

JYU DISSERTATIONS 532

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**Saara Haapanen**

**Cross-Cultural Study of Social  
Environmental and Individual  
Antecedents of Psychobiosocial  
States in High-Level Finnish and  
North American Athletes**

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UNIVERSITY OF JYVÄSKYLÄ  
FACULTY OF SPORT AND  
HEALTH SCIENCES

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Kasper Salin

Faculty of Sport and Health Sciences, University of Jyväskylä

Ville Korkiakangas

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## ABSTRACT

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This dissertation aims to explore the relationship between the coach-created autonomy supportive climate, perceived competence, achievement goals, competition appraisals and performance-related psychobiosocial state in two samples of Finnish ( $n = 484$ ,  $M_{age} = 20.3$ ,  $SD = 4.21$ ) and North American ( $n = 243$ ,  $M_{age} = 19.49$ ,  $SD = 6.06$ ) high-level athletes. In both samples of athletes, structural equation modeling indicated that perceptions of an autonomy-supportive climate were positively associated with perceived competence and mastery-approach goals. Competence was positively related to approach goals, challenge appraisals, and functional psychobiosocial states, while it was negatively related to mastery-avoidance goals. Avoidance goals were positively related to threat appraisals, which were positively associated with dysfunctional psychobiosocial states. A second aim included exploring the causal relationships between individual antecedents of functional and dysfunctional psychobiosocial states over a three-month time period. In the case of functional states, a cross-lagged panel analysis indicated that for both samples, perceptions of an autonomy-supportive climate and competence were significant positive predictors of challenge appraisals at Time 1. Mastery-approach goals were positive predictors of functional states and challenge appraisals, which in turn positively predicted functional states at Time 1. Challenge appraisals at Time 1 positively predicted challenge appraisals at Time 2, which in turn, positively predicted functional states at Time 2. Regarding dysfunctional states in both samples, threat appraisals were negatively predicted by perceptions of an autonomy-supportive climate and positively predicted by avoidance goals at Time 1. Perceived competence negatively predicted dysfunctional states at Time 1. Threat appraisals at Time 1 were significant positive predictors of threat appraisals at Time 2. Dysfunctional states at Time 1 were significant predictors of dysfunctional states at Time 2 for Finnish athletes only. Results indicate that the social environment and individual factors influence psychobiosocial states, with an autonomy-supportive climate being the most favorable. This research extends previous work by examining variables that lead to functional and dysfunctional psychobiosocial states. It further explores how this relationship plays out over a three-month period and how coaches and the climate they create can influence it.

Keywords: self-determination theory, achievement goal theory, IZOF model, MuSt theory, coach created climate

## TIIVISTELMÄ (ABSTRACT IN FINNISH)

Haapanen, Saara

Kulttuurienvälinen tutkimus yhteiskunnallisesta ympäristöstä ja psykobiososiaalisten tilojen yksilöllisistä edeltäjistä korkean tason suomalaisissa ja pohjois-amerikkalaisissa urheilijoissa

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Tähtäimenä oli tutkia valmentajan luomaa itsenäisyyttä tukevaa ilmapiiriä, havaittujen osaamisen tehokkuutta, saavutustavoitteiden, ja kilpailuarvioiden suhdetta suorituskyykyyn liittyviin psykobiososiaalisiin tiloihin. Sisältäen kaksi korkean tason urheilijoita käsittävää näytettä; suomalainen ( $n = 484$ ,  $M_{ikä} = 20,3$ ,  $SD = 4,21$ ) ja Pohjois-Amerikan ( $n = 243$ ,  $M_{ikä} = 19,49$ ,  $SD = 6,06$ ) korkean tason urheilijoita.

Molemmissa näytteissä rakenteellisten yhtälöiden mallintaminen osoitti käsitteitä itsenäisyyttä tukevasta ilmastosta, joka liittyy positiivisesti havaittuun osaamiseen ja hallitsemisen lähestymistavoitteisiin. Osaaminen liittyi positiivisesti lähestymistavoitteisiin, haastearviointeihin ja toiminnallisiin toimitushäiriöisiin psykobiososiaalisiin tiloihin ja negatiivisesti mestaruuden välttämisen tavoitteisiin. Välttämistavoitteet liittyivät positiivisesti uhkien arviointiin, mikä liittyi positiivisesti toimintahäiriöisiin psykobiososiaalisiin tiloihin. Toisessa tavoitteessa tarkasteltiin syy-yhteyksiä yksittäisten toiminnallisten ja toimintahäiriöllisten psykobiososiaalisten tilojen edeltäjien välillä, kolmen kuukauden ajan. Ristipaneelianalyysi osoitti, että arvioinnit molemmissa näytteissä: oivallus itsenäisyyttä tukevasta ilmastosta ja pätevyys olivat merkityksellisen positiivisia ennustajia aikana 1. Toiminnan hallitsemisen päämäärät olivat positiivisia ennustajia käytännöllisille tiloille ja haaste arvioinneille, jotka sittemmin ennakoivat käytännöllisiä tiloja aikana 1. Haaste arvioinnit aikana1 ennustivat positiivisia haaste arviointeja aikana 2, jotka puolestaan positiivisesti ennustivat päteviä tiloja aikana 2. Ottaen huomioon toimintahäiriöiden tila molemmissa näytteissä; uhka-arvioinnit olivat negatiivisiksi ennustettu havaittavasti itsenäisyyttä tukevassa ilmastossa ja positiiviseksi ennustettu päämäärien vaihtamistilassa aikana 1. Huomattava pätevyys negatiivisesti ennusti toimintahäiriöiden tilaa aikana 1. Uhka-arvioinnit aikana 1 olivat huomattavia positiivisia ennustajia uhka- arviointeihin aikana 2. Toimintahäiriölliset tilat aikana1 olivat huomattavia ennustajia toimintahäiriöille aikana 2 ainoastaan suomalaisten urheilijoiden tapauksissa.

Avainsanat: Sosiaalinen ympäristöjä yksilölliset, psykobiososiaalinen, IZOF-malli, MuSt-teoria, valmentaja ympäristöön, tiloihin, kolmen kuukauden ajanjaksoilla, valmentajien vaikutus urheilijoihin ja näiden luoma ilmapiiri.

**Author**

Saara Haapanen  
Faculty of Sport and Health Sciences  
University of Jyväskylä  
Finland

**Supervisors**

Docent Montse Ruiz, PhD.  
Faculty of Sport and Health Sciences  
University of Jyväskylä  
Finland

Professor Claudio Robazza, PhD.  
BIND-Behavioral Imaging and Neural Dynamics  
Center  
Department of Medicine and Aging Sciences  
“G. d’Annunzio” University of Chieti-Pescara  
Italy

Professor Joan Duda, PhD.  
School of Sport, Exercise and Rehabilitation Sciences  
College of Life and Environmental Sciences  
University of Birmingham  
United Kingdom

**Reviewer**

Associate Professor Carolina Lundqvist, PhD.  
Department of Behavioral Sciences and Learning (IBL)  
Linköping University, Sweden

Professor Dr. Xavier Sanchez  
University of Orléans, France  
University of Paris Saclay, