within the sports sector emerged. These pertained to the use of REBT to alleviate heightened anxiety among collegiate gymnasts and avoidance behaviour in sport and exercise (Ellis, 1994; Elko &

Ostrow, 1991). Over the past decade, there has been a resurgence in the use of REBT within sport psychology.

A mapping review established the breadth of research conducted whereby REBT is utilised to test the impact of irrational beliefs on various psychological consequences (Jordana et al., 2023). The main focus of research has been the reduction of irrational beliefs. However, more recent research has focused on a broader spectrum of concepts, such as psychological well-being, burnout, and self-determined motivation, to name a few (Jordana et al., 2023). Generally, the protocol of an REBT intervention centred around psychoeducation in an attempt to enhance helpful negative emotions (HNEs; see Turner & Barker, 2013). As research developed, a more comprehensive protocol was employed which encompassed homework tasks to embed the long-term effects of REBT psychoeducation sessions (e.g., Wood et al., 2017). Irrationality is clearly apparent within athletes and sporting contexts, and REBT appears to be ideally situated to support the development of greater rational cognitions and performance-related outcomes (Jordana et al., 2023).

Even though REBT research has shown a significant rise in publications within the last 10 years, very few studies have explored using REBT with sport coaches. However, research has suggested that coaches are performers in their own right (Thelwell et al., 2008) and may too experience irrationality in their own performance. Indeed, this has been shown to be the case. Bailey and Turner (2023) identified that the irrational beliefs of coaches influenced mental well-being. In a study with an aim to improve irrationality and wellbeing, REBT was an effective method to support coach irrationality. Further research explored stress appraisals in coaches (Dixon et al., 2017). The researchers identified that when a coach perceives a situation as threatening then they are more likely to engage in negative coaching behaviours, such as being more autocratic in their approach, and engage in avoidant behaviours, such as withdrawing from interactions with their athletes (Dixon et al., 2017). In

addition to this, Dixon et al. (2017) showed that coaches with higher levels of irrational beliefs are more likely to appraise stressful situations as threatening, and therefore, more likely to engage in avoidant behaviours. These findings show that athletes and coaches alike experience irrational beliefs and experience the emotional and behavioural consequences associated with irrationality. REBT is well placed to support people within a sporting environment to support a reduction in irrationality and promotion of rational beliefs.

In order to test the effectiveness of intervention studies, Jordana and colleagues (2023) identified that the most used beliefs measures were the shortened general attitudes and belief scale (SGABS; Linder et al., 1999) and the irrational performance beliefs inventory (iPBI; Turner et al., 2016). These measures tended to be used to establish a pre- and post-intervention difference in irrational beliefs with a reduction in irrational beliefs post-intervention suggesting effectiveness. The focus so far within this PhD has been on irrationality and how it impacts individuals. It is important to establish the methods used by researchers to identify and measure irrationality within particular populations. Therefore, the next step is to establish the tools used by researchers to elicit irrational beliefs in individuals.

2.1.5 Measurement in REBT

Since the inception of REBT in 1955, there has been a need to develop measurement tools to establish changes in rational and irrational beliefs, both for scientific and research purposes, but also for intervention effectiveness purposes (i.e., to establish whether the intervention achieved its goal). However, it is also important to establish what rational and irrational beliefs relate to (i.e., what are the consequences of rational and irrational beliefs?) As a result, irrational and rational beliefs have been measured using psychometric testing for more than five decades, both within adults and children (Bernard & Cronan, 1999; Jones, 1968). A systematic review of the use of psychometric measures within REBT showed that

there are a total of sixty-one different self-report measures of irrational and rational beliefs (King et al., 2024). Of those 61, 51 measured irrational beliefs only, eight measured rational and irrational beliefs, and only two measured rational beliefs only (King et al., 2024). King and colleagues (2024) identified three self-report measures of irrational and or rational beliefs: the irrational beliefs test (Lidner et al., 1999), the general attitudes and beliefs scale-short form (SGABS; Lidner et al., 1999), and the irrational performance beliefs scale (iPBI; Turner et al., 2016).

The irrational beliefs test (IBT; Jones, 1968) consists of 10 subscales, each with 10 items, resulting in a total of 100 items. The 10 subscales relate to the irrational beliefs of the time (Ellis, 1962), before refinement to the four described in section 2.1.3. The subscales are demands or need for approval (e.g., “it is important to me that others approve of me”), high self-expectation (e.g., “I hate to fail at anything”), blame proneness (e.g., “People who do wrong deserve what they get”), frustration reactivity (e.g., “Frustrations do not upset me”), emotional irresponsibility (e.g., “I cause my own moods”), anxious over concern (e.g., “I have a fear of something that often bother me”), problem avoidance (e.g., “I avoid facing my problems”), dependency (e.g., “Everyone needs someone they can depend on for help and advice”), helplessness (e.g., “It is almost impossible to overcome the influence over the past”), and perfectionism (e.g., “There is a right way to do everything”). The IBT is scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The IBT has been widely used since its inception (King et al., 2024). However, it is not without limitations. For example, the IBT solely explores the extent to which an individual is experiencing irrational beliefs (Jones, 1968). As discussed in section 2.1.3.3 irrational beliefs lead to maladaptive behaviours and dysfunctional emotional responses, whereas rational beliefs lead to more functional and helpful behaviours and emotions. Research which uses the IBT can only surmise that the REBT intervention reduces irrational

beliefs, although some research indicates that the REBT intervention also increases rationality (e.g., DiGiuseppe et al., 2018). Rationality cannot be implied through the use of the IBT, although it can be inferred that the less irrational one is, the more rational they are. A definitive conclusion cannot be reached without further testing. Although extensive, the IBT arguably does not only test irrational beliefs, but the emotional or behavioural responses of irrational beliefs.

The general attitudes and beliefs scale shortened version (SGABS; Lindner et al., 1999) consists of seven subscales, each with either three or four items in each subscale, equating to 26 items. The seven subscales are rationality (e.g., "I have worth as a person even if I do not perform well at tasks that are important to me"), need for achievement (e.g., "It's unbearable to fail at important things, and I can't stand not succeeding at them"), need for comfort (e.g., "It's unbearable being uncomfortable, tense, or nervous, and I can't stand it when I am"), self-downing (e.g., "If important people dislike me, it is because I am an unlikable, bad person"), other downing (e.g., "If people treat me without respect, it goes to show how bad they really are"), need for approval (e.g., "When people who I want to like me disapprove of me or reject me, I can't bear their disliking me"), and demand for fairness (e.g., "It is awful and terrible to be treated unfairly by people in my life").

The irrational performance beliefs inventory (iPBI; Turner et al., 2018) is a 28-item item scale which consists of four subscales. The four subscales are in line with the four irrational beliefs which are demandingness (e.g., "I need my manager/coach to act respectfully towards me"), awfulizing (e.g., "It's awful to not be treated fairly by my peers"), frustration intolerance (e.g., "I can't stand not reaching my goals") and depreciation (e.g., "If I face setbacks it goes to show how stupid I am"). The questionnaire is scored on a five-point likert scale ranging from strongly disagree (1) to strongly agree (5).

2.1.6 Influence of Irrational Beliefs on Individuals

REBT research has largely centred around the impact of irrational beliefs on individuals' emotional and behavioural disturbances and has, for the most part, focused on clinical populations (Turner, 2016). As a result of the focus on clinical populations, the vast majority of research has focused on clinical issues, such as anxiety, depression, addiction, among others. Additionally, the research tends to focus on the elimination of unhelpful and maladaptive cognitive, emotional, and behavioural consequences (DiGiuseppe et al., 2017) and there is less research on the development of helpful and adaptive cognitive, emotional, and behavioural consequences. However, irrationality may not always create emotional and behavioural dysfunction (Turner & Bennett, 2017). As previously mentioned, there is an element of choice with regards to the way in which they respond to particular situations (see., Lazarus & Folkman, 1984). King et al. (2023) began to take a slightly more systemic viewpoint of REBT and the influence on an individual, building upon the socialisation work of Ellis (2003).

King and colleagues (2023) explored the role of socialisation within sport, based on the premise that humans have biological tendencies to be irrational. King et al (2023) illustrated the methods by which key social agents influenced an individual, in this case, an athlete. These social agents included parents and siblings, teachers, peers, sporting environment, social media, and fans. These agents encompassed the micro-environment. The macro-environment included key stakeholder organisations or national governing bodies, sponsors, and media (see Figure 2.2). The concluding comments from King et al. (2023) suggested that athletes learn and develop through the way in which they communicate or interact with the aforementioned social agents. The influence of those social agents on athletes comes from their behaviours, language, and processes, and if these social agents harbour irrationality, this is then more likely to develop, reinforce and maintain irrational

beliefs within the individual athletes. As has been previously covered, the premise of REBT is that an individual is not directly influenced by others, but it is the appraisal of the situation and what it says about the individual which causes emotional and behavioural dysfunction (Ellis, 2021). However, there are outside influences which may influence one's irrational beliefs. This is important for the present PhD as it extends the scope of the GABC model and may indicate a more complex model is needed to incorporate other more concrete influences on one's irrational beliefs.

The socialisation of REBT and the influence of the environment on the individuals suggests there is an element in which psychological climates play a role within the development and maintenance of irrationality within macro- and micro-environments. Therefore, it is imperative to review the concept of climate and how irrationality and REBT link to particular environments.

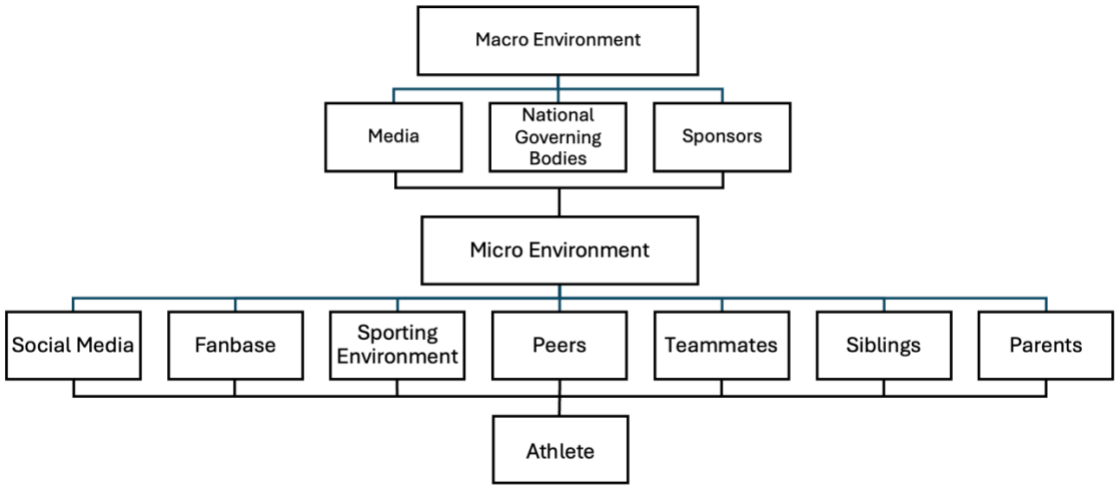


Figure 2.2
Shows the key social agents within the micro- and macro-environment model adapted from King et al. (2023).

2.1.7 Socialisation of Rational and Irrational Beliefs

It has been established that REBT posits that it is not the situation that causes emotional dysfunction, it is the beliefs and thought processes about ourselves which are

elicited by these situations which result in maladaptive and dysfunctional feelings and behaviours. David and DiGiuseppe (2010) explored the nature and nurture debate and the derivation of irrational and rational beliefs. An interactionist viewpoint was taken, suggesting that it would be too reductionist to explore whether rational and irrational beliefs derive solely from nature (i.e., genetics) or nurture (e.g., learned from parents), and therefore proposed that it is most likely an interaction of both nature and nurture which results in the development of rational and irrational beliefs. As a result of this, David and DiGuiseppe (2010) suggested that it would be conceivable and logical that an individual within an irrational environment and exposed to irrational beliefs would most likely develop irrational beliefs themselves. This too would be the case if an individual was based within a predominantly rational environment. Research supports the view that beliefs are learned and 'transferred' from parents to children. A study by Baron and Coren (2004) showed that mothers who had a mental health diagnosis resulted in their infants, whereby the infants show cognitive and emotional deficiencies.

Even though there are studies, such as Baron and Coren's (2004), which show a relationship between parental mental well-being and infant mental well-being, David and DiGiuseppe (2010) proposed that these social interactions were only possible by inherent evolutionary processes which are distinctly human. For example, the basis and ability of humans being able to learn complex cognitive concepts, such as language, gives weight to the role of nature within the development of belief systems. Ellis (1975) proposed a biological contribution to irrationality stating over 200 irrationalities with biological tendencies. Additionally, according to David and DiGiuseppe (2010), humans are predisposed to be irrational but do not go as far as to say that there are genes which determine rationality or irrationality. Although research has concluded that humans have a genetic predisposition to both rational and irrational beliefs, the environment determines the prevalence of rational or

irrational beliefs of individuals within the environment (Ellis, 1975). Therefore, one's rational or irrational beliefs are at least in part developed based on the environment one finds oneself (King et al., 2023).

To the knowledge of the primary researcher, there is no empirical evidence specifically exploring the heritability or genetic predisposition of rational and irrational beliefs. Having said this, there is evidence to support the notion that there is an interaction effect or 'nurturing nature' (see Meaney, 2001) whereby not all beliefs or behaviours can be solely genetic or solely learned (Simonson & Sela, 2009). Ellis himself explored the biological underpinnings of rationality and irrationality (See Ellis, 1976). However, these were nothing more than postulations based on Ellis' understanding of evolution and, again, were not based on empirical research.

When exploring the socialisation of rational and irrational beliefs, it would be amiss not to further explore the transmission of beliefs from parents to children. In addition to Baron and Coren's (2004) work, research has shown that depression in mothers is correlated with pessimism within their children (Sutherland et al., 2019) and mothers with negative thinking patterns result in children with maladaptive thinking patterns (Alloy et al., 2006). More specifically to REBT, Schmueli and colleagues (2021) identified that within a family structure (e.g., mother, father, child) there seems to be a shared structure of rational and irrational beliefs. The researchers showed gender differences between mothers and fathers and mothers seemed to be the driver of the familial thinking patterns. Most importantly from Schmueli and colleagues' (2021) research, was evidence of the transmission of both rational and irrational beliefs from parents to their children. These findings are important for the current PhD as it shows that being in an environment which is either rational or irrational, influences the beliefs exhibited by the members of the environment.

Irrationality can be seen in a variety of guises within sport and has been identified to be a vehicle for irrationality to spread with relative ease (Turner, 2019). Turner (2023) explored the possible mechanisms of the irrational contagion in sporting organisations and hypothesised that from a young age, athletes are exposed to high levels of adversity and uncontrollability which creates many opportunities for A to C thinking and establishing irrationality. Additionally, irrationality is memetic, meaning it can become part of the environment and then be perpetuated by individuals within the environment (e.g., coaches, parents, and support staff; Turner, 2023). This suggests that the mere presence of irrational beliefs can be transferred from one person to another. This premise is important for the present PhD as it establishes the possibility of irrational belief transference, which to the knowledge of the primary researcher, has not previously been established within the extant REBT literature. However, for full transference to occur, it is logical to assume that an individual must internalise others' irrationality or the perception of irrationality. In addition, the connotation is that an irrational environment may lead to unhelpful emotional and behavioural consequences.

2.2 Climate

2.2.1 Origins of Climate Research

Climate research has its roots within gestalt psychology and leadership. Kurt Lewin was one of the first psychologists to explore the influences on individuals within the formation, development, and maintenance of social groups. Lewin developed Field Theory to understand group dynamics coming off the back of World War I and II (Burnes & Cooke, 2012). Lewin's theory was based on Gestalt psychology, which states that the sum of the parts is greater than the whole (Koffka, 2013). As previously mentioned, Lewin explored this within the realm of group formation and dynamics. Therefore, Lewin explored the key

influences of individuals (i.e., the sum of the parts) which influenced one's behaviours (i.e., the whole). Field Theory states that behaviour is the function of the interaction between the person and the environment (characterised by the equation below; Lewin, 1947). Lewin also stated that it is there are key, symbolic interactions within an environment (or field) which, depending on their valence, can either reinforce or change behaviours (Burnes & Cooke, 2012).

$$B = f(\mathrm{p}, \mathrm{e})$$

One of the main criticisms of Field Theory is that Lewin focused too much on the theoretical and mathematical elements of the theory, and lost sight of its applied relevance (Brune & Cooke, 2012). However, Lewin's Field Theory was followed by his research into leadership and climates, which are still used nearly a decade later. Lewin and his colleagues, in fact, were the first to utilise the term 'social climate' in 1939, when examining the atmosphere of leaders-created group (Schnieder et al., 2017). Lewin et al. (1939) explored the difference in social climate against differing leadership types, in a series of three experiments. In the first experiment, two groups of children engaged in theatrical activities with one leader. The leader changed their teaching philosophy and was an autocratic leader for one group and a democratic leader for another. Following this, four groups of children engaged in similar activities but with four separate leaders. The leaders changed every six weeks, and the method of leadership changed too. For a six-week period, the leaders would be autocratic, the next six weeks the leaders would be democratic, and the next six weeks the leaders would be laissez-faire. This rotated for a period of five months. An interesting outcome from these studies was that more questions arose than did answers. One question in particular was whether a social atmosphere (also known as 'social climate') could change based on the type of leadership. Some of the findings from the series of studies are pertinent

to the present PhD. Firstly, Lewin et al. (1939) showed that when a leader is changed, the 'atmosphere' or 'climate' changed to match the leadership style. Secondly, when the leader changed their style of philosophy, the climate also changed. This is relevant to the present PhD as by understanding the environment (or climate) it shows that (a) key stakeholders can be trained to change the climate and (b) when leaders change, the climate can also change.

Lewin's work with social climates led to a flurry of research into climate. Research shows that leadership styles can influence the perception of the work environment (James et al. 1979). Therefore, as early as the 1950s, climate has been understood to be the perception of the environment, instigated by people in a position of power. Vroom (1960) highlighted the importance of understanding the perceptions of individuals within the climate, in this case, the workplace. There has been a debate within psychological research to understand whether a climate is a group-level or an individual-level phenomenon. The group-level climate being an objective climate existing, whereas the individual-level refers to the perceptions of those within the environment (Odden & Sias, 1997). However, when conceptualising climate, it is very difficult to ascertain whether a group climate is present as it is extremely difficult to measure, and, therefore, the main method of understanding the climate is at an individual level and to measure one's perception of the climate. Arguably, there is no need to understand the group-level environments as an individual's perception is their reality (Betancourt, 2018). Therefore, if an employee perceived an autocratic environment, where their views are not taken on board and are told what to do and how to do it, then this would likely express behavioural consequences of not offering opinions when perhaps they may be useful. Glick (1985) differentiated between group and individual-level variables and termed the group-level as 'organisational climate' and the individual as 'psychological climate'.

2.2.2 Culture vs Climate

Within the context of sport, culture and climate are terms which are sometimes used interchangeably, but incorrectly so (Glisson, 2015). Therefore, it is important to establish the nuances of culture and climate, and the differences between the two concepts. Within the extant research on climate in sport, the focus has tended to be on how coaches or other influential characters influence motivation. Therefore, to understand culture and climate fully it is important to take a step away from sport and look at the context of high-performance environments as a whole, and research from organizational psychology.

The existing literature from organisational psychology suggests that culture refers to the behavioural norms and expectations of a workforce, which dictates the manifestation of behavioural tendencies within the workplace (Glisson, 2015). Further research has suggested that culture is a construct built on deeply held values, beliefs, and assumptions, which then, in turn, dictate behaviour (Horn, 2008). However, more recent research concurs with Glisson (2015) and states that behavioural norms and expectations tend to influence culture more than values and assumptions (Leung & Morris, 2015). However, Schneider et al. (2017) posit an amalgamation of the above two definitions. Schneider and colleagues state that "Culture is defined as the shared values and basic assumptions that explain why organizations do what they do and focus on what they focus on… it exists at a fundamental, perhaps preconscious, level of awareness, is grounded in history and tradition and is a source of collective identity and commitment" (2017, pg. 469).

Climate, on the other hand, is a product of the perception of the psychological impact of the individuals within the environment. This can manifest in a collective view or shared appraisal of members of a workplace (Glisson, 2015). Schneider et al. (2017) suggests that climate is a shared perception of individuals' experience of people in influential positions

(i.e., leaders). In particular, it is the observation of what behaviours are rewarded, supported or expected of the members of the group (Schneider et al., 2017).

The distinction between these two is incredibly important within the literature and for the purposes of this PhD. Culture being of shared values and beliefs grounded in history and tradition is incredibly hard to measure and explore empirically, especially as it is a preconscious idea (Schneider et al., 2017). Whereas, within climate research, conscious perceptions of individuals within the environment and their psychological responses to it can be established (Glisson, 2015). The latter (i.e., climate) is much more measurable as a construct and, therefore, can be empirically researched. This then provides the opportunity, as psychology practitioners, to establish where an intervention may be useful and helpful in developing the psychological responses, and in turn, the behavioural and emotional responses to the environment. However frustrating the misuse of culture or climate is, it is understandable within the athletic domain where the word "culture" is sometimes used as a proxy for the nebulous meanings attached to any social structure, be it formal or informal. To be clear, it is climate and not culture that is at the heart of the present PhD.

2.2.3 Psychological climate

Psychological climate was developed out of the need to understand and establish the perceptions of those within the workplace (James & Sells, 1981). Psychological climate is defined as "The individual's cognitive representations of relatively proximal situational conditions, expressed in terms that reflect psychologically meaningful interpretations of the situation" (James et al., 1978, pg.786). There are four assumptions of psychological climate. These are (James et al., 1978):

1. Psychological climate is based on one's perception of the situation and environment. The individual then has a cognitive representation of the environment which may

offer different interpretation of the situation, based on the psychological meaning of the individual.

2. Psychological climate is multidimensional, and the amount and scale of these dimensions are idiosyncratic.
3. Individuals' perceptions are functional and are employed to examine behavioural norms within the group and establish acceptable behaviours within the environment.
4. Situational attributes, such as job variables, leader behaviours, and interpersonal relationships have a direct influence on how one experiences the environment.

Psychological climate is rooted in cognitive social learning theory and suggests that similarly to REBT and the broader cognitive-behavioural philosophy, it is not the situation which one reacts to, but the cognitive representation of the situation. These cognitive representations are based on previous experiences and learning are based on cognitive mediation.

2.2.4 Climate in Sport

Within sport, the concept of climate is not new. Definitions of climate may change based on the phenomenon being researched. However, climate has been commonly defined as a set of signals generated by key stakeholders (e.g., coaches, teammates, family members, etc.) which is perceived by athletes within their performance environment (see Castro-Sanches et al., 2019; Gomez-Lopez et al., 2019). Climate has been explored within the science of motivation for decades (e.g., Walling et al., 1993) and it is widely accepted that the coach is the main protagonist or influencer of climate (Duda & Balaguer, 2007). This suggests that the coach has the most influence on the athletes within the performance environment, research supports this hypothesis (Appleton et al., 2016). However, more recent

research has focussed on other stakeholders who influence the climate, such as parents and teammates (e.g., Ntoumanis et al., 2007). This opens the question as to who is more prominent in developing and perpetuating climate. The notion that the coach is the chief architect of climate may be a feature of the fact that coaches have been the main target of this research for far longer than other stakeholders. The fixation within the research to focus on coaches may be a missed opportunity to explore other potential avenues within the creation of climates. Through anecdotal evidence from the research team, the perpetuation of certain belief systems comes from a variety of key stakeholders, including teammates, performance directors, physiotherapists, and almost anyone within a performance environment has the propensity to add to the creation and maintenance of a climate.

As previously mentioned, climate in sport research has tended to focus mainly on a motivational climate. More recently this research has expanded to other psychological concepts, for example perfectionism. Hill and Grugan (2020) proposed the idea of a perfectionistic climate and how the coach can influence perfectionistic ideals onto their athletes. In the next two sections, motivational and perfectionistic climates are examined.

2.2.4.1 Motivational Climate

Motivational climate has been researched within sport for approximately three decades (Lochbaum, & Sisneros, 2024). Motivational climate research was initially explored in the physical activity context when Ames (1992) explored motivational climate within school children. Ames' (1992) work explored how different learning environments influenced the goal orientation of school children. This seminal piece of work has been credited with the inception of research into motivational climate and has been used as a rationale to explore motivational climate in sport. The reliance on Ames' work is due to the link between achievement goal theory and motivation climate (Ntoumanis & Biddle, 1999).

Selfriz and colleagues (1992) were among the first to explore motivational climate within sport. Selfriz et al (1992) examined how a motivational climate, created by coaches and teammates, influenced athletes' goal orientation, enjoyment, and perceived reasons for success, among varsity basketball players in US colleges. This study was one of the first to empirically investigate motivational climate with athlete behaviour in a sporting context. Findings from this study suggested that a climate with a focus on skill mastery (i.e., motivated to improve and develop skills) resulted in higher levels of enjoyment and a belief that effort levels are associated with achievement. Whereas a performance-orientated climate with a focus on winning, trophies, and accolades, was associated with a view that superior ability causes success. This piece of research by Selfriz and colleagues (1992) began a widespread examination of motivational climates in sport and exercise contexts.

Research in this area has explored the role of different social agents (or key stakeholders) within the generation and maintenance of a motivational climate in sport. Whilst research has primarily focused on coaches (Olympiou et al., 2008), there has been an influx of research investigating the role of teammates or peers, and parents (see Harwood et al., 2015). Duda (2013) introduced the combination of AGT and self-determination theory (SDT; see Deci & Ryan, 2000) and developed the idea of a coach-created motivational climate being either empowering or disempowering. Castillo-Jimenez and colleagues (2022) explored the empowering and disempowering motivational climates and the influence on psychological needs satisfaction and thwarting, and the mediation of self-determination in sports participation. Castillo-Jimenez et al (2022) found that an empowering motivational climate supported psychological needs satisfaction which, mediated by self-determination, supported participation in sport. In contrast, a disempowering motivational climate created psychological needs thwarting and mediated by self-determination, which led to drop out in sport. The empowering and disempowering motivational climate researchers offered applied,

practical suggestions for working with coaches to develop a more empowering climate. Integral for the present PhD, this focused on behavioural aspects of coaches and their coaching. Although there were no specific directives as to how to support coaches to offer more empowering behaviours, the fact that Castillo-Jimenez and colleagues (2022) referred to the importance of a coach's behaviour in the creation of an empowering or disempowering climate is important to the current thesis. Implicit and explicit signalling is an important part of some motivational climate research (see Castro-Sanches et al., 2019), and so too, an irrational climate.

Teammates or peers have also been heavily researched in the creation of motivational climates. The outcomes or predictive components of a peer-created climate have been widely researched, and peer-created climates have been associated with mental well-being, motivation, burnout, self-esteem, enjoyment, and anxiety, among other cognitive and behavioural consequences (McLaren et al., 2024; Ntoumanis et al., 2006; Smith et al., 2006; Smith et al. 2010). Through qualitative research methods, Vazou and colleagues (2005) identified eleven factors associated with a peer-created climate: improvement, equal treatment, relatedness support, cooperation, effort, intrateam conflict, intrateam competition, normative ability, autonomy support, mistakes, and evaluation of competence. These concepts could be perceived as wholly positive or wholly negative, or both partly positive and negative. Vazou and Colleagues (2005) were not able to give a definitive conclusion about the impact on a team as a result of a peer-created motivational climate. However, they concluded that further research and the development of a psychometric tool to quantitatively measure peer-motivational climate and the impact on sport-related outcomes (e.g., performance) was needed.

A third key stakeholder who has been the focus of motivational climate research is parental-initiated motivational climates. In a cohort of youth athletes from the United States

of America, O'Rourke and colleagues (2013) explored the impact of parental-initiated motivational climate on task and ego motivation, and autonomy regulation across a sporting season. Researchers found that athletes within a parent-initiated mastery climate were found to have higher levels of autonomy, while athletes who perceived an ego climate were found to have less autonomy. These findings continued to grow across the season. For instance, levels of autonomy increased across the season for those who perceived a mastery climate, whereas autonomy continued to decrease for those who perceived an ego-orientated climate. A key limitation of research into parent-initiated climates is the lack of control for numerous confounding variables and influences, such as the impact of others in the performance environment (e.g., coaches or teammates). O'Rourke and colleagues (2013) established that parent-initiated climates only examined the environment on an individual level – as the parents would only influence one athlete. Based on historical psychological research (e.g., Bandura, 1961), it is possible that a sporting climate could be initiated by parents. However, it is possibly more logical to suggest that those within the performance environment have a greater bearing on the outcome of the climate within the specific performance environment.

A qualitative piece of research explored the relationship between coach, teammate, and parent-initiated climates (Coutinho et al. 2021). Coutinho and colleagues (2021) recruited 30 participants who were considered highly skilled (n = 15) or less skilled (n = 15) in Volleyball and explored their perception of coaches, teammates and peers, and their parents in their development and participation in sport. For the highly skilled volleyball players, it was evident that their parents allowed a variety of opportunities to try different sports in the athletes' formative years. Additionally, highly skilled athletes described an autonomy-supportive parental style, whereas the less skilled athletes explained having overbearing parents who were over-involved in their sporting endeavours.

Interestingly, both highly and less skilled players favoured their coaches seeing and recognising value. This is interesting because, within REBT, this is known as contingent self-worth (i.e., the coach values me when I play well). Coutinho and colleagues (2021) explained this value judgement as facilitative as the coach sees value in their player's performance. Essentially, the research suggests that if a player feels valued by the coach the player feels better about themselves. Although there is no mention of whether the coach *only* sees value when the players play well, it would be possible that if the coach did not see value in their performance, the coach would not be so appreciative of them, and then the players would not feel valued. Therefore, an athlete's perception of how much their coach values them is incredibly important before making this judgement. Highly skilled players also favoured a demanding training environment provided there were structured sessions and one-to-one support from the coach. The less skilled players did not recognise this to be something which benefitted their development in sport. A possible reason for this could be the ability for the less skilled players to deal with these demands or they may not perceive themselves to have the resources to deal with the stressful situation of a demanding training environment (See Lazaruz & Folkman, 1984).

Coutinho and colleagues (2021) found that peers were pivotal in the beginning and maintenance of motivation to play sport. Similarly to the highly skilled players favouring a demanding training environment, the highly skilled players also favoured criticism and 'positive push' from their peers and teammates. Players who preferred this were seen to perceive the criticism as helping them develop and improve. Whereas the less skilled players did not prefer this method of teammate interaction. Again, this could be due to these players not being able to manage the demands of the environment and appraising themselves as not having the resources to perform under what could have been seen as intense scrutiny.

As part of the widespread investigation into motivational climate and sport, Harwood et al. (2015) produced a comprehensive systematic review of research on motivation climate and sport and exercise. In particular, Harwood and colleagues examined the correlates of a perceived motivational climate, which included, goal orientation and adaptation, the motivational regulation process, motivational dispositions, beliefs, values, and strategies, and cognitions, emotions, and affect. The latter of these correlates, cognitions, emotions, and affect, is pertinent to the current PhD. Generally, Harwood and colleagues (2015) identified that a mastery-oriented motivational climate fostered less distress and worry whereas a performance-oriented motivational climate was associated with higher levels of negative affect (e.g., worry, distress, mood). These results are important for several reasons. Firstly, these findings follow a logical process that if athletes are orientated towards mastery, they foster higher levels of enjoyment (Selfriz et al., 1992), and enjoyment fosters less worry and better mood. Secondly, the underlying cognitive processes are not explored enough within the motivational climate research, and it is here where the current PhD bridges that gap. With the introduction of a REBT-informed irrational climate, commentary can be offered, grounded in well-established cognitive-behavioural theory, as to *why* a mastery motivational climate creates space for a better effect, and less worry and distress.

2.2.4.2 Perfectionistic Climate

Perfectionistic climate literature mostly attributes the development of the climate to the coach, much like the vast majority of motivational climate research (see Hill & Grugan, 2020). Also, much like motivational climate, perfectionistic climate is rooted in achievement goal theory (AGT; Nicholls, 1984). However, perfectionistic climate researchers have also utilised Flett and colleagues' model of perfectionism development to explore AGT within the realm of perfectionism (Flett et al., 2002). Flett's model suggests that people engage in

perfectionistic behaviours to please themselves or to reduce the risk of ridicule from others. Essentially, a perfectionistic climate suggests that performances must be perfect, and anything less than perfection is unacceptable (Hill & Grugan, 2020).

Hill and Grugan (2020) explain that there are five components of a perfectionistic climate: (1) expectations, (2) criticism, (3) control, (4) conditional regard, and (5) anxiousness. The expectation component refers to how key social agents within a sporting environment expect unrealistic success from others, whereas the criticism component refers to how key stakeholders engage in harsh criticism of others when performance is not perfect (Grugan et al., 2021). The control component refers to the way in which key stakeholders use controlling strategies which give the impression that nothing less than perfection is acceptable (e.g., punishing a player for a small mistake), whereas conditional regard refers to when key stakeholders only offer acceptance or make the individual feel worthy when they are perfect (Hill & Grugan, 2020). Anxiousness refers to the perception that key stakeholders are worried or nervous about making mistakes. A key element to each of these components is the perception of those within the environment (in this context, this is athletes).

Given the infancy of perfectionistic climate as a concept, the extant literature is sparse. However, Meng and colleagues (2024) examined the influence of perfectionistic climates on performance among Basketball players in China. The researchers explored the stressors associated with being within a perfectionistic climate and their impact on coping strategies and performance. Findings from Meng et al. (2024) suggest that the stress associated with a perfectionistic climate did not necessarily negatively affect performance, providing effective coping strategies were employed. If athletes appraise the stress created by a perfectionistic climate as positive or as having potential for positive outcomes, and, importantly, the athletes perceived themselves as having the resources to deal with the stress, positive outcomes are more likely to occur. However, the converse is also true; if athletes

perceive or appraise a perfectionistic climate, and the stress associated with it as insurmountable and impeding goal attainment, the athletes are more likely to experience and decline in performance outcomes.

Perfectionism and irrational beliefs cannot be seen as totally separate and are inextricably linked due to perfectionism being an illogical, rigid, and extreme belief (Ellis, 1958). However, striving for perfection is not irrational, but it is the demand for perfection that is (Jordana & Turner, 2023). The work of Jordana and Turner (2023) drew on Karen Horney's concept that when one cannot reach the goals set to realise their ideal self, a negative spiral of trying and failing occurs (Horney, 1950). This spiral is then predicated by demand words (e.g., "musts" and "shoulds"). For example, an athlete who believes that they *must* be perfect may have thoughts or beliefs similar to "I must not make a mistake, making mistakes is the worst thing imaginable"; it is the *must* which indicates irrationality. Although perfectionism may not be considered an irrational belief itself, it may develop the introspective rhetoric which relates to irrational thinking. Hill and Grugan (2021) have shown that a sporting environment can be perceived as perfectionistic. In this PhD, it is proposed that a climate or performance environment can be perceived to be irrational. It is important to establish that although perfectionism and irrational beliefs are linked, they are also distinct concepts. As Jordana and Turner (2023) explained, perfectionism creates incongruence between one's goals (i.e., to be perfect) and situational As (i.e., not being perfect), which results in irrational beliefs and a stronger link to demandingness. For example, "I must be perfect" becomes "I *really* have to be perfect".

The demandingness of *needing* to be perfect may result in similar unhelpful emotional and behavioural consequences as seen from perfectionism research and previously identified consequences of irrational beliefs (e.g., burnout). Although there are links between perfectionism and REBT, they are distinct concepts. Therefore, it is imperative to be able to

measure the different constructs. As a result, it is important to delve into the measurement of both motivational and perfectionistic climates to establish an understanding and guidance for the development of an irrational climate measure.

2.2.5 Measurement of climate

In order to test motivational and perfectionistic climates, researchers have developed psychometric tests to examine the extent to which key stakeholders (i.e., coaches, peers, and parents) impact the performance environment. There has not been one questionnaire developed which has included all key stakeholders and climate questionnaires focus exclusively on the coach, teammates or peers, and parents. For example, motivational climate questionnaire researchers have developed a coach-initiated motivational climate questionnaire (see Smith et al., 2008), a peer-initiated motivational climate questionnaire in individual sport questionnaire (Harwood et al., 2019), and a parent-initiated motivational climate (White, 1992). For the purposes of this PhD, the most commonly used motivational climate questionnaires within the extant climate research were examined: (1) the perceived motivational climate in sport questionnaire (Selfriz et al., 1992), (2) the empowering and disempowering motivational climate questionnaire (Appleton et al., 2016), and (3) the perfectionistic climate questionnaire (Grugan et al., 2021).

The questionnaire which has been utilised most by motivational climate researchers is the perceived motivational climate in sport questionnaire (PMCSQ; Selfriz et al., 1992). In development of the PMCSQ, Selfriz et al. (1992) developed 106 items by rewording relevant items within the Classroom Achievement Goals Questionnaire (Ames & Archer, 1988). These items were then scrutinised by an expert panel which explored the accuracy of each item and their relevance to either a performance or mastery subscale. Only items scoring 100% accuracy across all experts were retained, resulting in 40 items. This 40-item PMCSQ

was then analysed using exploratory factor analysis and items were retained based on an eigenvalue greater than one and a factor loading of .4 and above. Items which did not conform to these criteria were removed, resulting in a 21-item version of the PMCSQ. A further factor analysis was completed resulting in two factors emerging, the same as originally predicted: mastery and performance subscales. The 21-item version was then subjected to concurrent validity testing and measured the PMCSQ against other scales testing for similar concepts, such as intrinsic motivation, beliefs, and goals (Selfriz et al., 1992). Confirmatory factor analysis (CFA) and criterion validity were tested by Walling et al. (1993). The CFA gave justification to two subscales developed by Selfriz et al. (1992). Furthermore, Walling et al. (1993) explored the predictive nature of the PMCSQ against team satisfaction and worry with a mastery climate resulting in greater levels of satisfaction and less performance worry. In contrast, a performance-oriented climate resulted in less satisfaction and more performance worry. On completion of validity and reliability testing, a 21-item PMCSQ was developed.

The PMCSQ consists of 21 items split into two subscales, task-involving and ego-involving. The performance subscale consisted of 12 items (e.g., "On this team, the coach gives most of his attention to the 'stars' ") and the mastery subscale consisted of 9 items (e.g., "On this team, trying hard is rewarded"; Selfriz et al., 1992). Items are scored using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

To measure a coach's behaviours and how they impact the climate, Appleton et al. (2016) developed the empowering and disempowering motivational climate questionnaire (EDMCQ-C). Appleton et al. (2016) developed an item pool from empowering and disempowering items chosen from several motivational climate questionnaires. These questionnaires were the second iteration of the perceived motivational climate in sport questionnaire (PMCSQ-2; Newton et al., 2000), the H coach climate questionnaire (HCCQ;

Reinboth et al. 2004), the coach controlling behaviours scale (CCBS; Batholomew et al., 2010), and the social support questionnaire (SSQ6; Sarason et al., 1987). Appleton et al (2016) selected items from these questionnaires whilst also creating new items based on the format and function of these questionnaires. This resulted in a 67-item EDMCQ-C and authors initially completed CFA for each subscale individually to reduce items to a more manageable sized scale. Following this, the authors tested a three-factor model testing empowering motivational climate (task-involving, autonomy-supportive and socially-supportive items) and a two-factor model testing disempowering motivational climate (ego-involving and controlling coaching items) to create a five-factor model for empowering and disempowering motivational climate. This resulted in a 35-item version of the EDMCQ-S. Accordingly, Appleton et al. (2016) tested alternative models using exploratory structural equation modelling. Analyses resulted in an EDMCQ-C comprised of five sub-scales: (1) task-involving (e.g., "My coach encouraged players to try new skills"), (2) autonomy-supportive (e.g., "My coach gave players choices and options"), (3) socially-supportive (e.g., "My coach could really be counted on to care, no matter what happened"), (4) ego-involving (e.g., "My coach substituted players when they made a mistake"), and (5) controlling coaching behaviours (e.g., "My coach was less friendly with players if they didn't make the effort to see things his/her own way") perceived by athletes. The EDMCQ-C is scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

In order to measure the development of a perfectionistic climate, initiated by the coach, Grugan and colleagues (2021) developed the perfectionistic climate questionnaire in sport (PCQ-S). Grugan et al. (2021) developed an initial item pool of 50 items based on evidence and theory from previous climate research. These items were then subjected to scrutiny by an expert panel and three focus groups of intended users (e.g., youth athletes). EFA was completed and resulted in a 20-item version of the PCQ-S loading onto five factors

(expectation, criticism, control, conditional regard, and anxiousness). Then the authors completed CFA to reaffirm the factor structure from the EFA process and tested three alternative models. Ultimately, the five-factor model was upheld throughout exploratory and confirmatory factor analyses. Then the PCQ-S was tested against dimensions of questionnaires related to empowering and disempowering motivational climate, including the EDMCQ-C; Appleton et al., 2016) among others (see Grugan et al., 2021). Finally, Grugan and colleagues (2021) tested the PCQ-S for invariance with respect to age and gender, establishing that comparisons between genders and ages can be made in future research. On completion of reliability and validity testing, a 20-item scale was developed. The PCQ-S measures the perceptions of athletes on five factors of coach climate: (1) expectation (e.g., "The coach expects performances to be perfect at all times"), (2) criticism (e.g., "The coach criticises even the best performances"), (3) control (e.g., "The coach uses his/her position unfairly to try to make performances perfect"), (4) conditional regard (e.g., "The coach is less approving when performances are not perfect"), and (5) anxiousness (e.g., "The coach is anxious about the possibility of even small mistakes when performing"). The PCQ-S is scored on a five-point likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

These questionnaires, along with the questionnaires testing irrational and rational beliefs (see section 2.1.5), offer an opportunity to quantify the phenomena they measure. The exploration of measurement of irrational beliefs and climates in sport is a necessary component of this PhD as it allows for a greater understanding of how and why there is a need for measures within sporting climate research. It also develops an understanding of how these scales are formed and the items used to explore the particular phenomena. The next stage of this thesis is the introduction of what has been termed an irrational climate. Scale development plays a central role within this as to be able to empirically understand an irrational climate as a concept, there is first a need to be able to measure it.

2.3 Introducing Irrational Climate

2.3.1 What is an irrational climate?

In this PhD programme of research, an REBT perspective is adopted in order to create an understanding as to the creation, maintenance, and impact of what is conceptualized as an 'irrational climate'. Much like a motivational or a perfectionistic climate, an irrational climate is posited to be generated and propagated by key stakeholders within a performance environment, which impacts upon all (See figure 2.3).

Within both the perfectionistic and motivational climates, there is the concept that key stakeholders have a strong impact on the climate and in particular, it is their beliefs which are the driving force for this (Grugan et al., 2021). Horn (2008) posits that a coach's behaviour is directly influenced by their values, beliefs, and goals. In addition, Horn (2008) showed a link between coach behaviour and athlete's beliefs, attitudes, and performances. This suggests that the coach's behaviour directly influences their athlete's behaviours (see section 2.2). As such, the irrational beliefs of a coach may inform the climate they create, thus influencing the irrational beliefs adopted by athletes and subordinate staff (See figure 1). Turner (2023) first coined the term 'irrational climate' although did not offer a definition. With respect to this, the proposed definition of an irrational climate is:

"The perceived signalling of irrational beliefs within the performance environment"

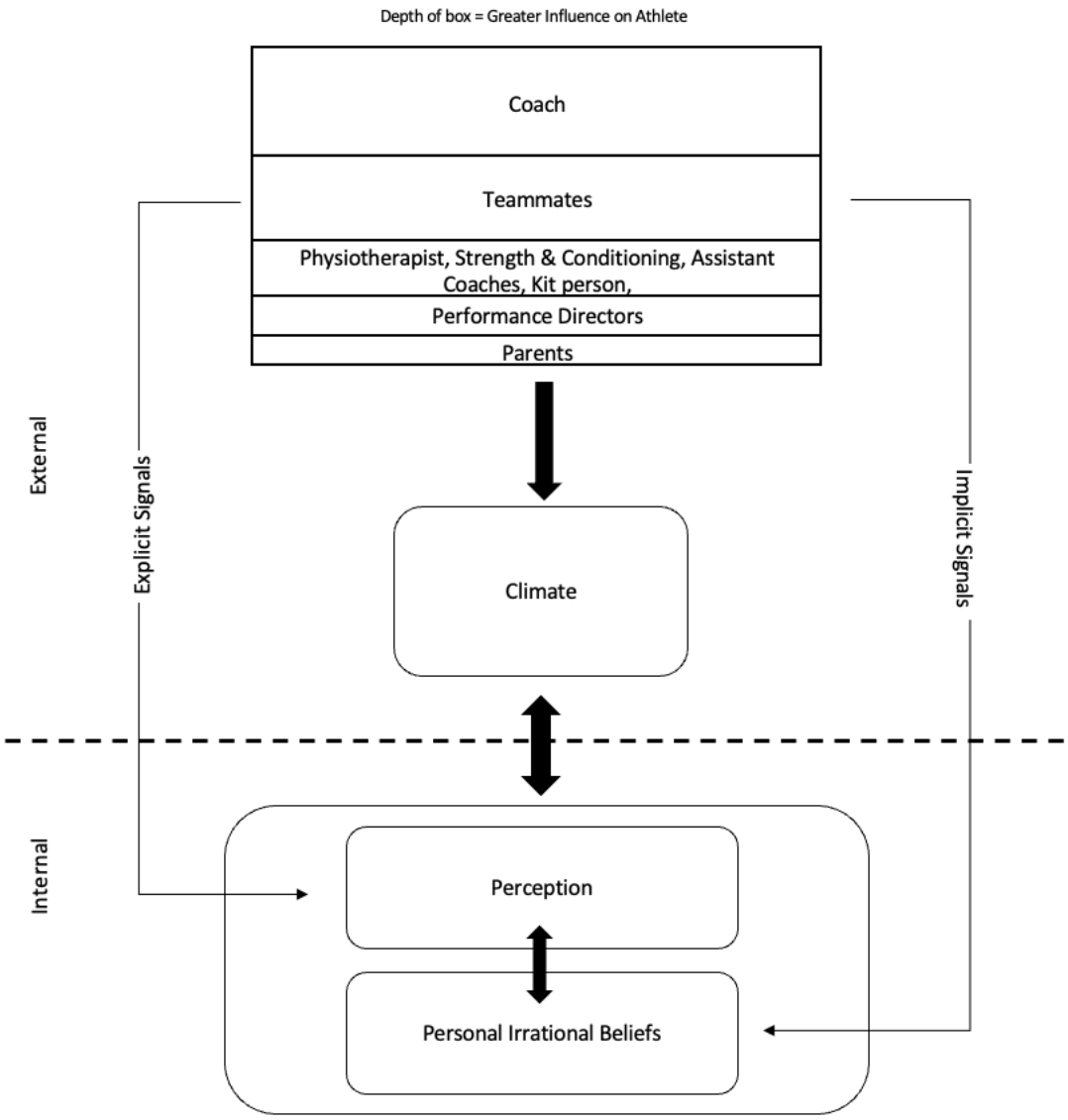


Figure 2.3

Irrational climate model: Showing the interaction between key stakeholders, the climate, and the individual adult athlete.

As can be seen from figure 1, it is proposed that the key stakeholders directly influence the climate, which in turn has a reciprocal influence on the individual athlete. Therefore, the climate can influence the individual's beliefs, through signals sent from key stakeholders, but can also be influenced by the individual's beliefs. However, it is proposed that the individual will only internalise the irrational signals if they perceive the signals. In

addition to this, the individual can also be directly influenced by key stakeholders, through either implicit or explicit signalling. Figure 2.3 also depicts the level of which it is suggested the amount of influence each key stakeholder has on adult athletes. The reason for this is due to proximity to the individual and the level of impact the stakeholder has as a result of that. This is also influenced by the amount of research in the area, which focuses heavily on coaches (Lochbaum & Sisneros, 2024), teammates (Ntoumanis et al., 2007), and parents (White, 2007). Parents have been given a lesser impact due to the age this model is currently aimed towards. Research tends to focus on youth sport concerning the influence of parents on climate and, therefore, parents tend to have less influence on the performance environment and climate, the older the athlete gets. It is also proposed that performance staff have an influence on the creation and maintenance of an irrational climate. Although there is applied knowledge from the research team regarding this, there does not seem to be any research to support this to date. However, it is possible to establish that if a support staff member (e.g., physiotherapist) is seen as a significant member of the team, they will then have influence on members within that team.

2.3.2 Elaborating on Components of the Definition

2.3.2.1 Irrational Beliefs

REBT posits that it is one's beliefs about situations which underpin emotional and behavioural responses (Turner, 2016), not the situation alone. Most importantly, irrational beliefs underpin maladaptive emotional and behavioural responses to situations, and undercut performance and wellbeing (Turner et al., 2019). There are four core irrational beliefs of demandingness, awfulizing, frustration intolerance, and global evaluation of worth, with the alternative rational beliefs being, preferences, anti-awfulizing, frustration tolerance, and unconditional self/other acceptance (Ellis et al., 2010). Irrational beliefs are rigid, extreme,

and illogical, and research in coaching has shown how irrational communication with athletes can elicit maladaptive cognition, but also that one's performance can be influenced using instructions (Evans et al., 2018; Turner et al., 2018). According to Ellis (2003), there are three demands (demands that one should perform well, one must be treated nicely, and life must be fair), which incur behavioural consequences, such as increased anger and avoidant behaviours.

2.3.2.2 Perceived

This thesis proposes that it is one's *conscious perception* of the climate which impacts an individual's beliefs. Previous measures of climate have focussed on the perceptions of athletes as opposed to measuring the 'actual' climate (see. Brinkman-Majewski, & Weiss, 2018; Castro-Sánchez et al., 2019; Gómez-López et al., 2019; Grugan et al., 2021). This may be because research has shown that climate can impact one's perceptions, outcomes, and behaviours (Ames, 1992). It may also be difficult to measure the actual climate as each individual athlete may appraise situations differently. Therefore, measuring athlete perception is a valid alternative which elicits thoughts and feelings from the athletes who are a part of the sporting environment. In addition, REBT posits that from a young age, children are taught to appraise situations as good or bad which translates to feeling good about oneself following success or feeling bad about oneself following failure (DiGiuseppe et al., 2013). Cognitive appraisal theory postulates that emotions are formed through information processing of a situation or event, and whether the event can harm, benefit, threaten, or challenge (Lazarus, 1991). However, emotions are not elicited until evaluation occurs (Hyland & Boduszek, 2012). Therefore, it is the appraisal of these situations and their perceived impact on oneself which results in the development of dysfunctional or irrational beliefs (DiGiuseppe et al., 2014). Appraisals are individual and differ from person to person within the same

environment, situation, or event (Lazarus, 1991). Therefore, it is difficult, if not impossible, to accurately measure *actual* climate as it may be perceived disparately by different members of the environment, and it is the individual perception of climate that drives measurable outcomes. That is, if an irrational climate is present but not perceived, then it is not possible for the climate to drive performance and wellbeing outcomes. To be clear, this hypothesis is a feature of the present PhD definition and of course needs to be tested.

2.3.2.3 Signalling

Signalling refers to the way in which coaches (and other key stakeholders) communicate irrationality. As within motivational climate research, this can be both implicit and explicit (Castro-Sánchez et al., 2019). Implicit signals can be referred to as non-verbal methods of communication (e.g., hand signals, body language, and gesticulation; Lausic, 2009). For example, a coach may throw their arms in the air and roll their eyes when an athlete makes a mistake to communicate their dismay at a passage of play or mistake from an athlete. Lausic (2009) explained that implicit signals can be expressed covertly and in a way which is not obvious to casual observers but understood by members of the team or environment. Conversely, explicit signals are verbal, unambiguous, and clear to the members of the environment (Lausic, 2009). For example, harbouring demandingness irrational beliefs could impact a key stakeholder's behaviour. For example, a coach who verbally demands good performances (e.g., "this is a must win game for us, losing would be awful") may increase the coach's anger at mistakes and negatively impact their behavioural response to the athletes. Therefore, the irrational beliefs of a coach (or other key stakeholder) may inform how they communicate with athletes and how they express their emotions, thus influencing athlete outcomes such as performance and wellbeing.

2.3.2.4 Performance Environment

The extant literature fails to give a conclusive definition of a performance environment. As a result, the present thesis has taken a pragmatic approach to defining what a performance environment is based on research related to sport psychology interventions within performance environments. To this end, a performance environment is defined as a setting whereby the ultimate goal of a team or organisation is performance- and outcome-driven (see Eubank et al., 2014).

2.3.2.5 Signallers of Climate

Previous research suggests that a coach (or other key stakeholder) influences the beliefs of their athletes (Horn, 2008). This suggests that researchers should be looking more closely at these beliefs and how they impact the beliefs of the athletes individually and globally throughout the team (i.e., the climate). Furthermore, the research surrounding social climates discusses the importance of the thoughts and beliefs of the members within the climate, including the key stakeholders. However, extant research does not explore this within great levels of detail and does not explore the impact of beliefs of key stakeholders on the members of the climate. Previous climate research does not suffice in being able to answer these questions. Therefore, it is imperative that a psychometric test is developed which takes key stakeholders into account within the same measure. This will develop the understanding as to how the beliefs of key stakeholders are expressed behaviourally from the perspective of REBT. Further, it may lead to an understanding as to how this has a wider impact on members of groups within various sectors or contexts. In addition, it is important to conceptualise the impact of an irrational climate and implement strategies or interventions to be able to create a more rational climate. Psychologists can enter a performance environment and perceive it to be irrational. However, they are not the ones performing.

Therefore, it is imperative that psychologists understand athletes' perceptions of their performance environment. One particular method of understanding the athlete's perspective is to measure it using a reliable and valid psychometric test.

2.3.3 Exchange of beliefs

The work of Dixon and colleagues (2017) identifies a need, within sport psychology, to understand the role in which coaches play in the development of beliefs within their athletes. Horn (2008) emphasised the link between coach behaviours and athlete beliefs, attitudes, and performances. Therefore, it is conceivable that if a coach experiences stress, and they perceive it as a threat, this could change their behaviours and signals they express. This, in turn, could be noticed by the athletes and impact the athletes' approach to the stressful situation. For example, a tennis coach approaching the final of Wimbledon may become anxious about their athlete winning the match. The coach could develop unhelpful cognitions about how they have prepared the player (e.g., "I cannot stand the feeling that I might not have prepared my athlete well enough, losing would be unimaginable"). As a result of these thoughts and feelings, the coach may become irritable and snappy in the dressing room. While on court, the coach could be on the edge of their seat, being overly excitable when their player wins a point, and overly critical when a point is lost. The athlete may pick up on these behaviours and interpret the signals expressed by the coach. If the athlete was to interpret the coaches' actions as being anxious, then the athlete could unintentionally imitate these behaviours and begin to feel anxious themselves. If it is possible for this transference to occur, it is then also conceivable that other key stakeholders within the performance environment could also impact athletes in this way (e.g., teammates, support staff, parents, and performance directors). Furthermore, the athlete could also tell themselves a narrative about the situation which includes irrational beliefs.

Within sport, and coaching in particular, Horn (2008) developed a working model of coach effectiveness. Incorporated in this model, Horn (2008) states that a coach's values, beliefs, and goals influence their behaviour, and in turn, influence the beliefs and attitudes of the athlete's they coach. Within the model, there are three components which influence the coach's thoughts, values, and beliefs. These are sociocultural context, organisational climate, and the coach's personal characteristics. Interestingly, for the current PhD, according to Horn (2008), the organisational climate directly influences the coach, who then directly influences the athlete, which therefore suggests that the climate is an area of importance in relation to the transference of beliefs between coach and athlete.

Outside of sport, the concept of social contagion explores how beliefs spread within a population (Rabb et al., 2022). Rabb et al. (2022) identified simple and complex contagion, where simple contagion refers to the transference of beliefs by merely being in the presence of others, whilst complex contagion refers to the need of a consensus within the members for the beliefs to spread. Simple and complex contagion are important concepts in the context of climate. To explain, if it is possible for beliefs to be transferred in the mere presence of others (simple contagion) then it is possible that if the person expressing beliefs is of significance, then transference may occur more readily. Furthermore, if the belief is accepted on a global level (complex contagion), in a team for example, the transference of these beliefs to other members may also occur more readily.

A possible explanation for the transference of beliefs and behaviours comes from Social Learning Theory (SLT; Bandura, 1969). SLT posits that behaviours are learnt through modelling and seeing significant others performing tasks. For example, within the bobo doll experiment, Bandura (1961) identified that children tend to mimic or copy their parent's behaviour. Within Bandura's experiment, he identified that once a child saw the parent acting aggressively toward the bobo doll, then the child would also act aggressively. There is a

cognitive processing element of the bobo experiment. For example, when the child sees his parent hitting the bobo doll, the intimation from the child is that the bobo doll is dangerous and needs intervention, or that it can be hit without any punishment and, therefore, there is no reason not to hit the bobo doll. The child is developing *rules* about the behaviours they have seen and then act upon these *rules* in a manner which *must* be acceptable because their parent just acted in the same way. Although this experiment has numerous ethical faults and criticisms, the underlying theory continues to be credible. Rotter (1966) posits that behaviours derive from the beliefs people hold. Therefore, it is possible that, following SLT, emotions, values, and beliefs can also be learnt from significant others.

Extending his theory further, Bandura (1986) introduced the concept of cognition within SLT. SLT, as a phenomenon, explains how significant people in our lives (i.e., parents) model behaviours. However, Social Cognitive Theory (SCT) aimed to understand how people acquire competence, values, behavioural tendencies and regulation, and motivation (Koutroubas & Galanakis, 2022). At the heart of SCT is a triadic model of causation, which states that there is a reciprocal relationship between personal, behavioural, and environmental influences. Bandura coined this triadic 'reciprocal determinism' (See Figure 2.4), although, within the literature, it is also referred to as reciprocal causation. Personal factors refer to the beliefs, attitudes, knowledge gained from previous experience, expectations, and goals. Environmental factors refer to the social circumstances, and societal influences. Behavioural factors refer to the skills, practice, and self-efficacy one possesses (Bandura, 1997). Although significant others are key to the development, it is pertinent to mention that not all followers react in the same way to leaders and some leaders may have stronger or weaker influence on different individuals (Burak & Bashshur, 2013).

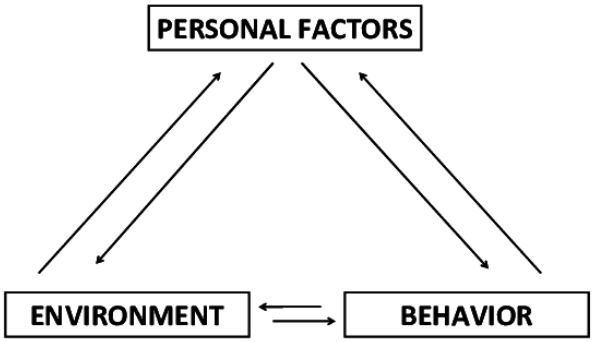


Figure 2.4

Shows the interaction between personal, environmental, and behavioural factors within reciprocal determinism.

Exploring the links between the components of reciprocal determinism, personal and behavioural factors denote the interaction between cognition, affect, and action (Bandura, 1989). The link between cognition and action is one which has been widely documented within psychological research (Solomon, 2003). From an REBT perspective, one's beliefs and thought processes shape the way in which one behaves, acts, and responds to adversity (Ellis, 2001). The link between environmental and personal factors refer to the thoughts, feelings and beliefs which are developed and modified by one's social influences and experiences, through modelling, instruction and or social persuasion (Bandura, 1986). A critical aspect of this interaction is the way in which people react depending on the schemas they have developed of the world around them (Yakin & Arntz, 2023). Similarly, one's role and status within social interactions influence the social reaction (Berger et al., 1972). In sport, this may manifest itself within team sports where the role of team captain may have more influence, and as a consequence be more vocal and outspoken about tactics and giving instructions. Whereas a newer, less experienced member of the team may have less influence, and therefore, does not give their views within group settings and is more reserved.

The premise of the link between behavioural and environmental factors of reciprocal determinism is that, for the most part, a potential environment only becomes the actual

environment once one behaviourally interacts with the environment. This is illustrated in the old adage of, *if a tree falls in the forest but no one is around to hear it, does it make a sound?* From the perspective of reciprocal determinism, the answer is that there is potential for a sound to be made, and logic suggests that a sound would occur, though it cannot be known for certain until there is interaction with the environment. Therefore, if one were present around a falling tree in the woods, the noise it makes would be heard. The same is true within sport. A football/soccer coach will prepare for a match and set-up the team in the way they think gives them the best possible opportunity to win. However, this cannot be put into effect until it is delivered to the players, the players perceive it, and the players put it into practice during the match. In essence, the competitive environment cannot impact the players until they are in the competitive environment.

Reciprocal determinism is pertinent within this PhD as it explains the role of the interaction between athletes and the environment. The reciprocity of personal, behavioural, and environmental factors shows a link between the way humans think, feel, behave and the influence of our thoughts, feelings, and behaviours, on our environment and people within the environment. Therefore, strengthening the plausibility that key stakeholders within a performance environment may influence the beliefs and, therefore, actions of the environment's members. However, as mentioned in the definition of an irrational climate, it is the *perception* of irrationality within a performance environment that predicates actual irrational climate.

When exploring the interaction of the person, the environment, and behaviours, it is imperative to look at how the person may change based on their environment. More specifically, it is important to explore how one may identify within that environment and explore that impact on behaviour. Social Identity Theory (SIT) is well placed to give a possible explanation to how social groups influence the behaviour of individuals while also

giving an explanation as to why people follow certain ideologies. Tajfel (1974) defined social identity as "the part of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the emotional significance attached to that membership" (pg. 69). One of the main aims of SIT is to understand why one may accept the identity of a new social group and follow the behaviours of others within that social group (Ellemers & Haslam, 2012). While to delve into the intricacies of SIT is beyond the scope of this PhD, exploring the core predictions of the theory is useful to help understand what is proposed to be a contributory factor to the exchange of beliefs within performance environments. Tajfel and Turner (1979) proposed three general assumptions of SIT:

1. Individuals attempt to develop their self-esteem.
2. Membership to social groups is associated with appraisals of the positive and negative value connotations – which may be dependent on the social norms either within the same group or across multiple groups.
3. The appraisal of one's social identity is derived from social comparisons between values and characteristics of specific other groups, with the aim to be seen as prestigious. Low prestige comes from a negative comparison to other social groups, while high prestige comes from a favourable comparison to other social groups.

Although SIT is nearly fifty years old and derived from a post-war drive for understanding how certain social groups gain influence (Ellemers & Haslam, 2012), the structure of the theory can still be seen within society today. Within the context of sport, SIT tends to be applied to the behaviours of sports teams and their behaviours (See Rees et al., 2015). Using Tajfel and Turner's (1979) assumptions of SIT, an understanding can be gained of why and how the structures of sport teams behave in certain ways.

Rees and colleagues (2015) utilised SIT to explore the behaviour, formation and development, support and stress appraisals, and leadership within sports groups. To go into all of these concepts in vast details is beyond the scope of this PhD, however there are elements which are pertinent and help to understand the complexities of emotional and cognitive transference. For example, the formation and development of groups refer more to team cohesion and its importance to performance (Grossman et al., 2022). Team cohesion is not of direct interest to this PhD, however the reasons stipulated as to why these groups are attractive to new members may be. Rees et al (2015) specify that, among other things, a group must be able to satisfy the affective needs of the individual. From what is known of the link between thoughts, affect and behaviour (Solomon, 2003), one could assume that others within a sporting environment could create a space whereby one's affect is impacted (through either implicit or explicit signalling of irrational beliefs), then this may impact the want to be involved in that environment. Anecdotally, if this person then cannot get out of that environment easily, this then unhelpful contagion may begin within the team, impacting cohesion, and the environment as a whole (i.e., climate).

In addition to the affective qualities of social identity, there are also important implications for stress appraisals and behaviours. Gallagher et al. (2014) posits that, according to SIT, stress appraisal, established by Lazarus and colleagues (see section 2.1.3.2), are inherent within how one perceives self and social identity. Therefore, whether or not a person experiences stress may be due to the perceived identification with a group (i.e., "what will my peers think of me?"). However, research has also shown that you are more likely to receive support from those within your social group (Haslam et al., 2005). So, one's individual perception may be one of fear or stress-induced irrationality (e.g., "If I play bad, my peers will think I am bad, and that is awful") even though the likelihood of support and encouragement is increased when in a group.

An extension of SIT, which explores the reaction to complicated situations is known as Self Categorization Theory (SCT). SCT has been impactful within research to help establish understanding of the role of the self and social influence. Turner (1987) states that when one is within a particular social group they are then coupled with similar ways of thinking as others within the ingroup and are presented within the same perceived stimuli. This similar perception then tends to lead to agreement in the response to the stimuli, whether that be cognitive, behavioural or emotional response. Turner (1987) summarised the methods in which others impact one's attitudes and behaviours. Firstly, one will align with a particular, distinct group (e.g., an athlete transferring to a new team). One then learns the appropriate expected and or normal behavioural responses to stimuli which reinforce group membership (e.g., berating a teammate who makes a mistake). The next stage is internalisation of the group norms (e.g., If I make a mistake then I am not good enough to be part of this group). Finally, the group norm then becomes the individual's normative behavioural response to similar stimuli. The importance of the internalisation of group norms has been shown in more recent research and stipulates that a kind of cognitive appraisal occurs based on their attachment to the group, meaning the individual chooses their response based on the perceived favourable response of the group norms (see Malteseva, 2015).

SCT is pertinent to this PhD as it emphasises the influence the group or team can have on the individuals within the team. The internalisation of the group norms and attitudes is something of great interest to this PhD as it is a potential explanation of the transference of beliefs, in particular irrational beliefs, within a performance environment. As mentioned in Figure 2.3, the perception of these beliefs in integral to the internalisation of them. SCT shows that perception is also key to the individual exhibiting the expected behavioural norms, as the individual has to perceive what the norm is and then mimic this behaviour.

2.3.4 Influencers of climate

As mentioned in the previous section, individuals within a group will be more likely to internalise behavioural norms to gain favour from others within the group. Within the context of sport, the person or people who are more likely to influence the norms of a team or group, is the coach (see. Duda & Balaguer, 2007). Within the extant climate literature, social agents which influence the development of climates include, coaches, parents, and peers (e.g., Ntoumanis et al., 2005, White, 2007). However, in development of measurement tools, the coach has generally been the focal point in the creation of climates within sport. For example, the perceived motivational climate questionnaire in sport – "On this team, the coach gives most of his attention to the 'stars" (Walling et al., 1993). Recently, research has extended to others within a performance environment who may influence the climate, such as performance staff (physiotherapists, strength and conditioning coaches, among others; Brinkman et al, 2018). Although, again, the measurement tools used in these studies utilise coach-led items. For example, the perceived motivation climate in sport questionnaire 2 is used frequently within motivational climate research and has items such as, "On this team, the coach wants us to try new skills", "On this team, the coach yells at players for messing up", and "On this team, the coach encourages players to help each other." The reason for this could have many explanations. For instance, Ames (1992) developed the concept of motivational climate in physical activity in schools and, therefore, focused on the teacher as the key influential character in the development of the climate in this instance. Within a sporting setting, the coach is the teacher, and therefore, it is not a huge stretch to make the assumption that the coach would be the main influencer. In addition, referring back to Social Learning Theory, it is understandable why the key influencer would be the coach. The coach holds enough gravitas for that athletes would begin to mimic and copy behaviours from their coaches, and most likely, be positively reinforced for doing so.

The original research from Social Learning Theory investigated how children responded to seeing their parents interact with different objects (see Bandura, 1968). With respect to this, the role parents play in the development of sporting climates has been well documented. The research into parent-initiated climates focuses on youth sports. The reason for this is that the majority of climate research focuses on coach-created climates in adolescent or adult sporting environments, and by this point the athletes may be less malleable and more rigid in their attitudes and beliefs (O'Rourke et al., 2013). As the concept of an irrational climate is developed within the context of adult, elite performance environments, the role of parents cannot be ignored. Younger, more adolescent athletes are increasingly involved in adult sports (e.g., Lamine Yamal (16 years of age) playing for the Spanish national football/soccer team at the European Championships). As a result of this, as seen in Figure 2.3, the parents remain a potential influencer to the climate, though having less impact than other members of the performance environment.

In addition to parents, peers have been another social agent who have been researched to understand their impact on climate. Much like parent-initiated climates, peer-initiated motivational climates tend to focus on youth sports. However, referring back to SIT, wanting to behave in a favourable manner, as seen by peers within the group, is a key driver of behaviour. Therefore, the role of peers within an adult or senior team or sporting group should not be underestimated, as it is conceivable that a similar phenomenon occurs within adult sports. Research conducted by Vazou and colleagues (2005) utilised a combination of focus groups and interviews to explore the development of peer created motivational climates. Interestingly, the authors identified 11 dimensions related to peer created motivational climate (cooperation, effort, improvement, mistakes, intra-team competition, intra-team conflict, equal treatment, normative ability, autonomy support, evaluation of competence and relatedness support). Vazou et al (2005) identified both positive impacts of

these dimensions. For example, how a climate can be supportive when a teammate makes a mistake, but also that the climate can be dysfunctional as it can lead to unhelpful downing of others. The authors concluded that similar concepts and dimensions from youth sport and peer-initiated climates are synonymous with coach-created motivational climates within elite, adult sports. Perception is key with respect to knowing whether the actions or behaviours of an individual in a performance environment would be seen as helpful or unhelpful (dysfunctional or supportive). Within the irrational climate model (Figure 2.3), perception and cognitive appraisal (see Lazarus & Folkman, 1984) is an integral element to the internalisation of the perceived signals. Therefore, the same signals could be sent to two different individuals, and they can be interpreted by the first individual as supportive, but dysfunctional by the second individual. For example, a football/soccer coach may shout "You *must* score there", one player may see that as the coach criticising their effort levels and result in irrational cognitions which lead to a further reduction in effort. Whereas another player may see this as motivational and instructional and, as a result, increases their effort levels.

The research into motivational and other climates (e.g., perfectionistic climate) has centred around the three main key stakeholders discussed within this PhD, the coach, parents and peers. Within some research there has been intimations that other people within the performance environment impact climate (e.g., physiotherapists; Weigand et al., 2001). However, to the knowledge of the primary researcher on this PhD, there has not been any empirical research conducted as to the impact these key stakeholders have on the creation of climates within performance environments. Using physiotherapists as an example, research has shown that physiotherapists have a great opportunity with athletes, who spent a lot of time with them, and who let their guard down when on the physio bed (Scott & Malcom, 2015). Other members of the performance staff also spend a lot of time with athletes throughout the week. For example, the strength and conditioning coaches, nutritionists,

physiologists, kit people, operations staff members, among others. Within this PhD it is proposed that all these people within the performance environment inevitably have some influence on the overall climate. Figure 2.3 shows the levels of influence different people may have within a performance environment. Based on the research explored, coaches have been depicted as having most influence. However, other support staff have been included to symbolise their inevitable involvement within climate creation and maintenance.

2.3.5 Measurement of an Irrational Climate

Currently, to the researcher's knowledge, the concept of irrational climate has not been conceptualised in literature, and therefore, there is no psychometric test for an irrational climate. Developing a specific psychometric test in the first instance, will allow for more valid and reliable testing of the performance environment (climate), in comparison to amending a measure not rooted in REBT theory, such as the PCQ-S. Creating and testing a scale would allow for an understanding of how an irrational climate is conceptualised based on modelling. An accurate irrational climate measure would indicate the extent to which members of a team or working group perceive that the climate they are a part of endorses irrationality as defined in REBT. In other words, a measure of irrational climates would indicate how demanding (e.g., "you must succeed"), awfulizing (e.g., "it is awful to fail"), intolerant (e.g., "we cannot stand failure"), and depreciating (e.g., "if you fail, you are a complete failure"), a climate is perceived to be.

In the current PhD research, a perceived irrational climate questionnaire for athletes (PICQ-A) is proposed, developed, and validity tested. The PICQ-A aims to measure an athlete's perception of the extent to which irrational beliefs (i.e., demandingness, awfulising, frustration intolerance, and/or global evaluation of human worth) are signalled within their performance environment (e.g., coaches). The scale measures the four irrational beliefs which

the athlete may perceive to come from one or more of three sources: the coach, teammates, and other members of the climate (e.g., assistant coaches, physiotherapist, and strength and conditioning coaches).

2.4 Conclusion

Irrational climate has its roots within rational emotive behaviour therapy (REBT). In particular, the relationship between irrational beliefs (Ellis, 2001), the process of cognitions within the GABCDE model (Turner, 2019), and cognitive appraisals (Lazarus & Folkman 1984). In other words, an irrational climate involves the signalling of the four core irrational beliefs as presented in contemporary REBT. A key aspect of an irrational climate is the signals sent from the key stakeholders within the performance environment and perceived by those proximal to the stakeholders. Characterised by their explicit (overtly saying something) or implicit nature (non-verbal signals, e.g., hand signals), these signals only have influence or impact when they are actively perceived and conceptualised by the members of the climate. How these signals are perceived and appraised will then have an influence on whether it will be internalised by an athlete. The key stakeholders vary from coach, teammates, other performance staff, and parents. However, the level of influence on the development and maintenance of an irrational climate is proportionate to the perceived influence of the team, squad or training group. This PhD explores the possible mechanisms involved in the transference of beliefs from key stakeholders to individuals within the group. With this in mind, the role of social learning theory (Bandura, 1969) was examined, along with the apparent influence of mimicry and modelling behaviour from key, influential individuals and its relative impact on observers' behaviours. Additionally, the role of the individual in group formation and maintenance was analysed from the perspective of social identity theory (Tajfel & Turner, 1979) and self-categorisation theory (Turner, 1987), which explored the

need to fit in within the in group and the behaviours surrounding this occurring. For example, exhibiting perceived favourable behaviours which the 'leaders' of the group may exhibit.

2.5 Rationale and Aims

REBT posits that it is not the situation or person who causes emotional dysfunction, but the cognitions and thoughts those situations or 'activating events' say about the person (Di Giuseppe et al., 2013). From the perspective of REBT, when a key stakeholder (e.g., a coach) says "You have to score that", the athlete is not disturbed by the coach or what the coach says, but how the individual perceives the meaning of what is said. For example, with the above example, a belief which may result from this is "I must score every shot I take, and if I don't, I am a complete failure", these feelings of failure may then lead to further self-deprecating thoughts of not being good enough. Additionally, it may have negative behavioural consequences where the athlete plays within themselves, does not take risks, or does not shoot as the worry of feeling like a failure is too much to warrant taking such risks. Within the present PhD, this premise is being challenged, and it is suggested that the explicit and implicit signals sent by key stakeholders can directly influence an athlete's thoughts, feelings, and behaviours, but also influence the environment in which they are a part of (see figure 1). REBT posits that it is the signal (A) and the appraisal (B) which creates maladaptive responses (C). However, within the present PhD, the premise is that irrationality can be captured and internalised from signalling alone. This is an important distinction from the thinking of REBT, which has stood for nearly a century, and may change the underlying principles of REBT.

In order to change these principles, it is imperative to have the ability to measure and test these new ideas. Presently, within the extant research, there is no mention of a phenomenon such as an irrational climate. However, climate is not a new concept and has

been researched for many years within the realms of organisational and sport psychology (See Braithwaite et al. 2011). Within the climate research, there is an omission of underlying beliefs and thought processes involved within the development of a climate. For example, within the perfectionistic climate research, Grugan et al (2021) proposed that a coach may develop a perfectionistic environment whereby nothing less than perfection is acceptable. Yet, perfectionism is an irrational concept as it is rigid, inflexible, and illogical. Though, there is no mention of the higher order thought processes involved in the creation of such a climate. The process of developing the concept of an irrational climate has taken this into account and, using an REBT approach, has allowed for an understanding of the methods in which signals are internalised and expressed within performance environments, which is believed to be the starting point of other climates. For instance, it has become possible to begin to understand the mechanisms of transference of irrational beliefs, and additionally understand the psychological mechanisms involved in motivational and perfectionistic climates. Therefore, being able to measure and empirically understand an irrational climate will give further evidence and weight for both the new underlying principles of REBT and the mechanisms underpinning creation and maintenance of climates. As a result, the aims of this PhD are as follows:

1. Introduce and establish an understanding of an irrational climate.
2. Develop an understanding of how an irrational climate impacts members of sporting environments.
3. Develop a psychometric test that assesses the irrationality of the coach, teammates, and environment; the perceived irrational climate questionnaire for athletes (PICQ-A) – Study 1.
4. Examine the factor structure of the PICQ-A via confirmatory factor analyses – Study 2&3.

5. Assess the criterion (concurrent and predictive) validity of the PICQ-A – Study 4.
6. Determine the test-retest reliability of the PICQ-A – Study 5.

Chapter 3

Development and validation of the Perceived Irrational Climate Questionnaire for Athletes (PICQ-A)

3.1 Introduction

Rational Emotive Behaviour Therapy (REBT) is a psychotherapy modality which was established by Albert Ellis in the 1950s (see Ellis, 1957). REBT posits that emotional distress, or dysregulation derives from one's thoughts and beliefs about a situation or social interaction which is perceived to have impeded one's goal. Within sport, the notion of irrationality can be seen in a variety of guises. For instance, a 100-metre sprinter may false start in the final of the World Championships, resulting in their disqualification (Activating event). As a result, the sprinter becomes emotional and cries (Emotional consequence), withdraws from the rest of the team (Behavioural consequence), and has a slow start out of the blocks in their next race (Behavioural consequence). According to REBT, the sprinter is not experiencing these symptoms because of the false start alone, they are experiencing them because of the thoughts and beliefs about the situation, themselves, and the world they inhabit. For example, the sprinter may have thoughts like, "I am a failure" (Global Evaluation of Worth), "I cannot stand this" (Frustration Intolerance), "This is the worst thing in the world" (Awfulizing; Beliefs).

The beliefs people feel in situations similar to the athlete above are known as irrational beliefs. REBT posits that irrational beliefs are rigid, illogical, unreasonable, and mostly adverse to the person (Vasile, 2012). REBT proposes four core irrational beliefs, namely demandingness, awfulizing, frustration intolerance and global evaluation of worth. Demandingness represents absolutistic thinking and is characterised by the use of certain demand words, such as *must, should, have to*. Awfulizing refers to the belief that the situation could not get worse. Frustration intolerance denotes the belief that one cannot endure the

situation. Global evaluation of worth indicates the depreciation of self, others, and the world (DiGiuseppe et al., 2014; Turner, 2022). Demandingness is the primary irrational belief and the other three are derivatives of demandingness, although this structure has been subject to debate (e.g., DiLorenzo et al., 2007). Revisiting the earlier example of a disqualified sprinter, they may hold a belief similar to "I must get out of the blocks perfectly, if I do not it will be the worst thing imaginable". This belief would then underpin consequences, such as the emotional response (i.e., crying), the withdrawal, and the maladaptive performance response of overcompensation on the blocks in the next race. However, it is also important to clarify that there is a reciprocal nature to beliefs and the reaction one has to particular situations. Through confirmation biases, one may unconsciously seek irrationality from within their environment (Turner & Bennett, 2017).

Research into the use of REBT in sport has tended to focus on alleviating irrational beliefs and developing a more rational athlete, either through the medium of individual or group sessions (Jordana et al., 2020). In addition, with the increase in popularity of using REBT in sport, more research has explored the benefit of using REBT to improve other psychological concepts, such as resilience, mental wellbeing, motivation, unconditional self-acceptance, and decision making (Cunningham et al., 2016; Davis, et al. 2020; Deen et al., 2017; Maxwell-Keys et al., 2020; Turner, 2016). This research shows the increase in popularity of REBT within sport. However, this has focused on individual, personal beliefs about adversity in sport. There is no current data on the impact of how social context may influence personal irrational beliefs or the signals perceived by individuals within sporting environments. Recently, researchers have begun to explore REBT in relation to the social psychology of sport. Notably, King et al (2022) examined the socialisation of irrational beliefs in athletes. King and colleagues explored the influential impact of people and systems within an athlete's life and, in particular, the athlete's performance environment (see Figure

3.1). These influencers consist of parents, teachers, peers, and support staff (e.g., coaches, physiotherapists, sport scientists, performance analysts). King et al. (2022) also examined the impact of those outside of the immediate performance environment, such as national governing bodies, Olympic and Paralympic committees, sponsors, and the media. King's conceptualisation of the environment is important for the development of the present PhD as it provides insight, using REBT, into the organisational and social contexts.

The influence of key stakeholders on athletes is not a new concept within sport and exercise psychology. Initially, Ames (1992) instigated the investigation into motivational climate within schools and was the first to develop a scale to examine the students' perceptions of their motivational climate within classroom settings. Motivational climate draws upon achievement goal theory (AGT; Nicholls, 1984) to establish the types of motivation that drive individuals. AGT outlines how an athlete can be either ego or task orientated. Task orientation refers to self-referential progress whereby success is found through developing one's own skills. Whereas an Ego orientation is peer-referential, whereby there is a perceived need to be better than others (Harwood & Siddle, 2002). Since Ames' (1992) research, there have been numerous studies exploring the concept of a motivational climate and the predictive outcomes of being more task or ego orientated in sports settings. For example, athlete engagement (Curran et al., 2015), win rate (Philyaw et al., 2024), wellbeing (Alvarez et al., 2012), performance anxiety (Smith et al., 2007), to name a few.

More recently, climate research in sport has expanded from focusing just on motivation. Hill and Grugan (2020) proposed the concept of a perfectionistic climate within sport. The researchers defined the perfectionistic climate as "the informational cues and goal structures (i.e., what people are expected to accomplish and how they are to be evaluated) aligned with the view that performances must be perfect and less than perfect performances are unacceptable" (Hill & Grugan, 2020, p. 4). Hill and Grugan identified five areas of a

perfectionistic climate, which is perpetuated by key stakeholders (e.g., coaches, parents, teachers, peers). These are expectation, criticism, control, conditional regard, and anxiousness. Hill and Grugan (2020) suggested that, within a perfectionistic climate, one has the expectation that they *should* be perfect and expect harsh criticism when they are not perfect. Control refers to an environment which pressurises the way one thinks, feels, and behaves in a particular way. Conditional regard refers to the manner in which key stakeholders manipulate the amount of praise or disapproval exhibited based on level of perfectionism. Therefore, conditional regard creates the impression that one only feels worthwhile when they are perfect. The final component, anxiousness, refers to the fear or worry about consequences when one makes a mistake. Grugan and Hill (2020) concluded that there is a need for further assessment and interventions to improve perfectionistic climates. As a result of this, Grugan and colleagues (2021) produced the perfectionistic climate questionnaire for sport (PCQ-S) which utilises the five components of a perfectionistic climate to explore the level of perfectionism within performance environments.

Research has explored the influence motivational and perfectionistic climate has on certain psychological concepts within sport. For example, performance (Cervello et al., 2007), burnout (Gustafsson et al., 2016), resilience (Vitali et al., 2015), and performance anxiety (Smith et al., 2007), among others. This is an important aspect to the present thesis as irrational beliefs have also been found to influence the same psychological concepts (see Jordana et al., 2023).

Within the context of an irrational climate, motivational and perfectionistic climate have both been instrumental in the understanding of the underlying mechanisms within sporting environments. However, irrationality appears to be a key mediator to the orientation of motivation and perfectionism within sporting environments. For example, perfectionism is

a goal of an individual, therefore, when the goal inevitably cannot be completed, one begins to experience irrational beliefs when they make mistakes or are not able to be perfect, and subsequently experience unhelpful consequences (Cunningham & Turner, 2016). Furthermore, research has also shown that an increase in irrational beliefs influences the motivation of athletes (Turner et al., 2022). Although there may be an association between perfectionism, motivation, and an irrational climate, the concept of an irrational climate appears to fill a gap in the literature by exploring the mechanisms of irrationality within sporting environments.

In an attempt to examine this gap in climate research, the present thesis has conceptualised the 'irrational climate'. An irrational climate is defined as "the perceived signalling of irrational beliefs within the performance environment". Irrational climate explores a 'missing link' of other climate research and aims to understand the underlying perception of thoughts and beliefs of individuals within performance environments which are perpetuated by key stakeholders (e.g., coach, teammates, environment). The present thesis proposes that the key stakeholders send implicit (e.g., throwing hands in the air to signify exasperation) and explicit (e.g., a coach saying "you have to do better there") signals to members within the performance environment (i.e., athletes). These signals are then either perceived consciously or unconsciously. If they are perceived consciously, they are then appraised by the athlete as either helpful or unhelpful. Either consciously perceived or unconsciously perceived signals can also be internalised and become an individuals' own irrational beliefs (See figure 2.3). Naturally, if an athlete is experiencing irrational signals from others in the performance environment, they too can send signals and influence the irrational beliefs of others.

3.2 Rationale, Aims & Hypotheses

The phenomenon of an irrational climate is a concept which has not yet been investigated within psychological research of any kind. REBT posits that it is not the person or situation which causes emotional dysfunction. However, it is hypothesised that this is not the case, and, in fact, an individual can be influenced by others' irrational beliefs either directly or indirectly (through implicit or explicit signalling). Research into the development of sporting climates has suggested a link between thoughts, feelings, and behaviours within the development of sporting climates (see Appleton et al., 2016; Hill and Gurgan, 2021). However, climate research has not explored this link, and no studies have explored how one's thought processes play a role in their behaviour within a performance environment. Although the concept of an irrational climate has strong foundations in theory, being able to test irrational climates allows for future research to determine the effectiveness and usefulness of irrational climate research within applied settings. Furthermore, there are currently no psychometric tests which are able to measure such a phenomenon. Therefore, there is a real need to develop a scale which is capable of testing such a nuanced concept as irrational climates.

With this rationale in mind, there are several aims across the process of scale development. The aim of study 1 was to develop sufficient items which are of satisfactory accuracy and clarity based on feedback from experts, novices, and intended users. Thus, creating items with face and content validity. The aim for study 2 was to explore the latest underlying factor structures within the PICQ-A. The hypothesis for study 2, based on previous research, was a four-factor model stemming from four irrational beliefs of REBT (e.g., demandingness, awfulizing, frustration intolerance, global evaluation of worth; e.g., Turner et al., 2016). The aim for study 3 was to confirm the factor structure derived from study 2. The aim of study 4 was to show the PICQ-A is statistically similar to other, previously validated measures and, therefore, show concurrent validity. Furthermore, the aim

was to explore which key concepts the PICQ-A may be able to predict, and therefore, show predictive validity. More specifically, the hypothesis is that the PICQ-A will be positively and highly correlated with the irrational performance beliefs inventory (iPBI; Turner et al., 2016), the empowering and disempowering motivational climate questionnaire (EDMCQ; Appleton et al., 2016), and the perfectionistic climate questionnaire for sport (PCQ-S; Grugan et al., 2021). Additionally, it was hypothesised that the PICQ-A will positively correlate with concepts with negative connotations of irrational beliefs (e.g., negative emotions, authoritarian leadership styles, thwarting coach support, burnout, and poor subjective performance). Therefore, the higher the irrationality of a climate, the more likely the climate will exhibit negative consequences. The converse is also true, it was hypothesised that low irrationality within the climate will correlate with positive consequences (e.g., supportive coach behaviours and good subjective performance). The aim for study 5 was to show the PICQ-A has high levels of test re-test reliability. Therefore, the hypothesis for study 5 was for the PICQ-A at time 1 and time 2 to correlate highly.

3.3 Components of Scale Development

Scale development is a crucial element of psychological research (Devillis, 2017). Boateng and colleagues (2018) proposed that there are three stages to good scale development which are item development, scale development, and scale evaluation. However, within Boateng's (2018) process there are multiple components to each stage which contribute to scale development, reliability and validity processes. For the purposes of the present thesis, the component parts of Boateng's (2018) process have been expanded. Therefore, the present study follows a five-stage process (see figure 3.2) of scale development, which includes developing face and content validity through item development, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), criterion validity, and

test-retest reliability. Item generation was used to explore the concepts and phenomena being captured (i.e., REBT and climate). The stage following item generation, was to explore the way the items represent REBT and climate theory (i.e., face and content validity). The next step was to explore the latent factor structures in a sample of participant data, followed by confirming these factor structures in a separate sample. The PICQ-A was then tested against other, already validated, questionnaires to ascertain the validity and reliability the measure (i.e., criterion validity). That is, if the PICQ-A does indeed measure the intended construct/s, scores should relate to those of similar measurement tools. Finally, the PICQ-A is tested at two different time points to establish the stability of the measure across time (i.e., test-retest reliability; see table 3.1).

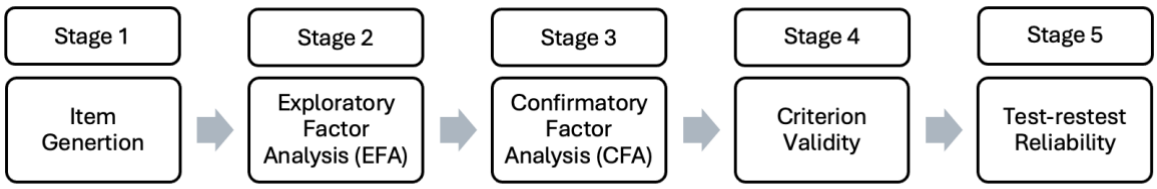


Figure 3.2

Shows the process of scale development utilised within the development of the Perceived Irrational Climate Questionnaire for Athletes (PICQ-A)

Previous research within sport and exercise psychology scale development have utilised a similar process. For example, Grugan et al. (2021) developed the perfectionistic climate questionnaire for sport (PCQ-S) and utilised a similar process of item generation and refinement, EFA, CFA, validity testing, and finally tested the variance within certain sub-groups (e.g., gender and age). Additionally, from climate research, Appleton et al. (2016)

followed a similar process to that of Grugan et al. (2021) in the development of the empowering and disempowering motivational climate questionnaire for coaches (EDMCQ-C). Within REBT scale development, Tuner et al. (2016; 2020) again used a similar process to the present study, following the exact process as outline in figure 3.2. These scale development studies using the same or similar processes produced statistically valid and reliable measures, and therefore, provides evidence that these processes are successful. As a result, following these processes allows for a greater opportunity to obtain similar outcomes (i.e., a valid and reliable measure) in the present thesis.

Table 3.1

A brief description of the scale development process used within the present PhD.

	Item Generation	Exploratory Factor Analysis (EFA)	Confirmatory Factor Analysis (CFA)	Concurrent Validity	Test-retest Reliability
What	Development of novel items based on a priori theory and research.	EFA allows us to explore the underlying factorial structures exhibited from the data.	CFA allows us to confirm the factor structure arrived at in the EFA, using statistical criteria.	Concurrent validity is the significant relationship between the PICQ-A and other measures which test similar concepts.	Test-retest reliability is the ability of a measure to be tested over time with the same or similar results occurring. This then shows that the items, if not exposed to an intervention, will remain the same.
When	At the beginning of the scale development process June 2022 – October 2022	Data collection for EFA began on completion of the item generation stage. Analysis was completed following data collection. The entire process was completed from November 2022 to June 2023	Data were analysed on two separate occasions for CFA. CFA1 was completed in September 2023 and CFA 2 was completed in March 2024. CFA2 used a separate and independent sample to CFA1.	Data were collected following the completion of CFA1 and CFA 2 and was analysed in March 2024.	Data were collected following the completion of CFA1and CFA 2 and ran concurrently with the concurrent validity data collection. Therefore, the data were analysed in March 2024.
How	Items were generated by developing questions based on the four irrational beliefs, for each targeted group (e.g., coach, teammate, environment). Then a number of stems were	EFA was completed using SPSS Version 28. Items were removed if they did not comply with certain statistical parameters. Items were removed until the remaining items all conformed with the	Using AMOS, the research team explored which items fit into which factors. Items were removed until the model fit indices reached acceptable levels. From CFA1 two models arose	Using SPSS, researchers explored the comparison between the PICQ-A and other measure of similar concepts, such as Perfectionistic and Motivational Climate, autocratic leadership	Using SPSS the researchers tested the correlation between the PICQ-A being completed at baseline (time 1) and the PICQ-A being completed by the same cohort of

	developed to create new questions which target either more explicit or implicit signals. The items were then sent to novice, expert and intended user panels. This process resulted in 1120 items.	aforementioned statistical parameters (see section 3.5.2.4). As a result of this process, there were 2 different factor models (Model 1 – GEW & DAFI; Model 2 – Coach, Teammate, Environment).	which showed similar model fit, therefore, the decision was made to take both models into a second round of analysis. A	styles, negative emotions, among others. It was hypothesised that PICQ-A would correlate highly with negative outcomes on most measures tested against.	participants two weeks later (time 2).
Who	Items were generated by the PhD student and supervisory team. 19 novices, experts, and intended users were recruited through the research team's network to assist with understanding the clarity and comprehension of the items.	439 participants were recruited from the online survey database, Prolific, and from students and athletes of the network of the PhD team. All participants were currently competing and were being coached.	231 participants were recruited for CFA 1 using Prolific and from students and athletes across the UK and USA. For CFA 2, the researchers utilised data from recruited participants for studies 4 and 5, therefore, 452 participants were recruited using Prolific and were currently competing and were being coached.	206 participants were recruited from prolific. These participants had not taken part in any other study related to this PhD (a function afforded to us by Prolific) and were currently competing and were being coached.	246 participants were recruited from prolific. These participants had not taken part in any other study related to this PhD (a function afforded to us by Prolific) and were currently competing and were being coached.
Why	To be able to develop a scale which captures the entirety of the a priori theory and research, as well as the applied experience of the PhD team. To develop content validity.	The purpose of EFA is to understand the underlying factorial structures (models). This then allows us to test these models under more scrutiny in confirmatory factor analysis.	The purpose of CFA is to confirm the underlying factor structures or models which arose from EFA.	Irrational climate is a new concept and, therefore, there are no other measures which can be solely compare the PICQ-A to. As a result, finding measures which had similar elements of the PICQ-A to be able to see if our measure was as reliable	The purpose of test-retest was to establish whether the PICQ-A was reliable over time. It was hypothesised that it would be and that no changes would occur and, therefore, would be highly correlated. This then allows us to establish

		as other validated measures, was difficult.	with greater certainty that any changes which do occur in future research is more likely to be due to an intervention completed by the research.

3.3.1 Item Generation

The methods to developing an item pool consists of an eight-step process for effective item generation and scale development (DeVellis, 2017). These steps include: (1) determining clearly what it is you want to measure, (2) generate an item pool, (3) determining the format for measurement, (4) initial item pool reviewed by experts, (5) considering inclusion of validation items, (6) administering items to an intended user sample, (7) evaluating the items, and (8) optimizing scale length.

Table 3.2

Details the methods used in the item generation process.

Item Pool Generation	Expert Panel	Novice Panel	Intended User Panel	Final Refinement
An extensive number (n = 1120) of items were generated through the development of item stems measuring irrational beliefs (demandingness, awfulizing, frustration intolerance, global evaluation of worth) of key stakeholders (coach, teammates, environment). These items were then refined, by the research team, based on item complexity and length. Resulting in a manageable number (n = 91) of items to be sent to experts and novices.	Experts of REBT were tasked with assessing the accuracy and clarity of the 91 items. They were also afforded the opportunity to give feedback on each item. Items were then either removed or amended based on expert feedback.	The items were then sent to novices to also explore accuracy and clarity of the items from those who have not learnt or known about REBT before. Items were removed or amended based on novice feedback.	The items were then sent to coaches and an athlete to explore the comprehension and clarity of the items specifically within a sporting context. Items were again removed or amended based on intended users' feedback.	The final process was any final item removal or amendment made by the research team to create a item pool which measured the concept of irrational beliefs of key stakeholders and was suitable for testing and analysis to establish further validity and reliability.

With respect to item generation in particular, items should reflect the purpose of the scale (DeVellis, 2017). Within the present thesis the purpose was to measure a sporting

environment based on the level of perceived irrational beliefs, using the underlying theory of REBT. The specificity of exploring perceived irrationality within a sporting context is novel and different from other irrational beliefs measures and, therefore, reduces the risk of overlapping with other pre-existing measures (Boateng et al., 2018). When considering what makes a good or bad item, DeVellis (2017) suggests that the items should not be too long, have a syntax too complex, and should not have multiple negatives. Based on DeVellis, items in the PICQ-A were worded with a simple syntax, using mostly monosyllabic words, and did not include any double negatives. Research suggests that there are two types of item generation: inductive and deductive (Boateng et al., 2018). The deductive method utilises previous research and a literature review of previous questionnaires pertinent to the context of the items being developed. Whereas the inductive method is the generation of items based on focus groups or interviews conducted about the intended measurement context. In the current study, a deductive method was conducted whereby a literature review of previous motivational and perfectionistic climate questionnaires was completed. Information, such as stems used, how key stakeholders were represented in items, and underlying theory, was used to inform and influence the way in which the items were developed for the PICQ-A.

The length of the initial item pool has been a somewhat contentious topic within the scale development literature. On the one hand, Kline (2015) and Schinka et al. (2005) suggested that the initial item pool should be at least double the number of the intended final number of items in the developed scale. On the other hand, DeVellis (2017) suggested that there are no limits on the number of items which are initially generated, and, in fact, the more items generated, the better. The latter was the approach adopted within this thesis and felt allowing the statistical analyses dictate item retention was the best method of determining the justification for further item refinement.

3.3.2 Exploratory Factor Analysis (EFA)

Having developed items, the next step was to explore the factor structures within them. An irrational climate is a concept which is, in itself is unobservable and, therefore, immeasurable. Within psychological research, these types of unobservable concepts are known as latent variables (Finch, 2013). However, it is possible to make inferences as to what might make an irrational climate. For example, the explicit and implicit signals communicated from a coach, teammate, or the environment discussed in Chapter 2. These characteristics of an irrational climate are known as the observed variables. They are observable as they can be measured or their likelihood of occurrence through items on a questionnaire is observable. EFA allows researchers to understand the underlying latent structures or constructs within a questionnaire (Harrison et al., 2022). Factor analysis does this by taking the entire data set and finding commonalities or intercorrelations between a set of variables (Devillis, 2017).

Factor analysis could be considered a continuum whereby one end of the spectrum is complete exploratory analysis with no prior knowledge of research or theory. The other end of the spectrum would be complete confirmation of the factor models. Therefore, understanding the underlying theory is an essential element to EFA (Finch, 2013). The present study is informed by theory and research from REBT and sporting climates (see chapter 2). As a result of utilising the extant research within these areas, it was theorised and inferred that the latent variables cause the observed variables. Within the present study it is not possible to establish a causal relationship between these variables, and it may never be possible to do this. However, without the theoretical underpinnings, the PICQ-A would lack content and face validity. As a result, expectations of factor structures are informed by the extant literature. For example, the development of the PICQ-A utilises REBT, which includes four irrational beliefs (see chapter 2). It is, therefore, predicted that a four-factor model of

each irrational belief could manifest. Conversely, climate research was utilised to understand the key influencers of climate development. Therefore, it is also conceivable that there may be a three-factor model consisting of coach, teammate, and environment. The role of EFA is not to confirm these structures exist but to test their existence within the dataset (Finch, 2013).

3.3.3 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) is utilised within scale development to understand the latent model structure of the psychometric (Brown & Moore, 2013). CFA identifies the underlying dimensions or factors and how items load to each factor. In contrast to exploratory factor analysis (EFA), the factors are known based on the results of EFA and then explored and confirmed within CFA. However, CFA can be used in an exploratory manner to examine possible latent structures (see Turner et al., 2021). As previously mentioned, factor analysis can be seen as a continuum which gives license to use CFA in an exploratory nature (Finch, 2013).

CFA requires an understanding of the factor models and an idea of the number of observed variables which load onto each factor (Finch, 2013). EFA established empirical data using underlying theory and that is critical for effective CFA and appropriate model fit (Finch, 2013). In previous research, there may have been more concrete a priori information to be more definitive with the possible factor structures within CFA. For example, within the development of the irrational performance belief inventory (iPBI: Turner et al., 2016) the items were generated based solely on the four irrational beliefs. Therefore, the logical factor structure would be to use the four irrational beliefs (e.g., Turner et al., 2016). However, this factor structure was reinforced by the statistical data from the CFA. The method of utilising CFA following EFA (such as in study 2) is integral to the scale development process in

which the aim was to validate the factor structures (Boateng et al., 2018). This is also a process which is widely utilised within the extant scale development literature (e.g., DeVellis & Thorpe, 2021; Ntoumanis & Vazou, 2005; Turner et al., 2021).

3.3.4 Criterion Validity

Criterion validity is the relationship between the performance of one psychometric test and another psychometric test (Boateng et al., 2018). There are two types of criterion validity: concurrent validity and predictive validity. Concurrent validity is the extent to which one psychometric test relates testing similar concepts, which has already gone through rigorous reliability and validity testing. Previous research has used this methodology. For example, when developing the irrational performance beliefs inventory (iPBI) Turner et al., 2016 utilised the shortened general attitudes and beliefs scale (SGABS; Lindner et al., 1999). The SGABS is a measure of irrational beliefs and, therefore, is a logical measure to understand whether the iPBI was measure a similar concept (i.e., concurrent validity). Similarly, the developers of the perfectionistic climate questionnaire for coaches (PCQ-S; Grugan, et al., 2021) utilised the performance perfectionism for sport scale (PPS-S; Hill et al., 2016). Again, the PPS-S measured a similar construct to the PCQ-S and tests individuals' perfectionism within a sport context. This particular study adopted a similar process by exploring concurrent validity with related constructs. However, there are no current measures which explicitly measures irrational beliefs of others (i.e., perception of irrational beliefs) within a sport environment. Therefore, there is a need for concurrent validity for the PICQ-A to use questionnaires which measure elements of the similar constructs, such as the iPBI, the PCQ-S and the coach created empowering and disempowering motivational climate questionnaire (EDMCQ-C; Appleton et al., 2016).

Predictive validity is the extent to which one psychometric test could predict the responses from another psychometrics (Boateng et al., 2018). In the development of the iPBI, the authors utilised the state-trait personality inventory (STPI; Spielberger, 1979) to test the predictive nature of the iPBI. Within REBT, unhelpful emotional disturbance may feature negative emotional responses, such as anger, depression, and anxiety. The STPI measures the individual differences within unhelpful negative emotions. Given the link between irrational beliefs and unhelpful negative emotions (e.g., anxiety, depression, anger, guilt), it is logical to assume that if one has irrational performance beliefs then they may experience higher levels of unhelpful negative emotions. Similarly, within motivational climate questionnaire development, the perceived motivational climate in sport questionnaire (PMCSQ) authors utilised measures of sport anxiety and team satisfaction in order to test predictive validity (Walling et al., 1993). As was the case with the iPBI, Walling and colleagues (1993) based their choices on previous research which suggested motivation influences athletes experience of anxiety during competition, and satisfaction of a team. Therefore, the use of measures of these two concepts creates a logical link to suggest the PMCSQ could predict anxiety and low satisfaction. Within the present PhD, there are numerous possibilities which may be predicted by an irrational climate as these could be predicated by irrational beliefs, motivational climate, and perfectionistic climate research. Therefore, the reasonable assumption would be that the PICQ-A could predict unhelpful negative emotions (e.g., anxiety), similar to the iPBI and PMCSQ.

3.3.5 Test-Retest Reliability

The correlation of scores of a scale being administered at two different time points is known as test-retest reliability. The correlation estimates the shared variance between the obtained scores from time 1 and time 2, and the true score of the latent variable (Devillis,

2017). Essentially, test-retest reliability explores the repeatability of a scale (Boateng et al., 2018). Test re-test reliability is an important part of scale development as it offers an opportunity to show that the scale is reliable across different time points and is not situation-specific (Law, 2004). If scores did not correlate between time 1 and time 2, this would suggest the scale was situation dependent and not reliable. However, the converse is also true, if scores from time 1 and time 2 correlate highly, then it suggests the scale is stable and consistent across time. For example, within the development of the irrational performance beliefs inventory (iPBI), Turner et al (2017) tested the iPBI across three time points in order to achieve greater test-retest reliability. However, guidelines propose a delay of several days as the minimum to establish good test-retest reliability (Law, 2004).

Table 3.3
Demographics for all participants involved in scale development.

		Study 1	Study 2	Study 3	Study 4	Study 5	Total
N		19	439	231	206	246	1141
*M*age (SD)		29.26 (8.83)	27.61 (4.71)	27.88 (4.39)	27.99 (4.49)	27.81 (4.25)	27.81 (4.46)
Gender	Male	5	250	146	148	162	706
	Female	14	185	77	57	84	403
	Non-binary	-	3	2	1	0	6
No. of sports represented		-	44	29	22	26	121
Time spent in sport Mean (SD)		-	10.10 (7.13)	9.92 (7.06)	9.97 (6.67)	9.48 (7.25)	9.87 (7.03)
Type of Sport	Individual	-	92	39	60	72	263
	Team		347	192	146	174	859

3.4 Study 1: Item Generation

3.4.1 Introduction

Item generation is an integral part of scale development because it defines the initial context for the measure (DeVeillis, 2017). The purpose of study 1 was initially to establish an item pool which showed good face and content validity. Therefore, this section consists of an exploration of the comprehensive procedures used to develop the initial item pool and methods of item refinement prior to moving to the next step of scale development. The present study follows the process of Turner et al (2021) closely.

3.4.2 Methods

3.4.2.1 Participants. Stage 1 - The research team consisted of one HCPC registered Sport and Exercise Psychologist, two BASES Accredited Chartered Scientists (Psychology), and a Psychology PhD student. Stage 2 - The expert panel consisted of four participants who had all completed both the primary and advanced certificate in REBT. Two participants were female and two were male (M_{age} = 29.60, SD = 7.23). Stage 3 - Seven novices, with no prior knowledge of REBT or particular sporting knowledge were recruited from a UK university. The novices were also not competing in competitive sport with a coach at the time of the research. The benefit for not having any prior knowledge allows for responses which are based only on the information given by the research team. All seven participants were female (M_{age} = 26.71 years, SD = 6.85). Stage 4 - Six coaches were included in the intended user panel. Four males and two females (M_{age} = 31.573 years, SD = 11.76) coached across soccer, basketball, and canoeing. On average, the coaches had 12.5 years of coaching experience, with the least experienced being 5 years and the most experienced being 21 years. One soccer coach was also a competing athlete. One athlete was also recruited to evaluate the items. They were an 18-year-old canoeist. The reason for using coaches when the intended user

would be athletes was to create posterity in the questions. It was important to create face validity with the items and coaches would be best placed to know what a coach may say to athletes, as well as athletes knowing what they had heard from coaches. Stage 5 - The research team from stage 1 completed the final refinement in stage 5. There are no current concrete guidelines for the participant numbers for each panel (i.e., expert, novice, intended user), however 4-7 participants appears to be appropriate and consistent, based on scale development research (see. Boateng et al, 2018; Turner et al, 2020).

3.4.2.2 Materials. At each stage, items were stored on a Microsoft Excel spreadsheet and distributed via email to each expert, novice, or intended user. Participants returned the completed Excel spreadsheet to the primary researcher on completion, again via email.

3.4.2.3 Procedure. Content and face validity were established through testing the understanding from three factions: experts, novices, and intended users. An initial item pool was thorough and extensive, allowing for the likelihood of the underrepresentation of a particular element of theory (e.g., an irrational belief or key stakeholder). The item stems and individual items were amended or removed based on their levels of accuracy, clarity or lacking face validity.

Stage 1. In order to establish a list of items suitable to measure irrational climates, the research team developed a considerable number of items, based on REBT and key stakeholder research. Initially, the research team devised a number of item stems (e.g., "The coach says things like…"; "It seems my teammates think that…"; "Within my performance environment…"). This process was extensive, and the research team were very thorough in the generation of stems, making sure there was a balanced distribution of key stakeholders and irrational beliefs being represented. Additionally, the research team focused on incorporating both implicit and explicit signalling (e.g., "I get the sense that…"; "My coach

says…", respectively). The next step was to develop questions based on the underlying theory, REBT. Therefore, there were items related to the four irrational beliefs, demandingness (e.g., "My coach says we must perform well"), awfulizing (e.g., "My teammates say that failing is the end of the world"), frustration intolerance (e.g., "People in my performance environment cannot stand losing"), and global evaluation of worth (e.g., "Within my performance environment, I am rubbish when I make a mistake"). Originally, ten questions were developed per irrational belief and then added the stem to the beginning of these questions and generated a total of 1120 items. Initially, the environment dimension incorporated both the effect of the environment as a whole, and key stakeholders other than the coach and teammates (e.g., performance director, physiotherapist, strength and conditioning, among others). As a result of this the environment dimension had a considerable amount more stems and items (see table 3.4).

Table 3.4

Shows the distribution of number of item stems and number of items across the REBT and key stakeholder dimensions.

	Number of stems	Demandingness	Awfulizing	Frustration Intolerance	Global Evaluation of Worth	Total
Coach	7	70	70	70	70	280
Teammate	7	70	70	70	70	280
Environment	14	140	140	140	140	560
Total	28	280	280	280	280	1120

Following the initial item generation, the research team began to refine the number of items by removing entire stems which were deemed not to be appropriate, either because of the semantic complexity, the lack of pertinence to applied settings, or similarity to other

stems. For example, “In my performance environment, people tell me…”, and “When I think about my teammates…” were removed as it was felt they were too closely related to other stems that offered better syntax, such as “People in my performance environment…”. Once the stems were removed, the focus turned to individual questions which again were refined and excluded due to semantic and syntactic factors (Fry, 1977). In particular, shorter words and sentences, with limited polysyllabic words and excluded multiple negatives within the items were selected (DeVellis & Thorpe, 2021). For example, an item such as “My performance environment gives off the impression that it is awful to not behave as expected” could be considered ‘wordy’ and therefore, likely to disengage the audience and potentially impact the results (Sinclair et al., 2020). Refinement and exclusion involved an iterative process across three separate periods of review. The initial review where the focus was removal of item stems, along with some individual items resulted in a total of 742 items being removed. Following this review, the items were categorised into situations (activating events) which feed into the irrational beliefs. For example, failure, performing well or poorly, expectations of others, perfection, losing, making mistakes, unfairness, sense of worth, and feelings of being let down. At this time, items were refined based on the same features previously mentioned (e.g., syntax, length, similarity) but mostly focused on the relevance to applied settings. Following the second review 197 items were removed leaving 108 items. The third review was a final evaluation of items to make any final reductions. As a result of this review 18 items were moved, leaving 87 items. At this stage, a single item was added to create parity across all irrational beliefs and key stakeholders. This resulted in a list of 88 items (see appendix 3.4.1).

Stage 2. The purpose of stage 2 was to establish the accuracy and clarity of the items generated in stage 1. In order to do this, an Excel spreadsheet consisting of the 88 items were sent via email to seven HCPC registered Sport and Exercise Psychologists who have

completed the primary and advanced certificate in REBT. These experts were asked to identify the irrational belief of each item to establish face and content validity. They were also asked to rate, from 0 (not at all) to 10 (extremely), the accuracy and clarity of each item (see Grugan et al., 2021; DeVellis, 2017). Feedback from the expert sample suggested that some items did not comply with the global nature of the global evaluation of human worth. More specifically, there was a disparity between questions relating to self-depreciation, (e.g., "I am an Idiot"), and contingent self-worth (e.g., "I am only worthwhile if I win"). In the former, the person is self-depreciative regardless of the situation, and in the latter, the person's worth is dependent on something, in this example, winning. For example, item 86 ("My performance environment makes it seem as if you are a bad person when you let people down") was deemed not to reference the global nature of the belief, and therefore was changed to reflect this ("My performance environment makes it seem as if you are a completely bad person when you let people down"). Here, the addition of *completely* emphasised the global nature of the belief and insinuates that you are totally bad as a person, rather than just a bad sportsperson. Therefore, five items were reworded to increase the consistency with relation to REBT theory. No items were removed at this stage. However, numerous items were reviewed as a result of expert feedback (items 17, 18, 19, 20, 22, 25, 26, 45, 46, 47, 48, 52, 59, 62, 76, 78, 80, 81, 82, 83, 84, 86, 87, 90, 91). Of these items, 5 were changed to conform with the underlying theory (items 45, 46, 80, 81, 86). These reworded items were then reviewed again by one member of the expert panel, who had previously questioned the items' clarity or accuracy, for further feedback on the changes. No further changes were made. The remaining 20 items (items 17, 18, 19, 20, 22, 25, 26, 47, 48, 52, 59, 62, 76, 78, 82, 83, 84, 87, 90, 91) were not changed due to the potential for reducing the integrity of the item with respect to the items being applied to a sporting context and reflected the applied setting.

Stage 3. A novice panel was then utilised to establish whether the items made sense to a lay audience, who had no previous understanding of REBT or irrational beliefs. Like experts in stage 2, the novice panel was asked to identify which irrational belief each item related to and rate the items on their accuracy and clarity, to establish content validity, with a cohort who do not have prior knowledge of the theory. The novices were given a definition for each irrational belief, which they could refer to when selecting which irrational belief the item referred to. Novices coded sixteen global evaluation of worth (GEW) items as frustration intolerance, which, along with the feedback from experts, prompted the changes in sixteen GEW items (as mentioned in stage 2). In addition to this, an amendment of the definition of GEW was given to novices, and were asked about components of GEW, as it may have been possible that the items were not the sole reason for the confusion. Therefore, the definition was reworded from being about GEW to being about aspects of GEW, depreciation and contingent self-worth. The original definition was "Human beings can be rated, and some people are worthless or less valuable than others" and was changed to depreciation: "A negative evaluation of the whole person" and contingent self-worth "A person's value or worth is dependent on their actions or the outcome of their actions". The same novice sample were asked to go through the same process again but this time only with the global evaluation of worth items (amended as per expert feedback) and indicate whether the items related to contingent self-worth or depreciation. Responses indicated that follow-up items were more consistent and showed greater levels of clarity and accuracy. No items were amended or deleted from the novice stage.

Table 3.5.1
Mean scores from novice and expert panels for number of correct scores, accuracy and clarity of PICQ-A items

	Novice	Expert
Correct Irrational Belief	4.41*	4.92**
Accuracy	8.24	8.84
Clarity	8.28	8.77

N.B. * mean from 7 participants, **mean score from 5 participants

Table 3.5.2
Mean scores from intended user panel for relevance clarity, and comprehension

	Intended User
Relevance	8.10
Clarity	7.66
Comprehension	7.86

Stage 4. Five coaches (one of whom was an athlete and coach) were asked to identify whether the items were relevant to a sporting context, clear, and comprehensible. The questions were modified from stage 2 and 3 to be more specific for coaches to gain more specific understanding of the relevance of the items to coaches, athletes, and elite sporting contexts. Then coaches were given the opportunity to make comments based on what they thought about the items. For example, one coach questioned what failure meant as it may be different for each individual or team, dependant on their goals. They felt that winning or losing would be a better judgement based on failure. However, failure within this thesis was referring to the achievement (or not) of a goal. These goals may not be outcome specific (e.g., winning or losing). Both quantitative and qualitative feedback from this coaching sample suggested that some of the items lacked clarity. As a result, items 26, 39, 48, 52, 62, 68, 71, and 82 were amended to improve comprehension. Following this, an additional coach was asked to rate the items in the same manner as the initial 5 coaches. A new coach was selected to get the views of a coach who had not previous seen the items and, therefore, not

biased in anyway by previously seeing the items. Following feedback from this coach, item 45 (“My teammates view people as valuable only when they perform well”) was amended to be more suited to the sporting context. An athlete from an individual sport was also asked to complete the same process to understand whether the items made sense in a sporting environment from an athlete perspective (the intended user). There was also a concern from the athlete that the items used rhetoric from team sports specifically, and our aim was to develop a psychometric which could be used across any sport environment whether playing as part of a team or competing individually. Part of the concern was due to the research team developing a sub-section on teammates. It was unsure as to whether athletes in individual sports would characterise their training partners or other individual athletes within their training environment, as teammates. As a result of the feedback from the athlete, items 50 and 45 were removed and item 39 was reworded to better incorporate individual sports (item 45 reworded from “My teammates cannot bear underperforming” to “On the field of play, my teammates cannot bear underperforming”.

Stage 5. In the final stage of item generation, the research team took a final critical view of the item wording and evaluated their relevance. The main focus of this process was to attempt to utilise terminology which would be more suitable for both individual and team sports and, therefore, making it suitable for sport in general rather than just team sports. As a result, four items were amended (e.g., items 10, 11, 61 and 69), three were deleted (items 50, 78, and 80), and two were added (Item 90 “My performance environment gives off the impression that if you let people down then you are a bad person”, and item 91 “A person's worth is dependent on their level of success in my performance environment”) in order to give a more generalised negative description of success. Other items focus on making mistakes, failure, and underperforming. Therefore, it was necessary to include words associated with achievement, such as success. These changes resulted in an 88-item PICQ-A.

3.4.3 Conclusion. Item generation initially produced 1120 items and, through expert, novice, and intended user feedback, resulted in 88 items. The process undertaken to get to this point has been utilised by other researchers who have followed a similar process (e.g., Turner et al., 2016). The item generation process manufactured an item pool with excellent initial face and content validity. However, before the PICQ-A could be a truly valid and reliable measure, the items must first be scrutinised statistically. The first stage of this is to explore the factor structures within the items.

3.5 Study 2: Exploratory Factor Analysis

3.5.1 Introduction

Exploratory factor analysis (EFA) explores the latent structures of a pool of items (DeVellis, 2017). Within study 2, methods were used to illicit the underlying factor structures of the PICQ-A and further item reduction methods, based on statistical analyses.

3.5.2 Methods

3.5.2.1 Participants. Participants were recruited using multiple approaches. The research team utilised their network of practitioners and athletes through convenience sampling, adverts were posted on social media, and the survey participant database, Prolific, was also used to recruit a sufficient number of participants. Prolific allowed us to be specific with our selection criteria. For example, the survey targeted members of Prolific aged 18-35 who participated in various sports within the UK and USA. Prolific, in the same way as conventional data collection, provided the ability to include selection criteria. For example, it was important for participants to be currently participating in sport and also have a coach. Additionally, Prolific allows researchers to block participants who have previously taken part

in the study, and therefore, stopping a participant being recruited more than once. Prolific also allowed for inclusion of attention checks to limit the probability of straight line responding (Carpenter, 2018). The attention checks would come in the form of simple questions with obvious answers (e.g., Q - 'What number comes directly after 3? A - 4). Attention checks were included within the data set at regular intervals. For example, an attention check was included every 15 questions and was incorporated within the PICQ-A questions. If participants got the question wrong, it was assumed that they were not actively engaging with the questions and not taking the time needed to answer each question thoroughly enough and therefore were excluded from the study. Ultimately, attention checks enhance scale and construct validity as it keeps participants on task and attempts to make sure their answers are based on the intended construct (Kung et al., 2018). Prolific participants were compensated for their time at a rate of £6 per hour.

Within study 2, recruitment of approximately 450 participants (5 participants per item) were recruited to satisfy the guidelines for good psychometric development (DeVellis & Thorpe, 2021). 877 participants were initially recruited for EFA. However, many participants did not comply with our selection criteria as they did not have a coach (n = 114) or were not actively taking part in sport (n = 207). A further 18 participants were excluded from the study because they did not complete the attention checks on Prolific. Finally, 99 participants were excluded from the study as they had not completed the entire study. Therefore, 439 participants were taken through to data analysis.

The 439 participants included 185 females (42.14%), 250 males (56.95%), 3 identified as non-binary (0.68%), and 1 participant chose not to disclose their gender (0.23%), with an average age of 27.61 years (*SD* = 4.71). 242 (55.13%) participants were from the UK, 146 (33.26%) were from the USA, and 51 (11.62%) were from other countries such as, Ireland, Australia, and Mexico. The participants also covered a range of ethnicities

with 311 (70.85%) being white, 46 (10.48%) black, 41 (9.34%) Asian, 29 Hispanic/Latinx (6.61%), and 12 (2.73%) mixed-raced. The majority of participants competed within either the UK (n = 279; 63.55%) or USA (n = 155; 35.31%). Although a small percentage competed outside of the UK or USA (n = 5; 1.14%), such as Ireland. The participants engaged in a wide range of sports (n = 44). Many of the participants engaged in one sport, with 33% (n=145) of participants engaging in football (soccer). The next highest participated sports were basketball (n=34; 7.75%), netball (n=31; 7.06%), athletics (n=25; 5.70%), and tennis (n=23; 5.24%). 181 (41.23%) participants engaged in other sports such as rugby, cricket, and volleyball. 347 (79.04%) participants played team sports while 92 (20.96%) played an individual sport.

3.5.2.2 Materials. The 88-item version of the PICQ-A, taken forward from study 1, was utilised within study 2. A 5-point likert scale (ranging from strongly disagree to strongly agree) was chosen to be utilised given the use of 5-point likert scales across numerous, valid and reliable climate and irrational belief scales (e.g., Grugan et al., 2021 & Turner et al, 2016, Raedeke & Smith, 2009). The items were randomised in Microsoft Excel to mix up the grouping of items. For example, it was felt that if the participants came across ten questions about the coach's demandingness, then they may get bored and be more likely to straight line respond. Once randomised, the items were then uploaded to Qualtrics.

3.5.2.3 Procedure. Once data were collected in Qualtrics, the data was then downloaded to Microsoft Excel, where any participants who did not comply with the selection criteria were removed from the study. Next, the data was then exported to SPSS. The data was windsorised to screen for any outliers and checks for missing data were completed. No outliers or missing data were found. Factor analysis was then completed on the dataset. If items were found not to comply with the rigorous standards (see below) they were recorded and removed (see tables 3.5 & 3.6), starting with the lowest number from the

factor matrix. Then through an iterative process, items were removed, and the process was then repeated until all items withheld to the standards.

3.5.2.4 Analysis. Exploratory Factor Analysis was completed using SPSS version 29. Each item and factor were subject to rigorous criteria to be retained, which adhered to recommendations from Izquierdo et al. (2014). Maximal Likelihood was used for factor extraction and direct oblimin with Kaiser normalisation used for factor rotation. These methods of factor extraction and rotation are both recommended (Costello & Osbourne, 2009). The decision was made to suppress data below .10 as this would not hold up to our exclusion criteria of 0.5 - 0.6 or above within the factor matrix. Items were removed if they were not 0.6 or above in the second and third EFAs. Items were also removed if there were cross loading and were loaded onto another item at 0.3 or above (Perez & Medrano, 2014). Finally, items were removed if they were found to have communalities above 0.6 (Finch, 2013). Finally, the eigenvalue of the factor was set to 1. Within research, maintaining an eigenvalue of 1 or above is somewhat contentious (Costello & Osbourne, 2009; Izquierdo et al., 2014). The reason for this is because researchers believe it may cause the retention of more factors than necessary. However, the use of this rule is extensive (e.g., Grugan et al., 2021; Turner et al., 2016) and therefore, the decision was made to follow the extant research.

3.5.3 Results

Exploratory factor analysis was completed to understand the factor structure of the items of the PICQ-A. Initially, the factor analysis revealed only one factor, and all items were related to Global Evaluation of Worth (GEW). As this would not represent the entirety of the irrational beliefs, based on REBT, within the questionnaire the decision was made to run further factor analyses and excluded all GEW items. This then allowed the research team focus on the items developed to represent the irrational beliefs demandingness, awfulizing,

and frustration intolerance (DAFI). Once again, items were removed if they did not meet the established criteria until all items were compliant with the standards. On completion of the second EFA, a model with two factors, GEW and DAFI was established.

The items were developed with key influencers of climate in mind. Within the PICQ-A this was the coach, teammates, and the environment itself. The first two-factor model took into account the underlying theory of REBT (i.e., GEW and DAFI). However, there was a possibility of two factor structures. One related to REBT (e.g., GEW and DAFI) and one which related to climate key stakeholders (e.g., coach, teammates, environment). Therefore, a third EFA was completed. The same process was then repeated, items were removed one at a time with the lowest number from the factor matrix, until all items were above 0.6 on the factor matrix.

Prior to performing EFA, the suitability of data for factor analyses were assessed. For EFA to be completed the Kaiser-Meyer-Oklin (KMO) value should exceed 0.6 (Kaiser, 1974), and Bartlett's Test of Sphericity should be statistically significant (Bartlett, 1954). The first EFA was found to be suitable as the KMO was above 0.6 (KMO = 0.99) and Bartlett's Test of Sphericity was found to be statistically significant (x^2 (3828) = 47911.46, $p < .001$). The second EFA was also found to be suitable as KMO was above 0.6 (KMO = 0.98) and Bartlett's Test of Sphericity was found to be statistically significant (x^2 (435) = 13520.66, $p < .001$). Finally, the third EFA was also found to be suitable as KMO was above 0.6 (KMO = 0.99) and Bartlett's Test of Sphericity was found to be statistically significant (x^2 (1653) = 31205.34, $p < .001$). Once the data was found to comply with these criteria, EFAs were completed.

Within the first EFA, 31 items (GEW items only) were taken into EFA, 15 items were removed, leaving a total of 16 items. Within the remaining 15 items, 5 items were related to the coach, 3 were related to teammates, and 7 were related to the performance environment.

Fifty-nine items (DAFI items only) were taken into the second EFA. 32 items were removed, leaving 27 DAFI items remaining. Of those 27 items, 5 were related to the coach, 13 were related to teammates, and 9 were related to the environment. 10 items were related to demandingness, 7 were related to awfulizing, and 10 were related to frustration intolerance.

The third EFA included all 88 items, 62 items were removed, leaving 26 items. Of the 26 items, 7 related to the coach, 11 related to teammates, and 8 related to the environment. GEW was represented by 12 items, 6 items related to demandingness, 3 related to awfulizing, and 5 related to frustration intolerance. Once the third EFA was completed, it was apparent that there were no questions related to coach awfulizing. Therefore, the decision was made to reinstate, statistically, the best 4 coach awfulizing items to take into the next study. Therefore, the total number of items from the third EFA was 31 item

Table 3.6.1

Factor Loadings, Factor Cross-loadings, and communalities of the GEW factor.

Items	Factor-loading	Cross-Loading	Communalities	% Variance	Loading Range	Loading Mean	*a*	Eigen Value	*M* (SD)
Factor 1: GEW				71.53	.40-.81	.56	.99	10.73	2.23 (1.04)
23	0.412	-0.185- -0.373	-						
80	0.399	-0.350- -0.375	-						
63	0.695	0.379	-						
45	0.811	0.332	-						
17	0.515	0.261	-						
24	0.524	0.245	-						
33	0.658	0.162	0.425						
73	0.684	-0.317	0.529						
1	-	-0.760 - 0.100	0.466						
11	-	-0.118 - -0.762	0.471						
10	0.870	0.148	0.493						
20	0.612	-0.125 - -0.127	0.549						
16	0.759	-	0.547						
8	0.631	-0.131	0.564						
22	0.839	-	0.585						

Table 3.6.2

Factor Loadings, Factor Cross-loadings, and communalities of the DAFI factor.

Items	Factor-loading	Cross-Loading	Communalities	% Variance	Loading Range	Loading Mean	*a*	Eigen Value	*M* (SD)
Factor 2: DAFI				72.24	.37-.54	.41	.99	20.23	2.69 (1.13)
48	0.366								
32	0.386								
46	0.391								
49	0.402								
25	0.410								
29	0.406								
54	0.433								
44	0.457								
7	0.463								
57	0.467								
52	0.509								
30	0.519								
13	0.525								
70	0.388								
42	0.443								
37	0.493								
84	0.497								
3	0.543								
21		0.373							
6		0.339							
15		0.335							
9		-	0.443						
5		-	0.485						
4		-	0.500						
2		-	0.520						
62		-	0.511						
12		-	0.516						
18		-	0.526						
14		-	0.576						
53		-	0.585						
19		-	0.593						

Items from model 1 (GEW and DAFI) were different to several items retained in the second factor model (Coach, Teammate, Environment). As a result, the decision was made to amalgamate the items from both models to take forward into study 3. As a result, a 46-item version of the PICQ-A was established (see appendix 3.4.2)

3.5.4 Conclusion

An anomaly against the hypothesis was observed as it was predicted there would be a four-factor model based on the four irrational beliefs of REBT. As a result, analyses resulted in a two-factor model whereby three irrational beliefs (demandingness, awfulizing, and frustration intolerance) combined to establish one factor (DAFI) while the fourth irrational belief, global evaluation of worth, was a standalone factor (GEW). In attempt to explore possible alternative models within the PICQ-A item development, a second factor structure was explored and identified a three-factor model of coach, teammate, and environment, depicting key stakeholders.

There are several possibilities as to why the hypothesised four-factor model did not come to fruition. The most notable explanation comes from the need for awareness of self and others. Within the questions we are asking individuals to think about their experiences and how they may be considered irrational. For example, the items ask whether their coach, teammate or environment think they are worthless if they do not perform. This can be a difficult, more deeply rooted ideal or belief which may take more time to explore and understand from individuals. Therefore, the participants may have under-represented the value-judgements placed on them by those in their performance environments, purely through ignorance rather than conscious processing. It is possible that GEW and DAFI are fundamentally different in nature, and as EFA is unable to consider theory, and is inherently statistically driven and exploratory, it is possible EFA is echoing this fundamental difference. David (2004) proposed

the idea of GEW being more like a schema, implying that GEW is a mental representation of how an individual sees the world, whereas DAFI could be more akin to reactive appraisals of one's surroundings. It is also important to understand that the present PhD thesis is measuring irrational beliefs in a way which has not been explored previously. Therefore, there is a possibility that when perceived irrational beliefs are measured in the context of climate, the structure of irrational beliefs (i.e., four separable core irrational beliefs) is different to when it is measured in the context of personal beliefs. However, further research and study would be needed to test this conjecture.

EFA identified two bifactor models within the PICQ-A. Bifactor because both models hold a general factor (e.g., irrational beliefs) which contributes to variance of all items, with specific factors which are not correlated (e.g., GEW and DAFI; DeVellis, 2017). Given the two models were shown to both reach acceptable levels of the satisfaction, it was decided to explore both models through confirmatory factor analysis (CFA) in an attempt to establish which model would hold up to statistical scrutiny.

3.6 Study 3: Confirmatory Factor Analysis

3.6.1 Introduction

During the EFA process, the previous research around irrational climate is, in essence, non-existent. Therefore, inferences were made based on REBT and motivational and perfectionistic climate research, which was used to understand the concept, making the factor analyses in study 2 exploratory. On completion of EFA, an understanding of the underlying factor models within the PICQ-A was established. These factor models were then examined to establish the pattern of relationships between the model structures and the theory which drives them (DeVellis, 2017). Therefore, the purpose of Study 3 is to explore the two model structures (GEW & DAFI; Coach, teammate, environment (CTE)) with confirmatory factor analysis. One of the stark differences between study 2 and study 3 is the restrictions placed on the dataset to

establish independence or covariance of the factors established in study 2 (Brown & Moore, 2012). An initial CFA was completed to test the factor structures from study 2, the result of this was that both factor models (GEW&DAFI; CTE) were both found to reach satisfactory model fit and there was no statistical reason to focus solely on one model. Therefore, a second CFA with a new cohort of participants was completed to reaffirm the statistical similarities or differences within the two factor models.

3.6.2 Methods

3.6.2.1 Participants - CFA1. A new cohort of 358 participants were recruited using Prolific for this study in order to carry out CFA. Prolific participants were compensated for their time at a rate of £6 per hour. However, 127 participants were excluded from the study because they did not meet study requirements, namely they reported not currently being coached or competing in sport. As a result, 231 (5.25 participants per item) participants were included in the analyses. The cohort consisted of 146 male (63.2%), 77 female (33.3%), and 2 non-binary (.9%) participants, with an average age of 27.88 years (SD = 4.39). 78.8% (182) of participants were from the UK, 7.4% (17) from the USA, and 11.3% (26) of participants were from other countries. A wide range of ethnicities took part in this study, though the majority were white (68.8%), while others were Asian (11.3%), Black (10.4%), mixed race (5.2%), Latina/Hispanic (3%), and other (1%). The most popular sport participants competed in was Football/Soccer (46.8%), with Netball the second most popular (8.7%). Various sports ranged from 1-5.6%, including American Football, Athletics, Basketball, Martial Arts, Rugby, Tennis, and Volleyball. However, 19.5% of participants engaged in a range of other sports, such as Cricket, Hockey, and Swimming. The majority of the participants engaged with sport at an amateur (59.7%), grassroots (18.6%), or semi-professional (14.3%) level. Though the study did include participants who competed at an elite level, either in an academy or talent programme

(3%), as a professional athlete competing nationally (1.3%) or a professional athlete competing internationally (0.4%). The average time spent competing in sport was 9.92 years (SD = 7.06).

3.6.2.2 Participants - CFA 2. A new sample was recruited in order to confirm the factor structure from CFA 1, to avoid championing a model that has an artificially good model fit on the basis of a single dataset (Knekta et al., 2019). Furthermore, a new cohort of participants is needed to be able to effectively accept the findings from the EFAs (Finch, 2013). Therefore, the decision was taken to use the PICQ-A data from studies 4 and 5 to complete a second CFA. Initially, 654 participants were recruited. However, 183 items were discounted for missing data and 19 items were removed as they completed the study too quickly and their results were considered to not have been given the appropriate attention. Therefore, data from 452 participants (10.27 participants per item) were taken forward for analysis. 310 (68.6%) participants were males, 141 (31.2%) were female, and 1 (0.2%) participant identified as non-binary. Most participants were either from the UK (204; 45.1%) or the United States of America (191; 42.3%). Although there were participants who were from other nations (57; 12.7%) such as, Nigeria, Ireland, Italy. The participants were from a range of ethnicities with 262 (58%) being white, 80 (17.7%) being black, 62 (13.7%) were Latinx, 27 (6%) were Asian, 15 (3.3%) were mixed-race, and 6 (1.3%) were of a differing ethnicity, such as native American. Of the participants recruited, the majority played team sports (320; 70.8%), while 132 (29.2%) participated played individual sports. Most of the cohort participated in amateur sport (237; 52.4%), 97 (21.5%) participated in semi-professional or collegiate sport, 87 (19.2%) participated in grassroots sport, 16 (3.5%) participated on elite sport, while the remaining cohort participated in professional sports, 11 (2.4%) nationally and 4 (0.9%) internationally.

3.6.2.3 Materials. The 46-item version of the PICQ-A, taken forward from study 2, was utilised within study 3. The items were randomised in Microsoft Excel in an attempt to mix up the groupings the research team had put the items into. Randomisation of items help to mitigate

against order effects and, therefore, reduce the risk of participants responding similarly to comparable items (Weinstein & Roedigerm 2012). The questions related to coach, teammate or environment (key stakeholder), and either demandingness, awfulizing, frustration intolerance or global evaluation of worth (GEW; irrational beliefs). For example, “For my coach, losing is the worst thing imaginable” (from Coach-DAFI), “My teammates act as if they cannot tolerate failure” (from Teammate-DAFI), and “People in my performance environment act as if your value as a human being is dependent on your performance” (from Environment-GEW).

3.6.2.4 Procedure. Prior to the completion of the CFA, data were analysed to check for any abnormalities within the dataset, such as missing values or outliers. No missing values or outliers were found and, therefore, no participants were removed at this stage. A number of descriptive fit indices were used, following guidelines for goodness of fit indices (Schermelleh-Engel et al., 2003). Specifically, the Root Mean Square Error of Approximation (RMSEA) was used, with a value of less than .08 considered a cut-off for acceptable fit (Hu & Bentler, 1999). The Comparative Fit Index (CFI) with a value of .95 indicative of acceptable fit and Normed Fit Index (NFI) whereby a value of .90 is indicative of acceptable fit (Kaplan, 2000) were also used. In addition, the Tucker Lewis index (TLI) was used, with values between .90 and .95 considered acceptable (e.g., Hu & Bentler, 1999). Whilst some criteria of fit may be loosened without causing substantial problems (e.g., CFI/TLI/RNI greater than .90 is acceptable; Matsunaga, 2010), the present study adhered to the Schermelleh-Engel et al. (2003) acceptable fit criteria. Modification Indices (MI) values higher than 20 related to sub-factor items were inspected (Rossier et al., 2012), and the covarying of subfactor item errors occurred because some subfactor items possessed similarities in item content (Byrne, 2010).

Items which did not comply with the factor loading goodness of fit guidelines were iteratively removed (Schermelleh-Engel et al., 2003), for two reasons. First, at 46-items the PICQ-A is lengthy for the assessment of climate. For example, the perfectionistic climate

questionnaire (PCQ; Hill & Grugan, 2021) has 20-items across five-factors. It is important that the PICQ-A can be administered briefly without burdening respondents with repetitive or superfluous items. Second, although CFA analysis in the current study is by definition confirmatory, there was still an element exploration, with models being tested for both two-factor and three-factor models (Marsh et al., 2020). This study aimed to gain a better understanding of the underlying structure of the PICQ-A and ensure the identification of an appropriate factor structure. To achieve this, the possibility of model modification was not prohibited, allowing assessments of factor loadings and modification indices (MIs) while maintaining the concentricity of the measurement model within the theoretical framework (e.g., Arifin & Yusoff, 2016). Caution was exercised in model modification (Bandalos & Finney, 2010).

3.6.2.5 Analysis. Confirmatory factor analysis (CFA) was completed using IBM AMOS, version 2. CFA was completed on two occasions, one for the two-factor structure of GEW and DAFI and another for the three-factor structure of CTE as both were found to have acceptable model fit. As previously mentioned, there continued to be an element of exploration within the CFAs in an attempt to explore the best factor structure based on statistical evidence. This is not a new concept and other scale development research has followed a similar method of exploratory confirmatory factor analyses (Marsh et al., 2020).

3.6.3 Results

3.6.3.1 CFA 1. Two models were tested, the first based on results from study 2 (EFA), testing the theoretical underpinnings of REBT, GEW and DAFI. The other CFA based on a logical three-factor model of coach, teammates, and environment. Both models were taken forward to bifactor analyses. The two-factor bifactor model was an acceptable fit, $\chi^2 = 722.21$, df = 244, $p < .001$, RMSEA = .09 (90% CI = .09–.100), CFI = .92, NFI = .88, TLI = .90, IFI = .92, RFI = 0.86, standardised RMR = 0.05. The three-factor bifactor model was also an

acceptable fit, χ^2 = 767.86, df = 270, p < .001, RMSEA = .08 (90% CI = .07–.09), CFI = .93, NFI = .89, TLI = .92, IFI = 0.93, RFI = 0.87, standardised RMR = 0.04. From the results, the second model tested (three-factor) appeared to be a stronger fit.

3.6.3.2 CFA 2. The same two models were re-tested with a new, larger cohort. The GEW and DAFI model showed an acceptable fit, χ^2 = 1116.60, df = 308, p < .001, RMSEA = .08 (90% CI = .07–.08), CFI = .92, NFI = .82, TLI = .83, IFI = .92, RFI = 0.87, standardised RMR = 0.05. The three-factor bifactor model was also an acceptable fit, χ^2 = 982.23, df = 265, p < .001, RMSEA = .08 (90% CI = .07–.09), CFI = .92, NFI = .89, TLI = .91, IFI = 0.92, RFI = 0.88, standardised RMR = 0.05. The second CFA showed a similarity between the two models. As a result, the decision was made to take both models forward for further analysis (i.e., predictive, concurrent and test re-test validity).

Many scale development studies have utilised multiple alternative factor structures within their scale development. However, this tends to be within a bifactor model and results in different methods of scoring a scale. For example, Beck's depression inventory (BDI-II; Beck et al., 1996) uses a general factor of overall depression, but can also be scored based on the bases of cognitive, affective, and somatic depression (Ward, 2006). To the knowledge of the author of this PhD, there are no measures, at least within the realm of motivational climate and REBT, which have two different factor structures which can be used to understand different elements of the same concept. Within the PICQ-A the GEW and DAFI factor model reflects the irrational beliefs of those within the performance environment. Whereas the coach, teammate, and environment factor model gave specific direction to the irrationality.

3.6.4 Conclusion

Within study 3 the factor structures were tested to explore the relationships between the factor structures established from study 2 (GEW & DAFI; CTE) and the underlying theory. The results showed that both factor models reached acceptable model fit. There is no statistical

reason to exclude either factor model. Therefore, both models are suitable for further analysis. As a result, the further analysis is required in order to further understand the validity and reliability of the PICQ-A.

Table 3.7.1

Model fit indices for alternative factor models of the PICQ-A from the first CFA process.

Model	c^2	Df	NFI	RFI	IFI	CFI	TLI	RMSEA (90% CI)	SRMR
Model 1 GEW & DAFI	722.211	244	0.878	0.862	0.916	0.915	0.904	0.092 (low .085 High .100)	0.048
Model 3 CTE	767.856	270	0.886	0.873	0.928	0.928	0.920	0.081. (Low 0.73 High 0.89)	0.041

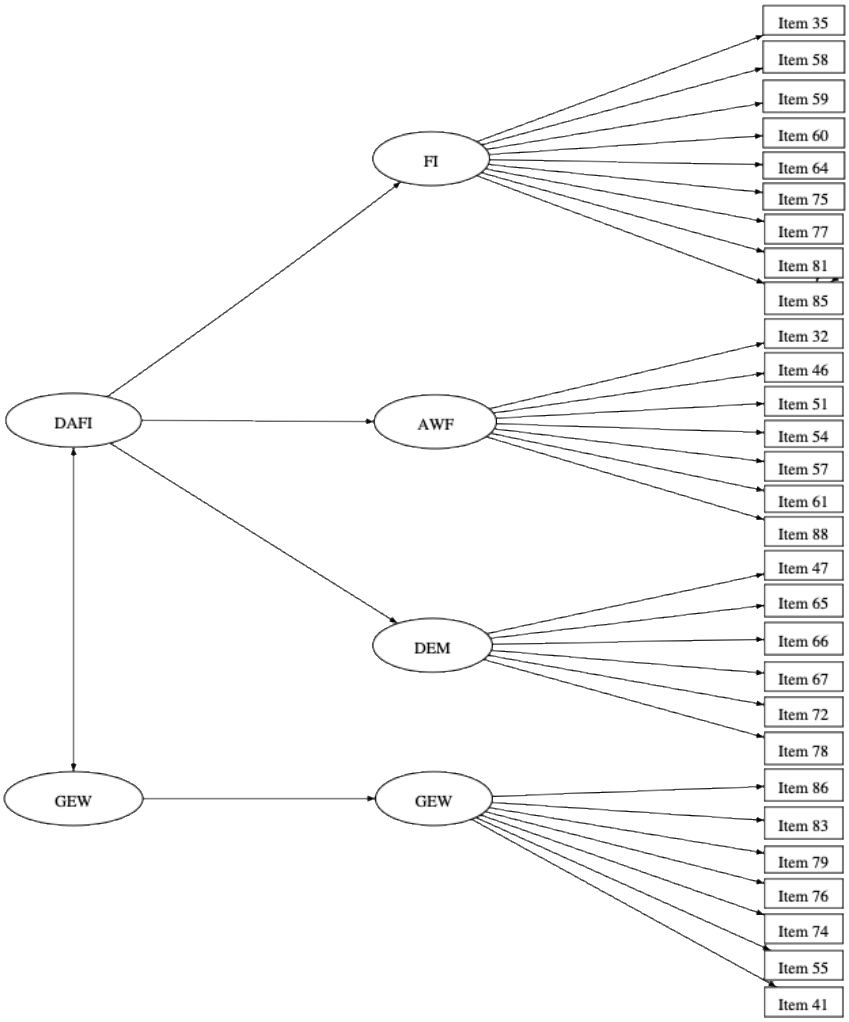
Table 3.7.2

Model fit indices for alternative factor models of the PICQ-A from the second CFA process.

Model	c^2	Df	NFI	RFI	TLI	CFI	TLI	RMSEA (90% CI)	SRMR
Model 1 GEW & DAFI	1116.60	308	0.889	0.873	0.917	0.91	0.917	0.077 (low.072-High.082)	0.049
Model 2 CTE	982.332	265	0.893	0.879	0.920	0.909	0.920	0.078 (low .073-high.083)	0.046

Figure 3.3.1

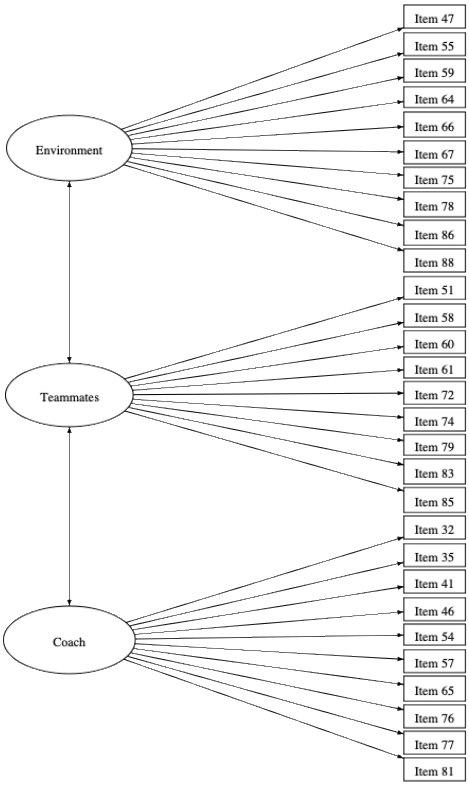
Final CFA Model of 29-item PICQ-A.



Note: DEM = Demandingness, AWF = Awfulizing, FI = Frustration Intolerance, GEW = Global Evaluation of Worth, DAFI = demandingness, awfulizing and frustration intolerance

Figure 3.3.2

Final CFA Model of 29-item PICQ-A



3.7 Study 4: Predictive Validity

3.7.1 Introduction

Studies 1 to 3 have given an understanding of the underlying factor structures of the PICQ-A. The next stage was to understand the relationship between the PICQ-A and other, already validated, measures which test similar concepts to that of the PICQ-A. This establishes concurrent validity (DeVellis, 2017). Within this section, the methods and procedures used to further validate the PICQ-A were outlined. The purpose of study 4 was to understand the relationship between the PICQ-A and the other psychometrics and understand the similarities between them. It is hypothesised that the PICQ-A will be positively associated with the iPBI, PCQ-S, ABQ, MEQ, and all the subscales within these questionnaires. It is also hypothesised that there will be a positive association between the ego and controlling coaching subscales of

the EDMCQ, the thwarting subscales of the IBQ, and the autocratic subscale of the LSS. Finally, it is hypothesised that there would be a negative associated between PICQ-A and the supportive subscales of the EDMCQ and IBQ, and the ASPS.

3.7.2 Methods

3.7.2.1 Participants. Within the present study 334 participants were recruited, using a combination of the online survey platform, Prolific (n = 311), and convenience sampling (n = 23) athletes within the researchers' network. The screening function on Prolific was used to ensure no participant had taken part in any of the previous 3 studies. 109 participants were excluded from the study as they either did not have a coach, were not currently competing in sport, or did not fully complete the study. 19 Participants were also excluded as it was felt they completed the study too quickly (less than 10 minutes) and, therefore, offered responses which were not considered to be of a high enough standard. Prolific participants were compensated for their time at a rate of £6 per hour. Scale development research has suggested a range from 1, 2, 3, 5, or 10 participants per item ratio with the more participants seen as better within criterion validity testing (Boateng et al, 2018). As a result of this, 206 participants were included in the study, which equated to 7 participants per item which is at the higher end of the participant by items ratio guidelines. The participants had a mean age of 27.99 years (SD = 4.49). 148 (71.8) of participants were male, 57 (27.7%) were female, and 1 (.05%) preferred not to say. Of the 206 participants, 80 (38.8%) were from the UK 91 (44.2%) were from the USA, and 35 were from other countries (e.g., Ireland) (17%). The cohort was relatively diverse with 117 (56.8%) participants being white, 37 (18%) were black, 24 (11.7%) were Asian, 15 (7.3%) were Latinx or Hispanic, 8 (3.9%) were mixed race, and 4 selected 'other' ethnicities.

With respect to the demographic information specific to sport, 104 (50.5%) participants competed in the UK, 98 (47.6%) competed in the USA, and 4 (1.9%) competed elsewhere. The majority of participants played teams sports (146; 70.9%) over individual sports (60; 29.1%).

There was a range of playing levels competed in from the participants, with the majority competing at an amateur level (98; 47.6%), 56 (27.2%) participants competed at semi-professional or collegiate level. 36 (17.5%) participants competed at grassroots level. Sixteen participants played at either elite (10; 4.9%), professional nationally (3; 1.5%) or professional internationally (3; 1.5%).

3.7.2.2 Procedure. A new cohort of participants were recruited, via the online survey platform Prolific and using the researchers' network, for validity testing. This new cohort comprised of 206 participants who have conformed to the same selection criteria as previous studies. Data collection entailed participants completing a battery of questionnaires related to several different concepts. The participants completed the PICQ-A, Perfectionistic Climate Questionnaire, Empowering and Disempowering Motivational Climate Questionnaire, Interpersonal Beliefs Questionnaire, Irrational Performance Beliefs Questionnaire, Athlete Burnout Questionnaire, Leadership Scale for Sport-Autocratic, Multidimensional Emotion Questionnaire, and the Subjective Performance Scale.

3.7.2.3 Measures. The measures utilised within criterion validity testing were chosen for several reasons. Firstly, they are similar concepts which test irrational beliefs or climate. Secondly, the measures test concepts predicted by irrational beliefs (e.g., burnout, negative emotional responses, impaired performance, among others). The measures selected for predictive validity testing were done so based on their compatibility with irrational climate. In particular, the measures chosen for predictive validity often share similar wording with irrationality (e.g. the leadership in sport scale – autocratic). Alternatively, measures were chosen for their conciseness (e.g., Athlete subjective performance scale).

Perceived Irrational Climate Questionnaire – Athletes (PICQ-A). At this point of the PhD, the PICQ-A was a 29-item questionnaire which measures the perceived irrationality within a performance environment. Items are scored on a 5-point Likert scale (1 – "Strongly Disagree" to 5 – "Strongly Agree"). The PICQ-A has subscales of key stakeholders and

irrational beliefs. The key stakeholder subscale consists of coach, teammate, and environment. The irrational belief subscales consist of global evaluation of worth (GEW) and demandingness, awfulizing, and frustration intolerance (DAFI). Therefore, the subscales are coach-demandingness (e.g., “It seems that my coach thinks we absolutely must not fail”), coach-awfulising (e.g.,” For my coach, losing is the worst thing imaginable”), coach-frustration intolerance (e.g., “My coach finds it unbearable when people perform below expectations”), coach-GEW (e.g., “Is it clear that my coach thinks people are useless if they do not perform to expectations), teammate-demandingness (e.g., “My teammates act like we absolutely must not make mistakes”), teammate-awfulising (e.g., “My teammates act as if it is terrible when we make mistakes”), teammate-frustration intolerance (e.g., “My teammates find it unbearable to perform below expectations”), teammate-GEW (e.g., “My teammates act as if people's value or worth is dependent upon their abilities”), environment-demandingness (e.g., “My performance environment makes it seem as if you must not fail”), environment-awfulising (e.g., When I look at my performance environment, I get the impression that losing is the worst thing imaginable”), environment-frustration intolerance (e.g., “If you do not behave as expected, people in my performance environment find it unbearable”), and environment-GEW (e.g., “My performance environment makes it seems as if losing makes you "a complete loser"”).

Irrational Performance Belief Inventory (iPBI; Turner et al., 2016). To measure participant’s irrational beliefs within the realm of performance, the iPBI (Turner et al., 2016) was included due to it being another irrational belief questionnaire relevant to a sporting context, similar to the PICQ-A. The iPBI is a 28-item questionnaire with four dimensions, demandingness (e.g., “I have to be viewed favourably by people that matter to me”), awfulizing (e.g., “It’s awful if others do not approve of me”), frustration intolerance (e.g., “I can't tolerate it when I fail at something that means a great deal to me”) and depreciation (e.g., “I am a loser if I do not succeed in things that matter to me”). Items are scored on a 5-point likert scale

ranging from 1 (strongly disagree) to 5 (strongly agree). The iPBI has been shown to have good test re-test reliability (r = .57-.76) and validity reached acceptable levels (Turner et al., 2016).

Perfectionistic Climate Questionnaire (PCQ-S; Grugan et al., 2021). The PCQ-S measures how much a climate is considered to propagate perfectionism (Grugan et al., 2021). The PCQ-S is a 20-item questionnaire consisting of five dimensions, expectations (e.g., "The coach expects performances to be perfect at all times."), criticism (e.g., "The coach criticises even the best performances"), control (e.g., "The coach uses his/her position unfairly to try to make performances perfect"), conditional regard (e.g., "The coach is less approving when performances are not perfect"), and anxiousness (e.g., "The coach is anxious about the possibility of even small mistakes when performing"). Items are scored on a 5-point likert scale from 1 (strongly disagree) to 5 (strongly agree). The PCQ-S has good reliability and validity (r = .82-.86; Grugan et al., 2021).

Empowering and Disempowering Motivational Climate Questionnaire (EDMCQ; Appleton et al., 2016). Similarly to the PCQ-S, the EDMCQ (Appleton et al., 2016) was utilised as it measures a comparable concept in terms of climate within sport. This 30 item questionnaire is scored on a five-point likert scale (i.e., 1 = strongly disagree - 5 = strongly agree) and divided into five sub-scales, task-involving (e.g., "My coach encouraged players to try new skills"), autonomy-supportive (e.g., "My coach gave players choices and options"), socially supportive (e.g., "My coach could really be counted on to care, no matter what happened"), ego-involving (e.g., "My coach substituted players when they made a mistake"), and controlling coaching (e.g., "My coach was less friendly with players if they didn't make the effort to see things his/her way"). The EDMCQ was found to have high internal reliability with the alpha being between 0.89 and 0.90 (Appletone et al., 2016).

Interpersonal Behaviours Questionnaire (IBQ; Rocchi et al., 2017). Based on basic psychological needs (see Deci & Ryan, 2012), the IBQ explores the way in which a coach creates an environment which supports or thwarts autonomy, competence, and relatedness. This

is pertinent to the present PhD as it explores the implicit and explicit mechanisms used by a coach to create such an environment. The IBQ is a 24-item questionnaire which is scored on a 7-point likert scale (1 = I don't agree at all to 7 = completely agree). The IBQ also has 6 subscales, autocratic supportive (e.g., "Gives me the freedom to make my own choices"), autocratic thwarting (e.g., "My coach pressures me to do things their way."), competence supportive (e.g., "My coach encourages me to improve my skills."), competence thwarting (e.g., "My coach points out that I will likely fail."), relatedness supportive (e.g., "My coach is interested in what I do.", and relatedness thwarting (e.g., "My coach does not comfort me when I am feeling low."). Rocchi and colleagues (2016) suggest that the IBQ demonstrates reliability and validity to acceptable levels with internal consistency ranging from 0.75 to 0.81.

Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The ABQ measures the frequency and severity of burnout symptoms in athletes (Raedeke & Smith, 2001). The reasons for choosing the ABQ for the present study is to establish whether the PICQ-A could predict the likelihood of burnout within athletes. Previous research has suggested that, within individual REBT sessions, those with higher levels of irrational beliefs, the more likely an athlete is to experience symptoms of burnout (Raedeke & Smith, 2001). Therefore, if a climate is irrational, hypothetically the individuals are more likely to be experiencing burnout symptoms. The ABQ is a 15-item questionnaire and is scored on a 5-point likert scale (i.e., 1 = almost never – 5 = almost always). The ABQ has three subscales, emotional/physical exhaustion (e.g., "I feel so tired from my training that I have trouble finding energy to do other things"), reduced sense of accomplishment (e.g., "I'm accomplishing many worthwhile things in sport"), and sport devolution (e.g., "I don't care as much about my sport performance as I used to"). The ABQ has good reliability with high Cronbach's alpha (ranging from 0.78-0.89; Raedeke & Smith, 2001).

Leader in Sport Scale – Autocratic (LSS-A; Chelladurai & Saleh, 1980). The LSS is a measure of leadership behaviours, and in this case, coaches' behaviours. The decision was

made to only include the autocratic subscale for a similar reason to the inclusion of the ABQ. Therefore, it is proposed that the more a climate is irrational, the more likely the athletes will perceive autocratic behaviours from members of the leadership team. The autocratic subscale consists of five items (e.g., "My coach refuses to compromise a point") which are scored on a five-point likert scale (i.e., 1 = Never – 5 = Always). The internal consistency estimates of the autocratic subscale were found to be very good (Alpha = 0.79; Chelladurai & Saleh, 1980).

Multidimensional Emotion Questionnaire (MEQ; Klonsky et al., 2019). The MEQ measures the frequency (scored from "about once a month" to "more than 3 times a day"), intensity (scored from "very low" to "very high"), duration (scored from "less than 1 minute" to "over 4 hours"), and regulation (scored from "very easy" to "very difficult") of numerous emotions. The full version of the MEQ includes both 'positive' and 'negative' emotions. Within the present study, the research team decided to use just 'negative', or 'unhelpful' emotions (based on REBT rhetoric). The reason for this is similar to the rationale to just use the autocratic subscale of the LSS, the extant research suggests that higher irrational beliefs result in more unhelpful emotions and emotional dysregulation (Klonsky et al., 2019). The emotions which were included within the present study are, sad, afraid, angry, ashamed, anxious. Klonsky and colleagues (2019) found that the MEQ had strong reliability and validity from their analyses (r = .48-.83).

Athletes' Subjective Performance Scale (ASPS; Lee et al., 2023). The ASPS is a measure of perceived performance from the perspective of the athlete. Previous research explores the relationship between irrational beliefs and perceived performance outcomes, with higher irrational beliefs resulting in lower perceived performance. The ASPS was used within the present study to understand the predictability of the PICQ-A on subjective performance outcomes. The ASPS is a six-item scale scored on a 10-point likert scale (i.e., 1 = not at all satisfied – 10 = fully satisfied). The items explore the extent to which the athlete contributed to their performances in the past week (e.g., "To what extent did you generally contribute to the

success of the team/individual performance?"). Research has shown that the reliability of the ASPS has acceptable confidence (r = .88; Lee et al., 2023).

3.7.3 Results

Pearson's correlation coefficients were calculated to examine the relationship between the subscales of the PICQ-A and the subscales of the IPBI, PCQ, EDMCQ, IBQ, ABQ, LSS, MEQ, and ASPS. Reliability estimates were also conducted using both Cronbach's Alpha and McDonald's Omega (see table 3.7). Both alpha and omega indicate similar things but the alpha uses inter-item correlations, whereas omega requires a factor model fit first (Orçan, 2023). There has been research in favour of using alpha (Orçan, 2023) and research for the use of omega (Ravinder & Saraswathi, 2020), though there tends not to much observable difference between the two (Deng & Chen, 2017). Therefore, it was decided to complete both measures of reliability estimates creating a further robust measure.

The IPBI subscales were found to have a small to moderate statistically significant positive correlation with all subscales of the PICQ-A. The IPBI scored highly in reliability with a strong alpha and omega. Additionally, all subscales of the IPBI reached the acceptable limits of Cronbach's alpha and McDonald's Omega, except Depreciation. All the PCQ subscales were shown to have a medium to large positive correlation with all subscales and total for the PICQ-A. The PCQ and all subscales show strong reliability with both alpha and omegas scoring above 0.8. The EDMCQ showed a negative small to medium correlation to all subscales of the PICQ-A. In addition to this, the ego-involving subscale of the EDMCQ showed a positive medium to large correlation with all subscales of the PICQ-A. The EDMCQ showed a high Cronbach's alpha, though a McDonald's omega which does not reach acceptable levels (.7 or above). However, all subscales reached the acceptable levels and showed appropriate levels of reliability.

Within the IBQ, all supportive subscales (autonomy, competence, relatedness, support total) showed small to medium negative correlations between all PICQ-A subscales. All thwarting subscales showed a medium to large positive correlation with all subscales of the PICQ-A. The IBQ was shown to have good reliability with a Cronbach's alphas reaching acceptance levels (above .6). The reduced sense of achievement subscales of the ABQ was shown to have a small to medium positive correlation with all subscales of the PICQ-A. The reliability estimates from both Cronbach's alpha and McDonald's omega were above the required .7 and, therefore, showed strong reliability. The LSS showed a medium to large positive correlation with all subscales of the PICQ-A. LSS showed good reliability with both Cronbach's alpha and McDonald's omega reaching required levels. The MEQ data showed a small positive correlation between all subscales within the MEQ and PICQ-A. The MEQ showed good reliability with both Cronbach's alpha and McDonald's omega reaching required levels. The ASPS data showed a small negative correlation between the all subscales within the ASPS and PICQ-A. However, the correlation between the current week and coach was non-significant. The ASPS showed good reliability with both Cronbach's alpha and McDonald's omega reaching required levels.

3.7.4 Conclusion

Testing of criterion was largely successful. Testing the PICQ-A against psychometrics measuring similar constructs to the PICQ-A (e.g., iPBI, PCQ-S, EDMCQ-C) resulted in generating good concurrent validity, as predicted. The measures used to explore the correlation between the PICQ-A and the possible consequences of an irrational climate (e.g., negative emotional response, autocratic coach behaviours, reduced performance, and thwarting behaviours, among others) suggested that being involved in an irrational climate is associated with negative and maladaptive consequences, such as negative emotions, burnout, decreased perceived performance, and negative coach behaviours, as hypothesised. Alternatively, a more

rational climate is associated with more rational and productive emotional and behavioural responses (e.g., helpful emotional response, higher performance ratings, supportive behaviours from others, and among others) which was, again, predicted.

Table 3.8

Shows descriptive statistics, bivariate correlations, and reliability estimates.

Questionnaire	M (*SD*)	α	ω	Coach	Environment	Teammate	GEW	DAFI	Total
				r	*r*	*r*	*r*	*r*	*r*
PICQ-A		.968	.968						
Coach	2.544 (.975)	.936	.936		.843***	.781***	.789***	.929***	.904/.930
Environment	2.781 (.894)	.909	.909	.843***		.886***	.816***	.963***	.937/.962
Teammate	2.666 (.918)	.920	.920	.781***	.886***		.892***	.911***	.948/.940
GEW	2.350 (.891)	.893	.891	.789***	.816***	.892***		.807***	.950/.881
DAFI	2.758 (.907)	.963	.962	.929***	.963***	.911***	.807***		.951/.990
iPBI		.920	.909						
Demandingness	3.488 (.702)	.795	.788	.196**	.221***	.240***	.172*	.234***	.231***
Low Frustration Tolerance	3.488 (.741)	.713	.716	.293***	.293***	.280***	.258***	.301***	.306***
Awfulizing	3.196 (.694)	.765	.713	.353***	.317***	.343***	.331***	.346***	.359***
Depreciation	3.304 (.586)	.649	.571	.352***	.359***	.357***	.326***	.372***	.377***
PCQ		.946	.943						
Expectation	2.697 (1.067)	.929	.929	.613***	.570***	.570***	.569***	.595***	.609***
Criticism	2.795 (1.021)	.860	.859	.591***	.585***	.585***	.535***	.607***	.610***
Control	2.208 (.996)	.868	.876	.526***	.478***	.478***	.529***	.507***	.528***
Conditional Regard	3.176 (1.046)	.865	.863	.628***	.618***	.618***	.473***	.659***	.639***
Anxiousness	2.726 (.974)	.821	.817	.690***	.657***	.657***	.567***	.692***	.671***
EDMCQ		.801	.587						
Task Involving	3.450 (.426)	.893	.891	-.318 ***	-.286***	-.352***	-.415***	-.305***	-.338***
Autonomous Supportive	3.470 (.456)	.792	.789	-.409***	-.344***	-.344***	-.372***	-.392***	-.399***
Socially Supportive	3.646 (.527)	.811	.815	-.453***	-.389***	-.389***	-.407***	-.424***	-.433***
Ego Involving	3.569 (.528)	.844	.845	.565***	.496***	.496***	.482***	.542***	.547***
Controlling Coaching	3.717 (.453)	.856	.855	.653***	.568***	.568***	.558***	.617***	.625***
IBQ		.696							
Autonomy Supportive	3.939 (.613)	.825	.827	-.464***	-.419***	-.419***	-.447***	-.449***	-.461***
Autonomy Thwarting	2.725 (.951)	.859	.857	.530***	.545***	.545***	.536***	.538***	.555***

Competence Supportive	4.216 (.666)	.862	.864	-.357***	-.287***	-.287***	-.420***	-.300***	-338***
Competence Thwarting	1.982 (.940)	.870	.870	.397***	.336***	.336***	.466***	.352***	.390***
Relatedness Supportive	3.810 (.755)	.859	.858	-.346***	-.288***	-.288***	-.329***	-.311***	-.324***
Relatedness Thwarting	2.102 (.863)	.882	.882	.500***	.442***	.442***	.539***	.469***	.499***
Support	3.988 (.571)	.904	.901	-.457***	-.389***	-.389***	-.468***	-.414***	-.439***
Thwarting	2.269 (.765)	.888	.881	.570***	.529***	.529***	.616***	.544***	.577***
ABQ		.892	.885						
RSoA	2.311 (.717)	.764	.769	.237***	.270***	.285***	.352***	.352***	.279***
Devaluation	2.322 (.815)	.782	.781	.324***	.344***	.344***	.363***	.363***	.329***
Exhaustion	2.420 (.910)	.876	.870	.272***	.319***	.319***	.392***	.392***	.382***
LSS		.816	.819						
Total - Autocratic	2.304 (.848)	.816	.819	.507***	.490***	.500***	.540***	.505***	.529***
MEQ		.917	.913						
Frequency	1.895 (.725)	.808	.815	.267***	.229***	.261***	.255***	.260***	.268***
Intensity	2.419 (.707)	.726	.725	.220**	.192**	.217**	.179*	.221**	.223**
Duration	2.423 (.721)	.767	.768	.171*	.148*	.175*	.145*	.173*	.175*
Regulation	2.574 (.741)	.805	.803	.220**	.203**	.235***	.187**	.231***	.232***
ASPS									
Current Week	7.160 (.1.270)	.867	.871	-.115	-.142*	-.168*	-.123	-.149*	-.150*
General	7.155 (1.303)	.891	.891	-.200**	-.217**	-.258***	-.238***	-.229***	-.238***

Note: *p <.05*, p <.01**, p <.001***, GEW = Global Evaluation of Worth, DAFI = demandingness, awfulising, and frustration intolerance, PICQ-A = Perceived Irrational Climate Questionnaire for Athletes, iPBI = Irrational Performance Belief Inventory, PCQ-S = Perfectionistic Climate Questionnaire for Sport, EDMCQ-C = Empowering and Disempowering Motivational Climate Questionnaire for Coaches, IBQ = Interpersonal Beliefs Questionnaire, ABQ = Athlete Burnout Questionnaire, LSS = Leadership in Sport Scale, MEQ = Multidimensional Emotion Questionnaire, ASPS = Athlete Subjective Performance Scale.

3.8 Study 5: Test-Retest Reliability

3.8.1 Introduction

Test-retest reliability occurs when a scale is administered to the same sample on two or more occasions and elicits similar results (Rousson et al., 2002). The purpose of this is to examine the stability of the scale across different time points, with the aim of the scale being highly stable and less changeable across time. The more stable the scale, the more reliable the scale is, and suggests that change which occurs within the scores from the scale is not due to the situation. Specifically, for the PICQ-A, stability is important to allow practitioners to understand if their intervention to reduce irrational beliefs within the climate has been successful. It is not expected that change would occur without a variable being manipulated. For example, within an intervention study you may test a cohort for performance anxiety, perform a psychological intervention to improve performance anxiety, and then retest the cohort to explore any changes in scale scores. Since the scale is being administered without any manipulation of variables, no changes in scale scores are expected, resulting in higher correlations. If there were to be a change from time 1 to time 2, and lower correlations, the conclusion could be made that the PICQ-A did not have test-retest reliability.

3.8.2 Methods

3.8.2.1 Participants. A new cohort of participants for test-retest reliability were recruited using the online survey platform, Prolific. Prolific participants were compensated for their time at a rate of £6 per hour. Initially, 264 participants were recruited, 97 participants were removed from the study for not meeting the selection criteria (i.e., not currently competing or not having a coach). Participants were also removed based on continued outlier scores, as this was indicative of straight-line responses. Retention rate from time 1 to time 2 was 79.17%. As a result, 112 participants were included within the data analysis. The participants included 66 males (58.9%) and 46 females (41.1%) and had a mean age of 27.8

(SD = 4.25) years. 59.8% (n = 67) of the participants were from Britain, 33% (n = 37) were from the United States of America, and 7.1% (n = 8) were from other countries, such as Ireland. The majority of the cohort were white (n = 67; 59.8%), with the rest of the cohort being black (n = 21; 18.8%), Asian (n = 16; 14.3%), mixed-race (n = 5; 4.5%), or Hispanic (n = 3; 2.7%). With respect to sporting specific demographic information, the majority of the cohort participated in team sports (n = 78; 69.6%) while the minority engaged in individual sports (n = 34; 30.4%). There was a variety of abilities within the cohort with the majority engaging in amateur sports (n = 63; 56.3%). The other participants engage in grassroots (n = 22; 19.6%), semi-professional or collegiate (n = 21; 18.8%), professional national (n = 3; 2.7%), elite (n = 3; 2.7%) sports. Finally, the average time spent in their sport was 9.48 (SD = 7.25) years.

3.8.2.2 Procedure. Prolific participants were taken to Qualtrics to complete the PICQ-A in the first instance. Prolific allows for recruitment of the same participants. As a result, the same participants were recruited two weeks later to again complete the PICQ-A for a second time (Polit, 2014; Turner et al., 2021). The reason for the two-week delay between time 1 and time 2 was two-fold. Firstly, to give sufficient time for any practice effects to subside. Secondly, the time between time 1 and time 2 not being too long was essential as participants may have changed teams or performance environments, which may have affected the data. It was important for the test-retest that the same conditions were maintained as closely as possible.

Once data collection had been completed, the data was exported from Qualtrics to SPSS (version 28). Prior to reliability testing occurred, the data was subjected to tests of outlier and missing cases. No missing cases or outliers were identified within the test-retest data. Following this, Pearson's product-moment correlations were completed on all established factors (from study 3). Therefore, correlations were explored between GEW, DAFI, Coach, Teammate, and environment subscales from time 1 to time 2. Reliability was tested on several parameters. For instance, intra-class correlation (ICC) at .80 with a 95% confidence interval at

.70 to .90 (Giraudeau & Mary, 2001) and Pearson's correlation (Turner et al., 2021). ICC and confidence levels provide reliability values at moderate (.5 - .75), good (.75 - .9), and excellent (above .9; Koo & Li, 2016), while a Pearson's coefficient above .7 represented test re-test reliability.

3.8.3 Results

Pearson's product-moment correlation showed that all subscales were highly correlated from time 1 to time 2 and were found to be statistically significant (see tables 3.9.1 & 3.9.2). Therefore, the subscales GEW, DAFI, coach, teammate, and environment showed strong reliability across two time points.

Table 3.9.1
Intraclass correlation, reliability and correlation from test-retest analysis

	Intraclass Correlation	95% Confidence Level		Time 1		Time 2		Pearson's Correlation
		Lower Bound	Upper Bound	α	ω	α	ω	
Coach	.761	.669	.829	.944	.944	.955	.955	.767*
Teammate	.762	.672	.830	.941	.941	.947	.947	.762*
Environment	.823	.753	.875	.930	.930	.935	.935	.824*
GEW	.793	.713	.853	.916	.917	.924	.922	.794*
DAFI	.834	.768	.883	.969	.969	.969	.968	.835*

Note: * = $p < .05$, α = Cronbach's Alpha, ω = McDonald's Omega, GEW=Global Evaluation of Worth, DAFI = demandingness, awfulizing, frustration intolernace

Table 3.9.2
Means, standard devastations, alpha, and omega for test-retest reliability.

	Coach			Teammate			Environment			GEW			DAFI		
	M (SD)	α	ω	M (SD)	α	ω	M (SD)	α	ω	M (SD)	α	ω	M (SD)	α	ω
Time 1	2.577 (1.028)	.944	.944	2.895 (.996)	.941	.941	2.935 (.981)	.930	.930	2.589 (.988)	.916	.917	2.877 (.972)	.968	.968
Time 2	2.716 (1.092)	.955	.955	2.870 (1.039)	.947	.947	2.997 (.996)	.935	.935	2.619 (1.052)	.924	.922	2.946 (.982)	.968	.986

Note: M(SD) = Mean (standard deviations), α = Cronbach's Alpha, ω = McDonald's Omega

Table 3.9.3

Final version of the Perceived Irrational Climate Questionnaire for Athletes (PICQ-A) with instructions for participants

This survey is about your perceptions of your coach, teammates, and the performance environment.
In this survey, some of the statements use the term “performance environment”. This refers to the **physical setting** you are in when you engage in your sport. For example, this could include time spent training, competing, socialising, or any other activity associated with your sport.
We also use the term “people” within some of the statements. This refers to **anyone you regularly interact with** in your performance environment.
Please read each statement carefully. You will be asked to indicate your level of agreement to each statement on a scale from 1 (strongly disagree) to 5 (strongly agree). Choose the number that best corresponds to your level of agreement on each statement.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
For my coach, losing is the worst thing imaginable	1	2	3	4	5
It is clear that my coach thinks people are useless if they do not perform to expectations	1	2	3	4	5
My teammates act as if it is terrible when we make mistakes	1	2	3	4	5
My coach acts like failing is an absolute disaster	1	2	3	4	5
My performance environment makes it seem as if losing makes you "a complete loser"	1	2	3	4	5
For my coach, making mistakes is completely awful	1	2	3	4	5
My teammates find it unbearable to perform below expectations	1	2	3	4	5
If you do not behave as expected, people in my performance environment find it unbearable	1	2	3	4	5
My teammates act as if they cannot tolerate failure	1	2	3	4	5
I get the sense that my teammates think that failure is the worst thing imaginable	1	2	3	4	5
People in my performance environment cannot stand failing to reach their goals	1	2	3	4	5
It seems that my coach thinks we absolutely must not fail	1	2	3	4	5
My performance environment makes it seem as if you must not fail	1	2	3	4	5
My teammates act like we absolutely must not make mistakes	1	2	3	4	5
I get the sense that my teammates view people as totally useless when they perform poorly	1	2	3	4	5
I get the sense that my coach thinks people are completely useless when they make mistakes	1	2	3	4	5
My coach finds it unbearable when people perform below expectations	1	2	3	4	5
In my performance environment, there is a "must not lose" mentality	1	2	3	4	5
My teammates act as if people's value or worth is dependent upon their abilities	1	2	3	4	5
My coach finds underperforming intolerable	1	2	3	4	5
I get the sense that my teammates think people are completely useless when they make mistakes	1	2	3	4	5
On the field of play, my teammates cannot stand people making mistakes	1	2	3	4	5
People in my performance environment act as if your value as a human being is dependent on your performance	1	2	3	4	5
When I look at my performance environment, I get the impression that losing is the worst thing imaginable	1	2	3	4	5
My coach acts like it is dreadful when we underperform	1	2	3	4	5
My coach cannot stand losing	1	2	3	4	5
In my performance environment, there is a "must-win" mentality	1	2	3	4	5
My performance environment makes it seem like you must meet expectations	1	2	3	4	5
People in my performance environment cannot stand losing	1	2	3	4	5

Chapter 4

General Discussion

Prior to the PhD, the investigation and conceptualisation of an irrational climate was something which had not been considered within the extant literature. The aims of the present PhD were to:

1. Introduce and establish an understanding of an irrational climate;
2. Develop an understanding of how an irrational climate impacts members of sporting environments;
3. Develop a psychometric to assess implicit and explicit irrationality signalled by coaches, teammates, other people in the performance environment, and the performance environment itself; the Perceived Irrational Climate Questionnaire for Athletes (PICQ-A);
4. Examine the factor structure of the PICQ-A via confirmatory factor analyses;
5. Assess the criterion (concurrent and predictive) validity of the PICQ-A;
6. Determine the test-retest reliability of the PICQ-A.

The process of scale development is a vital component to the further research of an irrational climate. The present chapter examines the methodology and findings of the scale development, the contributions of the PICQ-A to rational emotive behavioural therapy (REBT) and climate theory, implications for practice, limitations of the PhD, and recommendations for future practice, and final conclusions about this thesis.

4.1 Summary of findings

Climate research in sport has been widely examined over the past thirty years (e.g., White & Duda, 1996). There are no current measures of how the people in high-performance environments (sport, business, or otherwise) perceive irrationality. Although, a large pool of research indicates that irrational beliefs inform a multitude of maladaptive behaviours or cognitions which lead to emotional and behavioural dysfunction (see David et al., 2018), like depression, anxiety, burnout, performance decrease, and loss of motivation, among many other components.

In study 1, an initial 1120 items were developed and through novice, expert, and intended user panels, these items were reduced to 91. These 91 items were then analysed using exploratory factor analysis (EFA; Study 2). An iterative process was employed to remove items which did not reach specific criteria (see section 3.4). Initially, the focus for EFA was exploring if or how the PICQ-A items fit within the four irrational beliefs of REBT, as seen in previous measure development studies (e.g., Turner et al., 2016). However, the factor loadings developed a two-factor model of global evaluation of worth (GEW) and demandingness, awfulizing, frustration intolerance (DAFI). The possibility of another factor structure developed through the key stakeholder element of PICQ-A. Therefore, a three-factor structure of coach, teammate, and environment (CTE) was also explored. Item refinement through the EFA process resulted in a 46-item version of the PICQ-A. The next step in scale development was confirmatory factor analysis (CFA; Study 3). CFA was used to reaffirm the factor models and assess if one factor model had greater statistical relevance. Although, both models were found to have acceptable levels of fit (see section 3.5). Further items were removed based on not meeting statistical criteria and resulted in a 29-item version of the PICQ-A.

The next stage of scale develop was criterion validity (Study 4). Initially testing the PICQ-A against other similar measures which have already been validated (concurrent validity). The PICQ-A showed statistically positive correlations between the subscales of the PICQ-A and all subscales of the irrational performance beliefs inventory (iPBI), and the perfectionistic climate questionnaire for sport (PCQ-S). As well as the ego-involving and controlling coach subscales of the empowering and disempowering motivational climate questionnaire for coaches (EDMCQ-C). It was also found that the PICQ-A showed negative statistically significant correlations with the empowering subscales of the EDMCQ-C. These correlations ranged from small (.196) to large (.690; see table 3.8). These results were as hypothesised and suggest the PICQ-A has good concurrent validity. These results allowed for acceptance of the hypothesis that the PICQ-A would correlate with these psychometric tests. Furthermore, predictive validity was also assessed but testing the PICQ-A against measures of possible outcomes of an irrational climate, for example, burnout, negative emotions, decreased performance, and perceived negative coaching behaviours. The subscales of the PICQ-A were positively and statistically correlated with all unhelpful subscales of the measures (e.g., thwarting behaviours, burnout, autocratic coaching, negative emotions, and decreased performance). Whereas there were negative statistically significant correlations with the helpful subscales (e.g., supportive behaviour). These results were as hypothesised. The final aspect of scale development was test-retest reliability (Study 5) and found that all PICQ-A subscales had strong positive statistically significant correlations from time 1 to time 2.

4.2 Theoretical Contributions and Explanation of Findings

4.2.1 Scale development in Climate Research

Scale development within climate research has generally followed the same process, especially those measures development more recently (See figure 3.2). The process utilises item generation, exploratory and confirmatory factor analysis, criterion validity, and test-retest reliability (Boateng et al., 2016). This section delves into the findings of study 4 in particular and the relationship between the PICQ-A, other measures and predicted consequences of an irrational climate.

Study 4 explored criterion validity. Firstly exploring the concurrent validity of the PICQ-A by identifying the relationship between the PICQ-A and other measures which similar concepts. The measure used for this were the irrational performance beliefs inventory (iPBI; Turner et al., 2016), the empowering and disempowering motivational climate questionnaire (EDMCQ-C; Appleton et al., 2016), and the perfectionistic climate questionnaire for sport (PCQ-S; Grugan & Hill, 2021). Findings showed that, as hypothesised, all subscales of the PICQ-A were positively correlated with all subscales of the iPBI. The association between the iPBI and the PICQ-A is important for several reasons. Although the iPBI is a test of individual irrational beliefs, it is a good measure for comparison as the two measures share the same underlying theory, REBT. The iPBI has a four-factor structure, one for each of the four irrational beliefs, whereas the PICQ-A has a two-factor structure of GEW and DAFI, incorporating all four irrational beliefs in a two-factor model. The iPBI and PICQ-A were found to be highly correlated showing that the PICQ-A appears to be measuring the intended concept, with respect to the four irrational beliefs.

Analysis of the PICQ-A and the PCQ-S showed a positive correlation across all subscales. Within this thesis, we have established the links between perfectionism and irrationality (See Section 2.2.4.2). The concepts are similar due to the rigidity to cognitions involved in both perfectionism and irrationality (Jordana & Turner 2023). However, it is also

important to explore the differences between perfectionism and irrationality. The want or striving to be perfect is not inherently irrational, though the rigid demand to be perfect (e.g., "I must be perfect") is irrational according to REBT (Jordana & Turner, 2023). Therefore, a perfectionistic climate shares some similarities with an irrational climate. For example, the rigidity of signals sent by coaches to stipulate athletes *need* to be perfect. Therefore, the hypothesis that there would be a positive correlation between the PCQ-S and PICQ-A was accepted and suggests that one may experience irrationality and perfectionism concurrently. Although it may be the case that a performance environment is perceived as perfectionistic it may also be perceived to be irrational, it is not irrational because it is perfectionistic. The reason for this is that not all perfectionism is irrational. As Jordana and Turner (2023) explained, perfectionism becomes irrational when there is a goal to be perfect and the underlying belief is rigidly focused on *needing* to be perfect. If one is striving to be perfect with no underlying demand or need to be perfect, then one would theoretically continue with no unhelpful negative emotions or irrationality.

Findings from analysis of the PICQ-A and the EDMCQ-C seem to corroborate results from the relationships established between the PICQ-A and the iPBI and PCQ-S. All subscales of the PICQ-A were positively correlated with ego-involving and coach controlling subscales of the EDMCQ-C. Whereas significance was also found with the task-involving, autonomy supportive and socially supportive subscales, though a negative correlation was expressed. These findings as the subscales with a positive correlation tend to have more negative connotations (e.g., perfectionism and irrationality). Further suggesting that when a climate supports somewhat negative concepts, such as perfectionistic or ego-involving climates, then irrationality may too be present. A possible explanation for this is the notion of reciprocity. One may experience or perceive irrationally, perfectionistic tendencies, and disempowering climates due to the underlying beliefs of the individual. Ultimately,

irrationality begets more irrationality. The reciprocal nature of irrational beliefs, as depicted by Turner and colleagues (2019; see Figure 2.1), shows that beliefs can influence the attentiveness to particular adversities and adversity can shape beliefs. To broaden this to the model of an irrational climate (Figure 2.3), the reciprocal nature in the transference of irrationality continues.

The second aspect of criterion validity explored was predictive validity. Based on previous research investigating the implications of greater levels of irrationality, it was hypothesised that those who perceive an irrational climate would also experience an unsupportive coach, burnout, negative emotions, a coach with greater levels of autocracy, and reduced perceived performance.

To test the predictive nature of the PICQ-A against the perceived interpersonal style of the coach the interpersonal behaviours questionnaire (IBQ) was used. Findings showed that all irrational climate subscales had a positive correlation with all thwarting subscales of the IBQ. Conversely, all subscales of the PICQ-A were negatively correlated with all supportive subscales of the IBQ. Firstly, these results mimic the results shown from the relationship between the PICQ-A and the autonomy and social support subscales of the EDMCQ-C. Secondly, these results suggest that when an athlete perceives irrationality within their environment, they may also perceive their coach to be thwarting of their basic psychological needs. Humans have a basic level of psychological need (See Ryan & Deci, 2000). These needs are autonomy, competence, and relatedness and the results from validity testing shows that within an irrational climate, when irrationality is high there is an association with these basic psychological needs being thwarted. Alternatively, with lower irrationality, the climate may be supportive of one's basic psychological needs. Environments supportive of basic psychological needs tend to support autonomy, positive affect, well-being, internal motivation, and less distress is experienced (Mossman et al., 2024).

The PICQ-A was also shown to be positively correlated with all subscales of the athlete burnout questionnaire (ABQ). Previous research has suggested that the development of burnout in athletes derives from the unresolved irrational beliefs of individuals (Turner & Moore, 2016). Turner and Moore (2016) explained that by experiencing high levels of irrational beliefs for a long period of time or with greater frequency increases the likelihood of burnout. Therefore, this suggests that if one perceives a high level of irrational beliefs over a continued period of time within their sporting environment (i.e., an irrational climate) may contribute to the experience of burnout.

A further previously researched result of the experience of irrational beliefs is unhelpful negative emotions (DiGiuseppe et al., 2013). Negative emotions (e.g., sad, fear, anger, shame, anxiety) were tested against the PICQ-A using the multidimensional emotion questionnaire (MEQ). The MEQ tests the frequency, intensity, duration and regulation of negative emotions. It was found that the PICQ-A was positively correlated with all subscales of the MEQ, suggesting that if one perceives an irrational climate, they will likely also experience negative emotions. Given the knowledge gained from this thesis, it is perhaps unsurprising that these findings occurred. However, when beginning to establish why this occurs, there is a need to look back at the underlying theory of REBT. Ellis (1955) posited that people and events may trigger underlying irrational beliefs though cannot inherently make one feel a certain way. Feeling a particular way is based on the appraisal and internalisation of the situation or adversity experienced, which then leads to emotional dysfunction (MacLaren et al., 2016). Therefore, when one perceives irrationality within their climate, they may internalise the signals sent from the coach, teammate, and environment. This internalisation of irrationality then increases the individual's levels of irrational beliefs, resulting in emotional dysregulation.

The final aspect of predictive validity was the correlation between the PICQ-A and perceived athlete performance. Using the athlete subjective performance scale (ASPS) a positive correlation was found with the all subscales of the PICQ-A. This suggests that when an athlete perceives irrationality within the climate, they may also experience a perceived decrease in performance. It is beyond the scope of this PhD to investigate aspects of *actual* performance, though perceived performance allows for a greater understanding of the mentality of the athletes. Within the present thesis, it is impossible to establish a causal link between irrational climates and reduced performance. However, it is possible to explore the mechanisms as to why one may feel they are not performing as they would like to. From an REBT perspective the reason one may experience a perceived loss of performance could be due to an increase in irrational beliefs because the athlete feels they are unable to achieve their goals (Turner, 2019). However, it is also possible that an athlete can set goals which are driven by their underlying beliefs (see Figure 2.1). Therefore, irrationality is driving goal setting which may be unrealistic and unattainable, which may then lead to a feeling of perceived decreased performance.

The reciprocal nature of irrational beliefs and their interaction with the environment and aspects of one's consequences is an important theme from this thesis. It is not possible to decern a causal link between an irrational climate and the predictive concepts. In the same way we are unable to say that the predictive elements cannot cause irrationality. However, the reciprocity allows for exploration of biases and their impact on individuals and may give some understanding as to why one may perceive an irrational climate.

Cognitive biases are present within many aspects of psychology (Jones & Sharpe, 2017). There are a number of cognitive biases (see Hasleton et al., 2015) however, this thesis will focus on the most prevalently researched of confirmation bias. Confirmation bias refers to the way in which an individual may search for information which supports their beliefs and

ignore information which refutes their beliefs (Peters, 2022). Within the concept of an irrational climate (see figure 2.3) one may perceive irrationality within the performance environment due to them having an already high level of irrational beliefs. Therefore, they seek for irrational information or signals within the environment and perceive it to be irrational. Therefore, confirming their irrational biases.

These cognitive biases are predicated by the rules and pictures one makes of the world and of reality. These rules and pictures are known as schemas (James et al., 2004). Specifically, a schema is an accumulation of previously experienced thoughts and behaviours which have shaped the way in which one sees reality (James et al., 2009). By building a database of knowledge, one is then able to establish and predict what may happen in the future and identify any threats to self-esteem (Beck et al.,1979). For example, in the Netflix TV show 'Adolescence' (Graham et al, 2025) the child co-star accused of murder depicts a memory of his father turning his back and walking away when he made a mistake playing football. Within this example, the child begins to develop a picture of the importance of not making a mistake when playing football. Because the father gets angry when he made a mistake, the child then evaluates what this means and determines that it is a bad thing to make a mistake when playing football. This then may lead the child to develop irrational beliefs (e.g., "I must not make a mistake"). This links to cognitive biases as the schema one holds (i.e., "must not make mistakes") then focuses on information which strengthens these schema (e.g., the way his father may react to professional footballers playing on TV; confirmation bias). There is also a reciprocal component to the schema and cognitive bias relationship, due to biases also informing and reaffirming schemas (Ehrlinger et al., 2016).

4.2.2 REBT and Irrational Climate

Rational emotive behaviour therapy (REBT) is at the root of an irrational climate as conceptualised in the current thesis. REBT proposes a GABC model (see figure 2.1) which is used to show how an individual interprets a situation (A) as hindering toward their goal (G) attainment. REBT then posits that it is the individuals' beliefs (B) about the situation (A) which underpins emotional and behavioural consequences (C). The concept of an Irrational Climate is new within REBT and is an extension to current climate research within psychology. Specifically, within REBT, the underlying premise is that it is not the situation which causes emotional or behavioural dysfunction, it is what the situation says about themselves which causes the dysfunction (Ellis, 1955). Another premise is that an individual cannot be *made* to feel a certain way by others, as, again, it is the interpretation of the situation on oneself which causes the emotional and behavioural dysfunction (DiGiuseppe et al., 2013). Within the present thesis, these ideas are challenged. The signals in the climate are interpreted and interact with one's own IBs and, therefore are transactional.

The present PhD postulates that the climate sits outside of the main GABC model, though has potential for direct influence on the individual's goals, perceived adversity, beliefs, and consequences and too, in a reciprocal nature, one's irrationality can influence the climate. An athlete who perceives an irrational climate may begin to think more rigidly and set themselves more rigid goals, such as "I must be perfect at everything I do". The individual may have a lower tolerance for adversity or situations which present as inconveniencing their goal attainment. Their belief system then becomes inflexible and illogical and may present as "If I'm not perfect then it must show how rubbish I am". Resulting in unhelpful negative emotions (e.g., depression) and maladaptive behavioural responses (e.g., avoidance). Although an irrational climate does not exclusively represent perfectionism, the example above illustrates how an irrational climate could influence each element of the GABC model. To revisit the adage of "if a tree falls in the woods, does it

make a sound?" (see section 2.2.3) Within this metaphor, the irrational climate is the tree, needing to be perceived to be heard. However, to extend the metaphor, the perceptions of the tree falling then may differ based on one's perspective. For example, an individual may perceive the tree falling in a different manner than someone who hears a tree fall in the distance. For example, one person may see it, one person may hear it, another person may have experienced it previously and have seen unfelled trees act in the same way when a tree nearby has fallen and intimated that a tree has fallen nearby.

Within an irrational climate, one's own levels of irrationality may influence their experience or perception of irrationality within the performance environment. Within an irrational climate, there are a number of methods of influence from others, the direct, indirect, and contagion methods, established within the irrational climate model (see figure 2.3). The direct and explicit communication given by key stakeholders (e.g., a coach may say "You must play well") may cause the player to internalise such comments and create more irrational beliefs within an individual, resulting in emotional and behavioural dysfunction. The indirect and implicit communication given by key stakeholders (e.g., a teammate might gesticulate exasperation by throwing their arms in the air when a fellow teammate makes a mistake), again may be internalised by an individual it is aimed at and confirms irrationality they already possess. Finally, contagion from an individual merely being present within an irrational climate could develop the propensity for irrationality within an individual. In essence, the more an individual is exposed to irrationality, both explicitly and implicitly, the more likely they are to respond irrationally to situations which are deemed to impede their goal attainment. However, this premise requires more testing and further investigation.

Based on the underlying principles of REBT, the concept of an irrational climate is not only conceivable, but arguably necessary. REBT research has largely focused on the impact of irrational beliefs on the individual (David et al., 2018), some research, especially

within sport, has focused on group-based interventions, but these have tended to focus on the individual within a group (Jordana et al., 2023). There are also some historical commentaries by Ellis regarding the socialisation of irrationality and rationality, explaining that although people have an innate predisposition to be irrational, one's beliefs are also shaped by sociocultural aspects (e.g., learned behaviour from parents; Ellis, 1977). More recently by King et al. (2023). King and colleagues (2023) drew on the biological tendencies for irrationality held by individuals (see Ellis, 1976) and explored the notion that key social agents within the micro- and macro-environments have a direct influence on the athlete. Within the present PhD the influence of the sporting environment has been examined from King's model (see figure 2.2). Irrational climate bridges the gap between the socialisation and individual irrationality within a sporting performance environment. The development of the reliable and valid PICQ-A allows for such environments to be tested and researched in a way that has never been possible previously.

The broad aim for the present thesis was to develop the concept of irrational climate, and to develop a valid and reliable measure which can be used within research and applied settings to test the concept. The climate questionnaires available within the extant sport psychology research largely focus on motivational climate. Existing questionnaires explore the way in which, for the most part, a coach (other measures have explored peers and parents) creates either a task- or ego-orientated performance environment, based on achievement goal theory. More recently, other avenues within the space of climate in sport have been explored, specifically perfectionistic climate. Perfectionistic climate is also theoretically underpinned by achievement goal theory but explores motivation of athletes within a performance environment from the perspective of perfectionism. In essence, perfectionistic climate explores how the coach signals perfectionistic tendencies and uses achievement goal theory

as an indicator of how individuals identify success based on the perfectionism perceived within the performance environment.

Irrational climate, as has previously been explored within this thesis, is rooted theoretically within REBT. Therefore, it does not make logical sense to underlie irrational climate with achievement goal theory, like the perfectionistic climate questionnaire (PCQ-S) as the PICQ-A measures a related, but different concept. It is different as the demands an individual places on themselves or is placed upon them to be perfect is irrational. However, perfectionism without demands is not necessarily irrational. Jordana and Turner (2023) explored perfectionism from an REBT perspective and identified that to be perfect is the goal (G) of an individual and the adversity (A) is the result of not being perfect, which leads to irrational beliefs (B) such as "I must be perfect at all times, not being perfect shows I am completely useless". This irrational belief then contributes to unhelpful negative emotions and maladaptive behaviours. If these perfectionistic beliefs are driven by the coach, as proposed by Hill and Grugan (2019), then a reasonable assumption can be made that the coach is harbouring irrational perfectionistic beliefs and is, either directly or indirectly, imparting these onto their athletes and the environment itself. As a result of this, it then becomes essential to explore the underlying beliefs of the coach, and any other key stakeholder, and how they are influencing the athletes within a performance environment, and the environment itself.

4.3 Implications for practice

The development of the irrational climate concept and subsequent PICQ-A has the propensity to support applied practitioners within sporting contexts to establish an understanding of why athletes may think and behave irrationally, and the impact key, influential figures have on individual athletes within a performance environment. The aim,

therefore, for this section is to outline the possibilities the PICQ-A gives practitioners and how they can use it to understand an irrational climate and who the main instigator is. Additionally, the present thesis outlines some possible solutions to aid practitioners to develop a more rational climate both from direct work through psychology practitioners, but also through system level practices (e.g., working through coaches).

4.3.1 Using the PICQ-A

Previous sections have explored the reliability and validity of the PICQ-A. However, functionality and its application within applied settings have not yet been addressed. As previously mentioned, there are two factor models, resulting in five factors in total, within the PICQ-A, one being GEW and DAFI, and the others are coach, teammate, and environment (CTE). The entirety of the PICQ-A consists of 29 items, 7 GEW, 22 DAFI, 10 coach, 9 teammate, and 10 environment items. A key reason to keep both factor models is the statistical rigor and similarities the two have, but also that both are equally useful within a sporting context. If a practitioner wanted to explore only the perceived irrationality of the climate, they could just calculate the sum of GEW and DAFI items (see appendix 3.4.1). However, if the practitioner also wanted to explore where these irrational signals were being perceived from, then they could also calculate the sum of each of the CTE subscales. This could then allow the practitioner to take a more targeted intervention with specific groups. For example, the practitioner may see a large amount of perceived irrationality from the teammates and then could target a group intervention to improve rationality within the team. Therefore, the PICQ-A could be used for more surface level understanding of whether the performance environment is irrational or can go into more depth to explore the irrationality of individuals or groups within the performance environment.

A particular strength of the PICQ-A is the incorporation of multiple key stakeholders within a single measure. Within the extant literature, the influence one has over others may differ based on different individuals (Burak & Bushshur, 2013). Therefore, measuring a single key stakeholder may miss key influences on the perception of irrationality and where it originated. Applied knowledge, along with previous research, has established that the coach may not be the most significant factor within the development of particular reactions or outcomes, such as motivation orientation (e.g., White, 2007). Therefore, measuring multiple key stakeholders at once allows for a greater level of accuracy when trying to understand the key perceieved perpetuator of an irrational climate.

The next step would be to explore which type of intervention may be applicable based on the outcome a practitioner is working towards. King's et al (2023) study exploring the socialisation of irrationality gives great foundations to build on, particularly with the way in which REBT can be applied to micro-environments to assist in the development of a more rational environment. King and colleagues (2023) proposed seven methods of implementing REBT into an environment to support the development and maintenance of rationality. These were, the systematic use of REBT, psychoeducation for key stakeholders, challenge the use of irrational language, model rational behaviour and language, measure performance-specific irrationality, athlete education on information discernment, promotion of athletes' effort, values, and their story. For the purposes of this PhD, these recommendations are a foundation by which to build around the context of possible interventions for the coach, teammates, and the environment itself.

4.3.2 The Role of The Coach

The coach plays a pivotal role in the development and maintenance of climates within a performance environment (Duda & Balaguer, 2007). Previous research has indicated a

number of different methods to aid coaches to create a more task-orientated motivational climate (Garcia-Gonzalez et al., 2017). Originally, these methods or interventions were for the coach to implement strategies within their training practices to establish and reinforce more controllable concepts (e.g., effort levels, skill development; Ames, 1992). Further research has intimated a need for coach behaviours to be examined and, through psychoeducation, adapted to being more task-orientated (Allen & Hodge, 2006). The method of creating change within a motivational climate has largely focused on the coach role modelling the behaviours they want to see in their athletes and creating a space and environment which allows the athletes to develop basic psychological needs, such as autonomy, relatedness, and competence (Ryan & Deci, 2017). Although these methods have been proposed, research suggests it remains important to scope the direct and indirect influence of climate on athletes (Birr et al., 2023).

King et al (2023) inferred the importance of educating key stakeholders within a performance environment. Bailey and Turner (2023) developed a psychoeducation REBT programme with coaches to aid in the reduction of irrational beliefs and improve well-being among coaches. Within this study, Bailey and Turner (2023) utilised online group REBT sessions which included an initial session to explore REBT and establish foundational level understanding of REBT and, in particular, the notion that it is not the situation which creates adverse consequences, it is the beliefs about the situation with leads to these consequences. The next three sessions comprise of the education of the coaches on the ABC model of REBT, disputing irrational beliefs, and developing new rational beliefs (See Bailey & Turner, 2023 for further details). The findings were encouraging and showed that for 75 percent of the participants, the REBT psychoeducation programme supported a decrease in irrational beliefs, and an increase in mental well-being. However, is it not known whether there was a direct influence on the athletes as a result in this new rational way of thinking by the coaches.

Nevertheless, a coach psychoeducation programme appears to be fruitful in the reduction of irrational beliefs in coaches, and therefore, it is conceivable based on the irrational climate model, that this will too support athlete irrational beliefs.

Once coaches can begin to understand their own irrational beliefs they will then, in theory, be able to impart their new rational beliefs onto their athletes. As mentioned in figure 2.3, the explicit signals expressed by key stakeholders, including coach, both directly and indirectly influence the climate itself and the individual athlete. This has been shown in previous research whereby athletes were subjected to an irrational or rational team talk by their coach (Evans et al., 2018). Evans and colleagues developed a rational and an irrational coach team talk script which the coach delivered at half-time of a soccer match. The findings showed that following an irrational team talk, athletes were more likely to appraise a situation as threatening and may not feel they have the resources to manage the situation find themselves (Evans et al., 2018). Similar findings were exhibited when coaches engaged in negative behaviours, whereby there was an association between threat and autocratic behaviour (Dixon et al., 2017). However, these studies show that when the coach expressed more rational comments and behaved in a more socially supportive manner, athletes then appraised adversity as a challenge. It is therefore conceivable that this then may transfer to athletes, and they may begin to experience more challenge appraisals. These studies explain methods by which coaches can begin to develop rationality within their performance environment and gives tangible tasks the coaches are able to engage in to develop a more rational climate.

As shown by Dixon et al (2017), coaches who engage in socially supportive behaviours elicit challenge appraisals. These challenge appraisals are then associated with rational thinking (Dixon et al., 2017). Therefore, a key feature of coach behaviour is to model and project rationality through their behaviours in training, in competition, and around the

performance environment. Bandura and colleagues (1961) developed experiments to explore the importance of modelling from a parent to a child, but this research has continued to be developed and applied to other contexts. King et al. (2023) used Bandura's (1977) work to explain the transference of irrational beliefs within micro-climates through the method of verbal and behavioural modelling. From the perspective of socially supportive coach behaviours, when coaches take notice of the personal issues an athlete experiences and having a more informal relationship with athletes. To explore the perspective of irrational climate and how a coach can model rational behaviours, there are examples from coaches in the public eye have said and done. For example, Jurgen Klopp, Liverpool FC manager at the time said when unable to register a win in his first three matches for Liverpool FC.

> "*This is not the end of the world. We conceded a goal near the end, and it felt like the end of the world, but it is not the end of the world…I hope I'm not the only person in the stadium who thought: 'This is not the end of the world.' We can work on this…Of course, it is not the best moment for us, because we wasted a lot of energy. Southampton haven't lost away from home, so we had to work hard…You score the goal and you want to win, but it didn't happen for us today. Football is not a fairytale. Sometimes we can write stories like this but it doesn't always happen*" (Agence France-Presse, 2015).

Within this example, Jurgen Klopp models how it is not the end of the world for failure to occur (anti-awfulising). Here Klopp is able to rationalise that the situation of conceding a late goal is hard to deal with though is not as bad as it may seem at first. Klopp is expressing explicit rational signals by overtly saying that it is losing is not the end of the

world. As seen from Dixon's et al. (2017) work, the experience of more rationality develops more challenge appraisals and, although it is impossible to justify causality, may have been a contributory factor for Liverpool FC's success under Jurgen Klopp over recent years.

Perhaps at this point is pertinent to explore what modelling irrationality may look like. An example comes from Christian Horner, team principle of Red Bull Racing Formula One team. Over team radio he said to Red Bull Racing driver at the time, Pierre Gasly "You can't stay there Pierre. You have to increase your pace". In response to Pierre Gasly struggling to move through the field and pass perceived lesser teams. This was coupled with Horner shaking his head while appearing exasperated. This exert was taken from the Drive to Survive series on Netflix and it must be said that this could have been taken out of context. However, Gasly was removed from his seat at Red Bull Racing shortly after this encounter, mid-season. This is considered an example of irrationality firstly because of the demanding nature of the comments. The use of "can't" and "have to" have the potential to create pressure and tension within the driver (Ellis & MacLaren, 2005). This may then lead to him over-driving and not getting the most pace out of the car as Gasly would have wanted (i.e., not increasing his pace as Horner demands). These demanding words are paired with the possible sub-text (DiGiuseppe et al., 2013). The context at the time of this comment was that Pierre Gasly was rumoured to be relieved of his duties as a Red Bull Racing driver due to persistent underperforming. Therefore, it is conceivable that if his team principle then says 'you have to be quicker' the sub-text may be that if you don't drive quicker, that shows you are not good enough, and if you are not good enough, you are worthless. Although there are a number of variables which may influence athletes' mood or beliefs. These examples give evidence for the importance and level of influence a coach or significant stakeholder has on the athletes they work with. On one hand, a coach creates space whereby athletes feel their failures are not all-consuming catastrophes. On the other hand, a key stakeholder creates pressure and tension

for an athlete who ultimately does not perform how they want and does not reach their potential. Within the space of understanding how a coach can improve and develop their signalling of rationality, they first must go through a process of reflection to understand how their current behaviours impact the people around them.

There is an inordinate amount of pressure and stress on coaches in sport (Thelwell et al. 2008) and unless these coaches have adequate coping strategies, the coaches then become more susceptible to burnout and poor mental well-being (Baldock et al., 2022). It has been shown that higher levels of irrational beliefs are associated with burnout and poor mental well-being among coaches and therefore, reducing irrational beliefs would be a worthwhile pursuit for coaches (Bailey & Turner, 2023). However, coaches may not be aware of their own irrationality or the impact this may have on their athletes. The PICQ-A offers an opportunity to explore the coaches' levels of irrationality and how this then can remedy using REBT (e.g., Bailey & Turner, 2023). Other avenues explored within the extant literature to support coach self-awareness is reflective practice. Cropley et al., (2020) explored the use of reflective practice among coaches and the impact it had on levels of hardiness (how well one deals with adversity). Using thematic analysis, Cropley and colleagues (2020) identified having effective coping mechanisms as a component to hardiness. Following this the researchers showed that those who engaged intentional critical reflective thinking exhibited greater levels of hardiness and, therefore, would be able to withstand greater levels of adversity.

A method of reflection which holds good theoretical basis is Think Aloud (TA; Ericsson & Simon, 1993). TA involves a three-step approach to reflective practice. The first step is to verbalise any and all thoughts or inner monologue. The second step is to verbalise what is in the individual's focus, for example, what they can see, hear, smell, as well as nuanced elements to what they see (e.g., movement patterns). Step three is to verbalise

thoughts and feelings outside of their natural thought process. Whitehead et al. (2016) utilised the TA framework with Rugby League coaches and found that, once comfortable with the process, coaches became much more detailed in their reflections which lead to an increase in self-awareness and communication (Whitehead et al., 2016). Using TA alongside REBT psychoeducation could allow for coaches to develop greater levels of self-awareness and also an understanding of why they think, feel and behave the way they do, and the possible impact on their athletes. Although combining REBT and TA has not currently been researched, to the primary researcher's knowledge, this offers a practical and integrated psychological support to coaches, who require support to develop coping strategies and deal with their stressors.

4.3.3 The Role of Teammates

Similarly to the coach, teammates play a pivotal role in the development and maintenance of climate. Research has shown the link between coach-created and peer-created climate with the underlying theory of achievement goal theory (AGT) and self-determination theory (SDT; Ntoumanis et al. 2007). Noutamins and colleagues (2008) identified eleven key elements, both positive and negative, of a peer-created climate. The eleven elements are, improvement, equal treatment, relatedness support, cooperation, effort, intrateam conflict, intrateam competition, normative ability, autonomy support, mistakes, and evaluation of competence. Within all aspects of peer-created climate there is propensity for irrationality (See table 4.1). There are very clear and obvious situations and specific cognitive appraisals which need to occur for this level of irrationality to be present. However, as was learnt in section 2.2.3, the mere presence of irrationality could influence the team through contagion.

Table 4.1
Shows the possible irrationality through the peer-created climate framework.

Element of peer-created climate	Definition (based on Ntoumanis et al, 2007, pp148)	Possible irrational belief
Improvement	Encouraging and providing feedback for improvement to teammates	"I cannot stand when my teammates tell me what to do"
Equal treatment	Believing that everyone has an important role on the team and treating teammates in a non-preferential way	"I have to be treated equally"
Relatedness support	Fostering the feeling of being part of a group and creating a friendly atmosphere on the team	"It's awful when I don't feel part of the group"
Cooperation	Helping each other and working together in order to learn new skills	"I have to make sure I work with my teammates and help them get better"
Effort	Emphasizing the importance of exerting effort and trying one's hardest	"I am worthless if I do not work my hardest"
Intrateam conflict	Exhibiting negative and unsupportive behaviors (e.g., blaming each other for poor performance, laughing at teammates) that are not directly related to competing with others	"I cannot tolerate my teammates shouting at me when I do not perform well"
Intrateam competition	Promoting interindividual competition and comparison	"I must be better than my teammates"
Normative ability	Emphasizing normative ability and interacting only with the most competent teammates	"My teammates don't interact with me, that must mean I'm not as good as them"
Autonomy support	Perceiving that peers allow each other input in decision making and freedom in the way they play or perceiving that their peers act in a controlling manner	"I cannot stand when everyone gives their opinion and need someone to make a decision"
Mistakes	Worrying about how peers might react if athletes make mistakes, giving positive and negative reactions following athletes' mistakes	"I must not make mistakes, if I do my teammates might shout at me, and that is awful and shows how bad I am"

Evaluation of competence	Using normative or self-referenced criteria to evaluate athletes' competence	"I have to be as good as everyone else"

The question arises as to why contagion may be so prevalent among peers. King et al. (2021) emphasised the perceived need for peer acceptance within micro-environments (e.g., sporting environments). Previous research outside of a sporting context has shown a clear link between the influence of others (i.e., peer pressure) and the behaviours exhibited by individuals (Giletta et al., 2021). For example, people may engage in anti-social behaviours, drug use, or other behaviours which they may not necessarily engage in prior to being involved in their micro-environment. Reflecting on the seminal Stanford Prison Experiment, the level of conformity within a newly formed group becomes evident. Within the Stanford prison experiment, Zimbardo (1972) placed college students into two groups, prisoners and prison guards. The purpose of the experiment was to see how participants would confirm to the stereotypical prisoner (e.g., subservient and compliant) or prison guard (e.g., aggressive and to be feared). However, another aspect of the study showed how some people confirmed to engaging in behaviours which they would not ordinarily engage in. For example, prison guards were physically aggressive towards prisoners. Although the present PhD does not look at conformity per se, a driving force behind the conformity, it is conceivable to say, is due to wanting or need to be accepted by peers.

Specifically, within sport, research has shown that those who are seen to be more capable and have better physical abilities seem to be accepted more by their peers (Weiss & Duncan, 1992). Therefore, this becomes the goal of individuals within a sporting environment and sporting performance becomes the vehicle for peer acceptance. Therefore, when one does not perform, they do not reach their goal, irrational beliefs develop, and emotional and behaviour dysfunction occurs. As you can see in table 4.2, the person in this example has a fear of not

being accepted by their peers and puts pressure on their sporting performance to accomplish their goal of acceptance and the thought processes which may occur as a result.

Table 4.2

An example of perceived need of peer acceptance using the GABC model.

Goals	Activating Event	Belief	Consequence
Being accepted by my peers	Not performing well	"I must perform well otherwise my teammates will think I'm rubbish and won't like me, and I can't bear that feeling"	Playing within themselves, developed fear of failure, higher levels of performance anxiety.

However, this does not explain why contagion and conformity occur in non-performance related environments too. Contagion cannot be explained solely by the need to perform well for the acceptance of others. Revisiting Bandura's Social Learning Theory (SLT) may help establish reasons for this phenomenon. According to Bandura's SLT, there is a biological need to exist within social environments, and behaviours exhibited within those groups serve to aid and support membership (Bandura, 1986). As a result, individuals conform to the norms and attitudes of the group to gain acceptance and enhance their status (Smith & Lewis, 2009). This offers a clearer explanation for why individuals may behave or act out of character when part of a team or group. Within the context of an irrational climate, this mechanism appears to play a crucial role in the transmission of irrational beliefs among peers (as well as coaches and practitioners), particularly when those beliefs are influenced by a senior figure within the group, such as a coach.

The task then, for practitioners, is to work with the teams or groups of athletes to facilitate a more rational climate. REBT has been used many times within sport and sports teams to facilitate a greater level of rationality (e.g., Turner & Bennett, 2017). Barker and

Turner (2013) facilitated a three-session intervention with an academy soccer team to improve individual irrational beliefs. These sessions focused on psychoeducation of the ABC(DE) model of REBT. The results showed an immediate decrease in irrational beliefs among individuals. However, the irrationality appeared to return near to baseline after four weeks post intervention. Further research identified greater longitudinal effects when homework was included within the intervention and out of session 'homework' appeared to reinforce and embed REBT within the consciousness of the athletes (Wood et al., 2017). A key aspect of this research, which was not able to be collected, was the impact of irrational beliefs on the team themselves. The PICQ-A allows for an intervention similar to Barker & Turner (2013) to be conducted with the added benefit of knowing whether rationality had improved on the team level as well as the individual level.

4.3.4 The Role of the Environment

The environmental element of the irrational climate may be the element which reaps the most reward from an intervention standpoint. By focusing intervention on the environment as a whole, it allows for practitioner to embed rationality within the environment from a system level. King et al (2023) suggested this is needed within micro-environments such as sports clubs. To achieve this, King et al. (2023) suggested the use of psychoeducation to aid in environmental and organisational change. If look at the irrational climate model (see figure 2.3), it is apparent that there is a reciprocal nature of climate on the individuals within the environments (e.g., coaches, athletes, performance director, etc.). Therefore, there is a need to explore the organisational elements to a climate to establish sustainable and maintained rationality.

REBT has been used within organisations for many years (e.g., Bernard, 2019; Jones, 2023; Morris, 1993;). However, these have generally focused on the individuals within

different organisations. Turner (2016) expressed the importance of exploring the influence of key stakeholders on the development of cultural aspects of sporting contexts. He proposed that investigating the language used by key stakeholders (e.g., coaches, support staff, performance directors, etc.) and their propensity to use irrational language or signals. Bailey and Turner (2023) examined the irrational beliefs of several coaches and, following an online-REBT intervention consisting of four psychoeducation sessions, were able to reduce the irrationality within those coaches. However, Bailey and Turner (2023) did not explore the impact of the athletes the participants coached and the influence of their irrationality. Referring back to the irrational climate model (see figure 2.3) there is a link between the coaches (and other key stakeholders) irrational beliefs and their influence on the climate itself and the direct influence on the athletes' themselves. Therefore, it is conceivable that by Bailey and Turner (2023) reducing the irrationality of the coaches, that the athletes' irrationality of the athletes would have also reduced. Using the PICQ-A to explore the irrationality and the impact of the environment itself on the athletes' irrational belief would be an excellent use of the measure and would satisfy Turner's (2016) recommendation to study key stakeholders within a sporting environment.

What Bailey and Turner (2023) did show was that REBT is successful in the reduction of irrational beliefs within coaches. Therefore, the programme used, which is generally a well-used and accepted programme, would be successful with other members within the environment (e.g., assistant coaches, strength and conditioning coaches, physiotherapists, etc.). Therefore, as a recommendation for future research, it would be useful to see a similar programme implemented with the wider multidisciplinary team (MDT) to understand if the same or similar results are identified.

4.4 Limitations

By this point of the PhD, there is an understanding that perfection is not a rational pursuit due to it being unattainable. Thus, the limitations of this thesis must be examined. When putting these limitations into perspective it is important to remember the concept of an irrational performance climate is new within REBT and climate research. It has been the aim of this PhD to explore and highlight limitations within previous REBT and climate literature. Taking an introspective approach and analysing the limitations of this thesis from a theoretical and methodological perspective.

An area which may be seen as a limitation is the use of applied and theoretical logic and adding this to the statistical evidence within exploratory factor analysis (EFA). For example, within the EFA, there was an occasion when only GEW items were expressed. Therefore, this would have changed the landscape of the PICQ-A altogether, measuring only GEW. As a result, the decision was made to include DAFI items and make sure DAFI items were incorporated in order to create a measure which followed REBT theory and knowledge from applied practice of the research team. In addition, the decision was made to retain some coach-awfulising items to make sure this was a represented part of the measure, for the same reasons as the DAFI items retained in the example above. By following the statistical data only, a measure which was not representative of the underlying theory and opposed the philosophy of this thesis would have been developed. In order to navigate this, the decision was to keep items which performed best statistically and then run another EFA with a new dataset. This gave us the opportunity to re-test the items and explore the factor structures before moving onto CFA.

One particular area which may result in potential questions is the use of the online survey tool Prolific. There are many strengths to using Prolific, such as the ability to include and exclude participants from studies, being able to sort participants based on a variety of

characteristics. The intended focus from the current PhD was to acquire participants who were currently being coached, and who were part of a performance environment at any level. To attempt to control for this, qualifying questions were asked to establish whether or not participants were indeed coached within a performance environment. The potential issue with this is a matter of social desirability. The uncontrollable aspect was whether participants chose to say they were coached in a performance environment when they were not, to complete the study and receive their monetary reward. However, it is important to clarify that this is a limitation of all scale development research, not just of this thesis.

The decision to create a measure using athletes from all levels of sport (from grassroots to professionals competing internationally) could provide a skew to the data, due to not having a homogeneous sample. For the most part, participants in this thesis were from a grassroots or amateur level of performance. These environments tend to experience less pressure than those who are constantly competing for selection spots, medals or trophies, sponsorships, among other aspects which tend to be related to monetary gain and allowing those athletes to continue to perform (Fletcher et al., 2012). At grassroots level there is a lot less pressure to perform and a lot less pressure within the environments and, therefore, it would be expected there to be less irrationality. There is an argument that the development of the PICQ-A only be developed with the intended user (elite/professional athletes) involved in the data collection processes. However, previous research has established irrationality in sub-elite athletes (see Chadha et al., 2019). Additionally, reaching the recommended participant by items ratio of five participants per item would have become more difficult (DeVellis & Thorpe, 2021), or it would have taken and inordinate amount of time to collect sufficient data. Therefore, a conscious decision was made to reduce the homogeneity of the cohorts in order to recruit adequate participants to create a reliable and valid measure to be used with elite athletes.

There is potential for social desirability within other aspects of this thesis. For example, within previous REBT scale development research (e.g., Turner et al., 2016) has found four factors based on the four irrational beliefs. However, within the present thesis two factors were found, one for global evaluation of worth (GEW) and one for the other irrational beliefs (DAFI). A potential reason for this is because the participants do not want to report their coach, teammates or environment, as saying or doing things which influence their own personal beliefs. For example, participants may see it as more socially desirable to show how their coach may say "we must win this game" as opposed to saying "if we lose this game, the coach says I am worthless". Therefore, demandingness here is more socially desirable than the GEW statement and therefore they score higher on the demandingness than GEW, creating a skew in the data.

An alternative explanation may be that there is a certain level of self-awareness needed for people who have not experienced REBT, or any other form of therapy, to understand the intricacies of global evaluation of worth. For example, it is possible that items asked too much of the participants when they were asked whether "People in my performance environment act as if your value as a human being is dependent on your performance". It is possible that this question it too introspective for some participants and therefore, participants score lower as they are not confident enough to say their worth is contingent on performance. It is impossible to answer these questions however, what is known is that similar questions on other performance-focused REBT questionnaires have different experiences.

Another aspect for reflection is one which plagues all scale development theses, and again links to social desirability. The PICQ-A is a self-report measure and relies on participants offering accurate answers to the questions posed – especially when they are answering questions about influential people within their performance environment. There is a uniqueness to the propensity to social desirability within the PICQ-A for two reasons. Firstly,

the PICQ-A requires athletes to discern the beliefs of others within their performance environment. For example, athletes are asked to establish their coach's irrationality by the athletes understanding of how the coach is behaving or what they are thinking. It is conceivable there is a dilution of score response as a result of this and the athletes not 'sensing' their coach's, teammate's, environment's belief system. It may be that be belief identification in others is skill-based and something which one person may be better at than another. However, belief recognition is something learnt from infancy, and behaviours are used to establish how someone is thinking or feeling (Trauble et al., 2010). As children develop, and get older, they are able to discern different beliefs in others, again, based on behaviour they exhibit (Flavell et al., 1992). Therefore, it is a logical to assume that adults too continue this process of using behavioural cues to understand beliefs of others. Israelashvili and colleagues (2019) showed that this indeed the case, and more significantly, the representation of other's beliefs reflects reality.

The second possible limitation of asking athletes to discuss the beliefs of others in their performance environment is the fear of reprisals from those people. It is conceivable that, within a performance environment, a practitioner could use the PICQ-A to establish irrationality within the climate and show a coach who drives irrational beliefs within the team or group of athletes. This may then be fed back to the coach in order to explore next steps of working solely with the coach to develop their rationality. However, this could come with some fear of reprisals and therefore, athletes score more favourably. Research around this area tends to focus on severe bullying and abusive behaviours within coach-athlete relationships (e.g., Marracho, et al, 2023). However, there may be fear of lower level, but still inappropriate behaviours, such as non-selection (Slade et al., 2024). In order to remedy this possible limitation, there is a need for thorough contracting with the sport psychology

practitioner, the coach, team or group of athletes, and making sure there is a definite understanding of the processes and how it can be beneficial (Woolway & Harwood, 2019).

A final, broader, limitation of the development of the PICQ-A is that the participants used within the development of the PICQ-A were largely from and competing in western countries and tended to be from the UK or USA. For example, across all studies 69.14% of participants were from the UK or USA. The remaining 30.86% also consisted of western countries outside of the UK and USA, for example, Ireland. As a result, the cohort from western countries is above 70%. Therefore, it would be useful for scholars to explore the use of the PICQ-A within other countries and cultures.

4.5 Recommendations for Future research

The notion of an irrational climate is novel and something which has not yet been conceptualised within the extant literature. As a result, it opens many avenues for investigation and to research concepts which could be tested using the PICQ-A within sporting environments. In addition to providing a novel approach to climate research, the irrational climate concept has the potential to reshape perspectives on REBT and influence how it is applied within organisations.

REBT works on the premise that one experiences emotional or behavioural dysfunction because of the way they interpret adversity (i.e., What does the situation I am in say about me?) not because of the situation itself or people involved in the situation. This thesis posits that it is that there are forces on one's irrationality which are not necessarily derived from our own irrational beliefs alone. The premise of an irrational climate is that the people within the environment have a direct and indirect influence on how individuals perceive irrationality. As a result of this shift in ideas, there is scope and a need to explore this empirically. Within the present PhD social learning theory has been used to establish a

mechanism which influences this emotional, cognitive, behavioural, belief contagion. However, there is a need to synthesise theory and empirical evidence with these ideas. Additionally, global evaluation of worth has been identified as being a standalone irrational belief and not incorporated within the four irrational beliefs as previously illustrated within the extant literature. For example, the two-factor model of GEW and demandingness, awfulizing, and frustration intolerance (DAFI). There may be many reasons for this, for instance the items within the PICQ-A could have been considered to be too introspective and needing an excellent level of self-awareness to be able to answer with full clarity. As a result of this, participants may not have answered the questionnaire based on their understanding of their own deeper level irrational beliefs or schemas (see. David et al., 2002). Therefore, moving away from the signals sent by those within the environment or the environment itself. It is imperative to explore the notion of GEW being more of an irrational schema than an irrational belief and possibly sits one rung below the other irrational beliefs.

Previous thinking from Ellis (2001) hypothesised that demandingness was the primary irrational belief with awfulizing, frustration intolerance, and global evaluation of worth were secondary irrational beliefs predicated by demandingness. This may have suggested that demandingness was the easiest type of irrational belief to be identified, mainly because of the understanding that demandingness is exemplified by demanding words, such as must, should, have to, need to, etc. However, it may also mean that the other three irrational beliefs are more difficult to identify for those not well versed in REBT. What has been elucidated in this thesis is that GEW may be harder to identify than the other three irrational beliefs and therefore, require greater levels of self-awareness and introspection to be able to identify when an athlete or other people are evaluating their worth based on their performances. Therefore, it is useful to establish this concept in greater detail and explore

whether GEW acts more like a schema, as mentioned by David et al. (2002) or whether there is something else happening within the irrational beliefs.

Returning to a previously identified area of research, there is a need to understand the mechanisms of the transference of beliefs from key stakeholders and the individual athletes, and indeed, if there are any. Research has previously understood that there is a transference of beliefs from coaches to athletes (Horn, 2008), though this has not been established with vigorous empirical tests and has not been done through the lens of REBT. The exploration of this in greater, empirical detail would establish further validity for the irrational climate concept and give greater understanding of the irrational climate model (seen in figure 2.3). Developing an understanding of one's relational identity to the group may offer an explanation as to how this transference of beliefs may occur, in particular how an individual may internalise aspects of their relation to the group or team. For example, an athlete may think "my team's success is my success". Suggesting that one's own success or failure is predicated by the outcomes of their team's performance, rather than just their own (Sluss et al., 2024).

Finally, there is scope to modify the PICQ-A to measure irrational climates in other sectors, for example, businesses. The model itself lends itself to other divisions of climate research which focus on teams, groups of individuals, or organisations with management structures. Therefore, modifying the language used in the questions and exploring their validity and reliability within other sectors would be useful to understand irrational climates across psychology as a whole rather than pigeonholing it to sporting environments.

4.6 Conclusion

In conclusion, this thesis introduces the novel concept of an irrational climate. The PhD has explored possible mechanisms involved in the development and maintenance of an

irrational climate (Chapter 2). However, in order to test this phenomenon, it is imperative that researchers have the opportunity to test and empirically measure the concept. Therefore, this thesis devised a questionnaire to measure the components of an irrational climate from an REBT perspective. Chapter 3 explored the methods utilised to develop a valid and reliable measure. Within study 1, 91 items with content and face validity were generated. These items were then analysed based on hypothesised factor structures (e.g., four irrational beliefs) and items were refined to develop a more succinct measure. Study 2 resulted in two factor models, GEW and DAFI (two-factors), and coach, teammate and environment (CTE; three factors). In study 3, the two factor models were further tested and both were found to reach acceptable model fit and therefore satisfied statistical guidelines. Study 4 identified that the PICQ-A has good levels of criterion validity. Firstly, through testing the PICQ-A against other, similar measures (concurrent validity) and finding statistically significant correlations. Secondly, through testing the predictive properties of the PICQ-A (predictive validity) and again found statistically significant correlations between the PICQ-A and hypothesised outcomes of an irrational climate (e.g., burnout, increased negative emotions, reduced performance, among others). Finally, in study 5, the PICQ-A was tested at two seperate time points with the same cohort to establish the stability of the measure across time. Study 5 showed that the PICQ-A has strong test-retest reliability. This thesis, therefore, developed a highly reliable and valid psychometric test of an irrational climate. The present PhD finally offered methods of use for the PICQ-A in applied settings and also offered opportunities for further research.

Chapter 5

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Appendix

Appendix 3.1: Chapter 3 Ethical Approval

Manchester Metropolitan University

21/04/2023
Project Title: Development and Validation of the Athlete Perceived Climate Questionnaire

EthOS Reference Number: 42906

Ethical Opinion

Dear Ryan Bailey,

The above amendment was reviewed by the Health and Education Research Ethics and Governance Committee and, on the 21/04/2023, was given a favourable ethical opinion. The approval is in place until 25/10/2024 .

Conditions of favourable ethical opinion

Application Documents

Document Type	File Name	Date	Version
Additional Documentation	Participant Information Sheet - EFA	21/04/2023	3.0
Additional Documentation	Protocol v1.5.4	21/04/2023	1.5.4

The Health and Education Research Ethics and Governance Committee favourable ethical opinion is granted with the following conditions

Adherence to Manchester Metropolitan University's Policies and procedures

This ethical approval is conditional on adherence to Manchester Metropolitan University's Policies, Procedures, guidance and Standard Operating procedures. These can be found on the Manchester Metropolitan University Research Ethics and Governance webpages.

Amendments

If you wish to make further changes to this approved application, you will be required to submit an amendment. Please visit the Manchester Metropolitan University Research Ethics and Governance webpages or contact your Faculty research officer for advice around how to do this.

We wish you every success with your project.

Health and Education Research Ethics and Governance Committee

For help with this application, please first contact your Faculty Research Officer. Their details can be found here

Appendix 3.1.1: Chapter 3 Ethical Approval Addendum

21/11/2023
Project Title: Development and Validation of the Athlete Perceived Climate Questionnaire

EthOS Reference Number: 42906

Ethical Opinion

Dear Ryan Bailey,

The above amendment was reviewed by the Health and Education Research Ethics and Governance Committee and, on the 21/11/2023, was given a favourable ethical opinion. The approval is in place until 04/10/2024 .

Conditions of favourable ethical opinion

Application Documents

Document Type	File Name	Date	Version
Additional Documentation	Protocol v1.5.5	16/11/2023	v1.5.5

The Health and Education Research Ethics and Governance Committee favourable ethical opinion is granted with the following conditions

Adherence to Manchester Metropolitan University's Policies and procedures

This ethical approval is conditional on adherence to Manchester Metropolitan University's Policies, Procedures, guidance and Standard Operating procedures. These can be found on the Manchester Metropolitan University Research Ethics and Governance webpages.

Amendments

If you wish to make further changes to this approved application, you will be required to submit an amendment. Please visit the Manchester Metropolitan University Research Ethics and Governance webpages or contact your Faculty research officer for advice around how to do this.

We wish you every success with your project.

Health and Education Research Ethics and Governance Committee

For help with this application, please first contact your Faculty Research Officer. Their details can be found here

Appendix 3.2: Chapter 3 Participant Information Sheet

Performance Environment Survey

1. Invitation to research
We would like to invite you to take part in a research study. Before you decide you need to understand why the research is being conducted and what it would involve for you. Please take time to read the following information carefully. Ask questions if anything you read is not clear or would like more information. Take time to decide whether or not to take part.

2. Why have I been invited?
You have been invited to this study as you are an athlete who plays an individual or team sport.

3. Do I have to take part?
It is up to you to decide. We will describe the study and go through the information sheet, which we will give to you. We will then ask you to sign a consent form to show you agreed to take part. You are free to withdraw at any point until 1st March 2023, without giving a reason.

4. What will I be asked to do?
You will be asked to complete one questionnaire and should take no longer than 30 minutes.

5. Are there any risks if I participate?
There is a possibility that this study may cause some psychological harm, though it is unlikely. The subject matter may be distressing as some questions may trigger previous experiences. However, if this is the case, please contact MIND (TEL: 0300 123 3393), Samaritans (TEL: 116 123), or the NHS (TEL: 111) who will be able to give you support. If you would like to withdraw, please contact the Martin Turner (contact details below) with your participant identification number (generated prior to beginning the research). If you would like to withdraw, please contact the Martin Turner (contact details below) with your participant identification number (generated prior to beginning the research).

6. Are there any advantages if I participate?

There is no direct advantage for you taking part in this research.

7. What will happen with the data I provide?
Fully anonymous data will be stored securely for 10 years.
What will happen to the results of the research study?
The results of this study will be written up and submitted to a peer-reviewed journal and potentially presented at a sports psychology conference. I must remind you that your data will remain confidential and anonymous throughout. We are aiming to publish this research in a peer-reviewed journal, and this will be open access, meaning anyone will be able to read the research article.

Who has reviewed this research project?
The research is being completed as part of a Psychology PhD at Manchester Metropolitan University. The study has been reviewed and approved by Manchester Metropolitan University.

Who do I contact if I have concerns about this study or I wish to complain?
If you have any concerns regarding the personal data collected from you, our Data Protection Officer can be contacted using the legal@mmu.ac.uk e-mail address, by calling 0161 247 3331 or in writing to Data Protection Officer, Legal Services, All Saints Building, Manchester Metropolitan University, Manchester, M15 6BH. You also have a right to lodge a complaint in respect of the processing of your personal data with the Information Commissioner's Office as the supervisory authority. Please see contact Dr Claire Fox, Head of Research Ethics and Governance for the Faculty of Health and Education, FOHE-ethics@mmu.ac.uk.

Name of the Researcher/Research Team Members
Primary Researcher: Mr Ryan Bailey, Email: 210440871@stu.mmu.ac.uk
Supervising Research: Dr Martin Turner, Email: m.turner@mmu.ac.uk

THANK YOU FOR CONSIDERING PARTICIPATING IN THIS PROJECT

Please tick the box to confirm your agreement:

I confirm that I have read and understood the Participant Information Sheet. I have had the opportunity to consider the information, ask questions, and have had these answered satisfactorily.	
I understand that participation is voluntary and that I am free to withdraw from the study, at any time, without having to give a reason, by closing the browser. Once I have completed the study I am can withdraw my data up until one month after I take part.	
I understand that the data I provide will be used for this research project only. All data will be anonymized and stored safely in a password-protected folder on a MMU server. After 10 years all study data will be destroyed.	
I agree that all data collected can be used for publication in scientific journals, presented at scientific forums (e.g. conferences, seminars, workshops), at business consultancy work, and the findings of the research can be shared using social media. I understand that all data will be presented anonymously.	
I understand that data collected as part of this study will be made available via an open access repository. All data will be anonymous.	
On this basis I am happy to participate in the project.	

If you have any general questions about the study, please contact the main researcher:
Mr Ryan Bailey,
Email: 21440871@stu.mmu.ac.uk

Appendix 3.2.1: Chapter 3 Debrief Sheet

Manchester Metropolitan University

DEBRIEF INFORMATION

Development of the Athlete Perceived Irrational Climate Questionnaire

Thank you for participating in the present study regarding the development of the athlete irrational climate questionnaire. This study investigated the accuracy and clarity of the APICQ questions.

I would like to remind you that you have the right to withdraw until the time when data has been analysed (the date will be given at end of the experiment). Furthermore, your information will remain anonymous and confidential throughout.

If you have any questions regarding this study, please feel free to ask the researcher at this time. If you feel some distress as a result of being a participant in this research, then please contact one of the following organisations:

MIND: 0300 123 3393
Samaritans: 116 123
NHS: 111

If you have any questions on queries, the contact details of the primary researcher and supervisor are below.

Contact Details
Primary Researcher
Mr Ryan Bailey

Email: 21440871@stu.mmu.ac.uk

Research Supervisor
Dr Martin Turner

Tel: 0161 247 2000
Email: m.turner@mmu.ac.uk

Appendix 3.3: Chapter 3 Recruitment Poster

Performance Environment Survey

Do you play a sport? If so, I need your help!

If you play a sport at any level and have 20-30 minutes, please complete the performance environment survey to help me with my research. Use the QR code below and follow the instructions.

If you have any questions, please contact Ryan Bailey (primary researcher) on: 21440871@mmu.ac.uk

Appendix 3.4: Iterations of the Perceived Irrational Climate Questionnaire for Athletes (PICQ-A)

Appendix 3.4.1: Chapter 3, Study 1 & 2 - 88-item Version of the PICQ-A

Items	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
When we lose, my teammates act like we are complete failures	1	2	3	4	5
When people make mistakes, my teammates use words like "idiot" or "useless" to describe them	1	2	3	4	5
When people make mistakes, my coach treats them like complete failures	1	2	3	4	5
When I look at my performance environment, I get the impression that you must not make mistakes	1	2	3	4	5
When I look at my performance environment, I get the impression that you are only valuable if you perform well	1	2	3	4	5
When I look at my performance environment, I get the impression that performance absolutely must be perfect	1	2	3	4	5
When I look at my performance environment, I get the impression that losing is the worst thing imaginable	1	2	3	4	5
When I look at my performance environment, I get the impression that it is terrible to not perform well	1	2	3	4	5
Performing poorly is viewed as unbearable in my performance environment	1	2	3	4	5
People in my performance environment cannot tolerate performing poorly	1	2	3	4	5
People in my performance environment cannot stand losing	1	2	3	4	5
People in my performance environment cannot stand failure	1	2	3	4	5
People in my performance environment act as if your value as a human being is dependent on your performance	1	2	3	4	5
People in my performance environment act as if you are a complete failure when you fail	1	2	3	4	5
People in my performance environment act as if they only accept you if you perform well	1	2	3	4	5
Not living up to peoples expectations is seen as intolerable in my performance environment	1	2	3	4	5
My teammates see people as valuable only when they perform well	1	2	3	4	5
My teammates only accept people when they perform well	1	2	3	4	5
My teammates find underperforming intolerable	1	2	3	4	5
My teammates find it unbearable to perform below expectations	1	2	3	4	5
My teammates find it unbearable to fail	1	2	3	4	5
My teammates cannot stand people making mistakes	1	2	3	4	5
My teammates behaviour tells me that we must always perform well	1	2	3	4	5
My teammates act like we must not fail	1	2	3	4	5
My teammates act like we absolutely must not make mistakes	1	2	3	4	5
My teammates act like they cannot stand losing	1	2	3	4	5
My teammates act like I am a bad person when I do not meet their expectations	1	2	3	4	5
My teammates act as if they cannot tolerate failure	1	2	3	4	5
My teammates act as if people's value or worth is dependent upon their abilities	1	2	3	4	5
My teammates act as if it is terrible when we make mistakes	1	2	3	4	5
My teammates act as if it is dreadful when we underperform	1	2	3	4	5
My teammates act as if I am a complete loser	1	2	3	4	5
My performance environment makes it seem like you must meet expectations	1	2	3	4	5
My performance environment makes it seem as if you must not let people down	1	2	3	4	5
My performance environment makes it seem as if you must not fail	1	2	3	4	5
My performance environment makes it seem as if you are worthless if you perform poorly	1	2	3	4	5
My performance environment makes it seem as if you are completely useless if you make mistakes	1	2	3	4	5
My performance environment makes it seem as if you are a bad person when you let people down	1	2	3	4	5
My performance environment makes it seem as if you are a bad person if you do not behave as expected	1	2	3	4	5
My performance environment makes it seem as if not meet peoples expectations is awful	1	2	3	4	5
My performance environment makes it seem as if losing makes you "a complete loser"	1	2	3	4	5
My performance environment makes it seem as if losing is intolerable	1	2	3	4	5

My performance environment makes it seem as if letting people down is intolerable	1	2	3	4	5
My performance environment makes it seem as if it is terrible to fail	1	2	3	4	5
My performance environment gives off the impression that if you let people down then you are a bad person	1	2	3	4	5
My coach treats people as though their value or worth is dependent upon their abilities	1	2	3	4	5
My coach treats people as if they are only valuable when they perform well	1	2	3	4	5
My coach treats me like I am a bad person when I do not behave in the way they expect	1	2	3	4	5
My coach treats me as if I am a complete loser	1	2	3	4	5
My coach sees people as valuable only when they perform well	1	2	3	4	5
My coach says things like "you must perform well"	1	2	3	4	5
My coach finds underperforming intolerable	1	2	3	4	5
My coach finds it unbearable when people perform below expectations	1	2	3	4	5
My coach finds it unbearable to fail	1	2	3	4	5
My coach cannot tolerate things going against us	1	2	3	4	5
My coach cannot stand people making mistakes	1	2	3	4	5
My coach cannot stand losing	1	2	3	4	5
My coach acts like it is dreadful when we underperform	1	2	3	4	5
My coach acts like failing is an absolute disaster	1	2	3	4	5
My coach acts as if they cannot tolerate failure	1	2	3	4	5
My coach acts as if it is terrible when we do not win	1	2	3	4	5
Making mistakes is seen as unbearable in my performance environment	1	2	3	4	5
Making mistakes is seen as an absolute disaster in my performance environment	1	2	3	4	5
Losing is seen as the worst thing imaginable in my performance environment	1	2	3	4	5
Letting people down is seen as awful in my performance environment	1	2	3	4	5
It seems that my coach thinks we absolutely must not fail	1	2	3	4	5
It seems that my coach thinks we absolutely have to be perfect	1	2	3	4	5
It seems like my teammates cannot stand losing	1	2	3	4	5
It is clear that my coach thinks people are useless if they do not perform to expectations	1	2	3	4	5
It is clear that my coach only accepts people when they perform well	1	2	3	4	5
In my performance environment, I get the impression that people who fail are considered "idiots" or "losers"	1	2	3	4	5
In my performance environment there is a "must not lose" mentality	1	2	3	4	5
If you do not behave as expected, people in my performance environment find it unbearable	1	2	3	4	5
I get the sense, from my coach, that I absolutely must meet their expectations	1	2	3	4	5
I get the sense that my teammates view people as useless when they perform poorly	1	2	3	4	5
I get the sense that my teammates think we absolutely have to be perfect	1	2	3	4	5
I get the sense that my teammates think that failure is the worst thing imaginable	1	2	3	4	5
I get the sense that my teammates think people are completely useless when they make mistakes	1	2	3	4	5
I get the sense that my teammates think it is awful when we fail	1	2	3	4	5
I get the sense that my coach thinks people are completely useless when they make mistakes	1	2	3	4	5
I get the sense that I absolutely must meet my teammates' expectations	1	2	3	4	5
For my teammates, losing is an absolute disaster	1	2	3	4	5
For my coach, making mistakes is the worst thing imaginable	1	2	3	4	5
For my coach, losing is an absolute disaster	1	2	3	4	5
Failure is seen as intolerable in my performance environment	1	2	3	4	5
Failure is seen as awful in my performance environment	1	2	3	4	5
A person's worth is dependent on their level of success in my performance environment	1	2	3	4	5
A person's worth is dependent on their ability in my performance environment	1	2	3	4	5

Appendix 3.4.2: Chapter 3, Study 3 - 46-item Version of the PICQ-A

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
My performance environment makes it seem as if you are completely useless if you make mistakes	1	2	3	4	5
My coach treats people as though their value or worth is dependent upon their abilities	1	2	3	4	5
My coach acts like it is dreadful when we underperform	1	2	3	4	5
For my coach, losing is the worst thing imaginable	1	2	3	4	5
My coach acts like failing is an absolute disaster	1	2	3	4	5
For my coach, making mistakes is completely awful	1	2	3	4	5
It seems that my coach thinks we absolutely must not fail	1	2	3	4	5
I get the sense, from my coach, that I absolutely must meet their expectations	1	2	3	4	5
My coach cannot stand losing	1	2	3	4	5
My coach finds it unbearable when people perform below expectations	1	2	3	4	5
My coach finds underperforming intolerable	1	2	3	4	5
It is clear that my coach thinks people are useless if they do not perform to expectations	1	2	3	4	5
When I underperform, my coach treats me as if I am a complete loser	1	2	3	4	5
I get the sense that my coach thinks people are completely useless when they make mistakes	1	2	3	4	5
It is clear that my coach only accepts people when they perform well	1	2	3	4	5
When I look at my performance environment, I get the impression that it is terrible to underperform	1	2	3	4	5
When I look at my performance environment, I get the impression that losing is the worst thing imaginable	1	2	3	4	5
In my performance environment, there is a "must-win" mentality	1	2	3	4	5
My performance environment makes it seem like you must meet expectations	1	2	3	4	5
My performance environment makes it seem as if you must not fail	1	2	3	4	5
In my performance environment, there is a "must not lose" mentality	1	2	3	4	5
If you do not behave as expected, people in my performance environment find it unbearable	1	2	3	4	5
People in my performance environment cannot stand failing to reach their goals	1	2	3	4	5
People in my performance environment cannot stand losing	1	2	3	4	5
My performance environment makes it seem as if you are totally worthless if you perform poorly	1	2	3	4	5
My performance environment makes it seem as if you are a completely bad person when you let people down	1	2	3	4	5
My performance environment gives off the impression that if you let people down then you are a bad person	1	2	3	4	5
In my performance environment, I get the impression that people who fail are considered "idiots" or "losers"	1	2	3	4	5
My performance environment makes it seem as if losing makes you "a complete loser"	1	2	3	4	5
People in my performance environment act as if your value as a human being is dependent on your performance	1	2	3	4	5
I get the sense that my teammates think it is awful when we fail	1	2	3	4	5
My teammates act as if it is dreadful when we underperform	1	2	3	4	5
My teammates act as if it is terrible when we make mistakes	1	2	3	4	5
I get the sense that my teammates think that failure is the worst thing imaginable	1	2	3	4	5
For my teammates, losing is an absolute disaster	1	2	3	4	5
On the field of play, my teammates act like we must not fail	1	2	3	4	5
My teammates' behaviour tells me that we must always perform well	1	2	3	4	5
I get the sense that my teammates think we absolutely have to be perfect	1	2	3	4	5
My teammates act like we absolutely must not make mistakes	1	2	3	4	5
My teammates act like they cannot stand losing	1	2	3	4	5
My teammates find it unbearable to perform below expectations	1	2	3	4	5
My teammates act as if they cannot tolerate failure	1	2	3	4	5
On the field of play, my teammates cannot stand people making mistakes	1	2	3	4	5
I get the sense that my teammates view people as totally useless when they perform poorly	1	2	3	4	5
My teammates act as if people's value or worth is dependent upon their abilities	1	2	3	4	5
I get the sense that my teammates think people are completely useless when they make mistakes	1	2	3	4	5

Appendix 3.4.3: Chapter 3, Study 4 & 5 29-item Version of the PICQ-A

Performance Environment Survey

This survey is about your perceptions of your coach, teammates, and the performance environment.

In this survey, some of the statements use the term “performance environment”. This refers to the **physical setting** you are in when you engage in your sport. For example, this could include time spent training, competing, socialising, or any other activity associated with your sport.

We also use the term “people” within some of the statements. This refers to **anyone you regularly interact with** in your performance environment.

Please read each statement carefully. You will be asked to indicate your level of agreement to each statement on a scale from 1 (strongly disagree) to 5 (strongly agree). Choose the number that best corresponds to your level of agreement on each statement.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
For my coach, losing is the worst thing imaginable	1	2	3	4	5
It is clear that my coach thinks people are useless if they do not perform to expectations	1	2	3	4	5
My teammates act as if it is terrible when we make mistakes	1	2	3	4	5
My coach acts like failing is an absolute disaster	1	2	3	4	5
My performance environment makes it seem as if losing makes you "a complete loser"	1	2	3	4	5
For my coach, making mistakes is completely awful	1	2	3	4	5
My teammates find it unbearable to perform below expectations	1	2	3	4	5
If you do not behave as expected, people in my performance environment find it unbearable	1	2	3	4	5
My teammates act as if they cannot tolerate failure	1	2	3	4	5
I get the sense that my teammates think that failure is the worst thing imaginable	1	2	3	4	5
People in my performance environment cannot stand failing to reach their goals	1	2	3	4	5
It seems that my coach thinks we absolutely must not fail	1	2	3	4	5
My performance environment makes it seem as if you must not fail	1	2	3	4	5
My teammates act like we absolutely must not make mistakes	1	2	3	4	5
I get the sense that my teammates view people as totally useless when they perform poorly	1	2	3	4	5
I get the sense that my coach thinks people are completely useless when they make mistakes	1	2	3	4	5
My coach finds it unbearable when people perform below expectations	1	2	3	4	5
In my performance environment, there is a "must not lose" mentality	1	2	3	4	5
My teammates act as if people's value or worth is dependent upon their abilities	1	2	3	4	5
My coach finds underperforming intolerable	1	2	3	4	5
I get the sense that my teammates think people are completely useless when they make mistakes	1	2	3	4	5
On the field of play, my teammates cannot stand people making mistakes	1	2	3	4	5
People in my performance environment act as if your value as a human being is dependent on your performance	1	2	3	4	5
When I look at my performance environment, I get the impression that losing is the worst thing imaginable	1	2	3	4	5
My coach acts like it is dreadful when we underperform	1	2	3	4	5
My coach cannot stand losing	1	2	3	4	5
In my performance environment, there is a "must-win" mentality	1	2	3	4	5
My performance environment makes it seem like you must meet expectations	1	2	3	4	5
People in my performance environment cannot stand losing	1	2	3	4	5

Appendix 3.5: Chapter 3 Concurrent Validity Measures

Appendix 3.5.1: Irrational Performance Beliefs Inventory (iPBI; Turner et al., 2016)

Irrational Performance Belief Inventory (iPBI)

Using the following scale, please circle a number from 1 to 5 for each statement to indicate the level you agree or disagree with the following statements.

	Strong Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

Decisions that affect me must be justified	1	2	3	4	5
I have to be viewed favourably by people that matter to me	1	2	3	4	5
I need others to think that I make a valuable contribution	1	2	3	4	5
I absolutely should not be snubbed by people that matter to me	1	2	3	4	5
I must not be dismissed by my peers	1	2	3	4	5
I have to be respected by the members of my team	1	2	3	4	5
I need my athletes to act respectfully towards me	1	2	3	4	5
I can't bear not being given chances	1	2	3	4	5
I can't stand not reaching my goals	1	2	3	4	5
I can't bear not succeeding in things that are important to me	1	2	3	4	5
I can't tolerate it when I fail at something that means a great deal to me	1	2	3	4	5
I can't stand failing in things that are important to me	1	2	3	4	5
I can't bear not getting better at what I do	1	2	3	4	5
I couldn't stand it if my competencies did not continually develop and improve	1	2	3	4	5
It's awful to not be treated fairly by my peers	1	2	3	4	5
It's awful if others do not approve of me	1	2	3	4	5
It's awful if others think I do not make a valuable contribution	1	2	3	4	5
It would be terrible to be dismissed by my peers	1	2	3	4	5
It is appalling if others do not give me chances	1	2	3	4	5
It would be awful if my position as the coach was not secure	1	2	3	4	5
It's terrible if my team do not respect me	1	2	3	4	5
If decisions that affect me are not justified, it shows that I am worthless	1	2	3	4	5
If others think I am no good at what I do, it shows I am worthless	1	2	3	4	5
If I face setbacks it goes to show how stupid I am	1	2	3	4	5
If I am not given opportunities, then it shows that I am not a worthwhile person	1	2	3	4	5
I am a loser if I do not succeed in things that matter to me	1	2	3	4	5
If my position as the coach was not secure, then it would show I am worthless	1	2	3	4	5
If my competencies did not continually develop and improve, it would show what a failure I am	1	2	3	4	5

Appendix 3.5.2: Empowering and Disempowering Motivational Climate Questionnaire for Coaches (EDMCQ-C; Appleton et al., 2016)

Empowering and Disempowering Motivational Climate Scale – Coaches

		Strongly Disagree	**Disagree**	**Neither disagree nor agree**	**Agree**	**Strongly Agree**
Task-Involving						
1	My coach encouraged players to try new skills	1	2	3	4	5

4	My coach tried to make sure players felt good when they tried their best	1	2	3	4	5
11	My coach made sure players felt successful when they improved	1	2	3	4	5
13	My coach acknowledged players who tried hard	1	2	3	4	5
18	My coach made sure that each player contributed in some important way	1	2	3	4	5
23	My coach made sure everyone had an important role on the team	1	2	3	4	5
28	My coach let us know that all the players are part of the team's success	1	2	3	4	5
30	My coach encouraged players to help each other learn	1	2	3	4	5
34	My coach encouraged players to really work together as a team	1	2	3	4	5
Autonomy-supportive						
3	My coach gave players choices and options	1	2	3	4	5
6	My coach thought that it is important that players participate in this sport because the players really want to	1	2	3	4	5
16	My coach answered players' questions fully and carefully	1	2	3	4	5
22	When my coach asked players to do something, he or she tried to explain why this would be good to do so	1	2	3	4	5
32	My coach thought that it is important for players to play this sport because they (the players) enjoy it	1	2	3	4	5
Socially-supportive						
8	My coach could really be counted on to care, no matter what happened	1	2	3	4	5
14	My coach really appreciated players as people, not just as athletes	1	2	3	4	5
27	My coach listened openly and did not judge players' personal feelings	1	2	3	4	5
Ego-involving						
5	My coach substituted players when they made a mistake	1	2	3	4	5
9	My coach gave most attention to the best players	1	2	3	4	5
10	My coach yelled at players for messing up	1	2	3	4	5
19	My coach had his or her favorite players	1	2	3	4	5
21	My coach only praised players who performed the best during a match	1	2	3	4	5
25	My coach thought that only the best players should play in a match	1	2	3	4	5
33	My coach favored some players more than others	1	2	3	4	5
Controlling coaching						
2	My coach was less friendly with players if they didn't make the effort to see things his/her way	1	2	3	4	5
7	My coach was less supportive of players when they were not training and/or playing well	1	2	3	4	5
12	My coach paid less attention to players if they displeased him or her	1	2	3	4	5
17	My coach was less accepting of players if they disappointed him or her	1	2	3	4	5
24	My coach shouts at players in front of others to make them do certain things	1	2	3	4	5
26	My coach threatened to punish players to keep them in line during training	1	2	3	4	5
29	The coach mainly used rewards/ praise to make players complete all the tasks he/she sets during training	1	2	3	4	5
31	My coach tried to interfere in aspects of players' lives outside of this sport	1	2	3	4	5

Appendix 3.5.3: Perfectionistic Climate Questionnaire in Sport (PCQ-S; Grugan et al., 2021)

Perfectionistic Climate Questionnaire - Sport

Using the following scale, please circle a number from 1 to 5 for each statement to indicate the level you agree or disagree with the following statements.

	Strong Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
The coach expects performances to be perfect at all times.	1	2	3	4	5
The coach expects performances to be perfect.	1	2	3	4	5

The coach expects performances to include no errors.	1	2	3	4	5
The coach expects nothing less than perfect performance.	1	2	3	4	5
The coach criticises even the best performances.	1	2	3	4	5
The coach criticises performances that are not perfect.	1	2	3	4	5
The coach criticises all mistakes no matter how small.	1	2	3	4	5
The coach criticises performances all the time.	1	2	3	4	5
The coach uses his/her position unfairly to try to make performances perfect.	1	2	3	4	5
The coach uses threats to try to stop mistakes in performances.	1	2	3	4	5
The coach uses punishment to try to make performances perfect.	1	2	3	4	5
The coach withholds rewards if performances are not perfect.	1	2	3	4	5
The coach is less approving when performances are not perfect.	1	2	3	4	5
The coach is friendlier when performances are perfect.	1	2	3	4	5
The coach is kinder when no mistakes are made when performing.	1	2	3	4	5
The coach is less friendly when performances are not perfect.	1	2	3	4	5
The coach is anxious about the possibility of even small mistakes when performing.	1	2	3	4	5
The coach is tense when mistakes are more likely to happen during performances.	1	2	3	4	5
The coach is nervous that things will not go perfectly during performance.	1	2	3	4	5
The coach is concerned about mistakes during performance.	1	2	3	4	5
The coach expects performances to be perfect at all times.	1	2	3	4	5
The coach expects performances to be perfect.	1	2	3	4	5
The coach expects performances to include no errors.	1	2	3	4	5
The coach expects nothing less than perfect performance.	1	2	3	4	5
The coach criticises even the best performances.	1	2	3	4	5
The coach criticises performances that are not perfect.	1	2	3	4	5
The coach criticises all mistakes no matter how small.	1	2	3	4	5
The coach criticises performances all the time.	1	2	3	4	5

Appendix 3.6: Chapter 3 Predictive Validity Questionnaires

Appendix 3.6.1: Interpersonal Behaviours Questionnaire (IBQ: Rocchi et al., 2017)

Interpersonal Behaviours Questionnaire

Please circle the answer which best describes how your coach behaves within your sporting environment.

	Do not agree			Somewhat agree		completely agree	
My coach gives me the freedom to make my own choices.	1	2	3	4	5	6	7
My coach supports my decisions.	1	2	3	4	5	6	7
My coach supports the choices I make for myself.	1	2	3	4	5	6	7

My coach encourages me to make my own decisions.	1	2	3	4	5	6	7
My coach pressures me to do things their way.	1	2	3	4	5	6	7
My coach imposes their opinions on me.	1	2	3	4	5	6	7
My coach pressures me to adopt certain behaviours.	1	2	3	4	5	6	7
My coach limits my choices.	1	2	3	4	5	6	7
My coach encourages me to improve my skills.	1	2	3	4	5	6	7
My coach provides valuable feedback.	1	2	3	4	5	6	7
My coach acknowledges my ability to achieve my goals.	1	2	3	4	5	6	7
My coach tells me that I can accomplish things.	1	2	3	4	5	6	7
My coach points out that I will likely fail.	1	2	3	4	5	6	7
My coach sends me the message that I am incompetent.	1	2	3	4	5	6	7
My coach doubts my capacity to improve.	1	2	3	4	5	6	7
My coach questions my ability to overcome challenges.	1	2	3	4	5	6	7
My coach is interested in what I do.	1	2	3	4	5	6	7
My coach takes the time to get to know me.	1	2	3	4	5	6	7
My coach honestly enjoys spending time with me.	1	2	3	4	5	6	7
My coach relates to me.	1	2	3	4	5	6	7
My coach does not comfort me when I am feeling low.	1	2	3	4	5	6	7
My coach is distant when we spend time together.	1	2	3	4	5	6	7
My coach does not connect with me.	1	2	3	4	5	6	7
My coach does not care about me.	1	2	3	4	5	6	7

Appendix 3.6.2: Leadership Scale in Sport – Autocratic (Chelladurai & Saleh, 1980)

Leadership Scale for Sport

Using the following scale, please circle a number from 1 to 5 for each statement to indicate the level you agree or disagree with the following statements, regarding your coach.

	Never	Seldom 25% of the time	Occasionally 50% of the time	Often 75% of the time	Always
My coach works relatively independently of the athletes	1	2	3	4	5
My coach does not explain their actions	1	2	3	4	5
My coach refuses to compromise a point	1	2	3	4	5
My coach keeps to themselves	1	2	3	4	5
My coach speaks in a manner not to be questioned	1	2	3	4	5

Appendix 3.6.3: Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2009)

Athlete Burnout Questionnaire

Using the following scale, please circle a number from 1 to 5 for each statement to indicate the level you agree or disagree with the following statements.

	Almost Never	Rarely	Sometimes	Frequently	Almost Always

I'm accomplishing many worthwhile things in sport	1	2	3	4	5
I feel so tired from my training that I have trouble finding energy to do other things	1	2	3	4	5
The effort I spend in sport would be better spent doing other things	1	2	3	4	5
I feel overly tired form my sport participation	1	2	3	4	5
I am not achieving much in sport	1	2	3	4	5
I don't care as much about my sport performance as I used to	1	2	3	4	5
I am not performing up to my ability in my sport	1	2	3	4	5
I feel "wiped out" form sport	1	2	3	4	5
I'm not into sport like I used to be	1	2	3	4	5
I feel physically worn out form sport	1	2	3	4	5
I feel less concerned about being successful in sport than I used to	1	2	3	4	5
I am exhausted by the mental and physical demands of sport	1	2	3	4	5
It seems that no matter what I do, I don't perform as well as I should	1	2	3	4	5
I feel successful at sport	1	2	3	4	5
I have negative feelings toward sport	1	2	3	4	5

Appendix 3.6.4: Multidimensional Emotion Questionnaire (MEQ; Klonsky et al., 2019)

Multidimensional Emotion Questionnaire

This questionnaire asks about your experience of different emotions such as sad, afraid, angry, etc. For each emotion, you will be asked to rate your experience based on 4 questions. Please use the scale to indicate which answer best describes your experience of each emotion.

Sad	How often do you experience the emotion?				
	About once a month	About once a week	About once a day	About 2-3 times a day	More than 3 times a day
	Typically, how intense is the emotion when it occurs?				

	Very low	Low	Moderate	High	Very High
	How long does the emotion typically last?				
	Less than 1 minute	1-10 minutes	11-60 minutes	1-4 hours	Over 4 hours
	How well can you regulate the emotion when it occurs?				
	Very easy	Easy	Moderate	Difficult	Very Difficult
Afraid	How often do you experience the emotion?				
	About once a month	About once a week	About once a day	About 2-3 times a day	More than 3 times a day
	Typically, how intense is the emotion when it occurs?				
	Very low	Low	Moderate	High	Very High
	How long does the emotion typically last?				
	Less than 1 minute	1-10 minutes	11-60 minutes	1-4 hours	Over 4 hours
	How well can you regulate the emotion when it occurs?				
	Very easy	Easy	Moderate	Difficult	Very Difficult
Angry	How often do you experience the emotion?				
	About once a month	About once a week	About once a day	About 2-3 times a day	More than 3 times a day
	Typically, how intense is the emotion when it occurs?				
	Very low	Low	Moderate	High	Very High
	How long does the emotion typically last?				
	Less than 1 minute	1-10 minutes	11-60 minutes	1-4 hours	Over 4 hours
	How well can you regulate the emotion when it occurs?				
	Very easy	Easy	Moderate	Difficult	Very Difficult
Ashamed	How often do you experience the emotion?				
	About once a month	About once a week	About once a day	About 2-3 times a day	More than 3 times a day
	Typically, how intense is the emotion when it occurs?				
	Very low	Low	Moderate	High	Very High
	How long does the emotion typically last?				
	Less than 1 minute	1-10 minutes	11-60 minutes	1-4 hours	Over 4 hours
	How well can you regulate the emotion when it occurs?				
	Very easy	Easy	Moderate	Difficult	Very Difficult
Anxious	How often do you experience the emotion?				
	About once a month	About once a week	About once a day	About 2-3 times a day	More than 3 times a day
	Typically, how intense is the emotion when it occurs?				
	Very low	Low	Moderate	High	Very High
	How long does the emotion typically last?				
	Less than 1 minute	1-10 minutes	11-60 minutes	1-4 hours	Over 4 hours
	How well can you regulate the emotion when it occurs?				
	Very easy	Easy	Moderate	Difficult	Very Difficult

Appendix 3.6.5: Athlete Subjective Performance Scale (ASPS; Lee et al., 2023)

Subjective Sport Performance Satisfaction

Please rate your performance during the past week according to your own opinion. Use the scale between 1-10: 1 = “not at all satisfied”, 10 = “fully satisfied”

	Not at all satisfied									Fully Satisfied
Overall – to what extent are you satisfied with your sporting performance at the moment?	1	2	3	4	5	6	7	8	9	10
To what extent did you generally contribute to the success of the team/individual performance?	1	2	3	4	5	6	7	8	9	10
To what extent are your capabilities truly reflected in your usual performance?	1	2	3	4	5	6	7	8	9	10

To what extent do you contribute to improving the performance of the athletes around you?	1	2	3	4	5	6	7	8	9	10
To what extent are you satisfied with your functioning during challenging moments?	1	2	3	4	5	6	7	8	9	10
To what extent do you think the coach is satisfied with your performance?	1	2	3	4	5	6	7	8	9	10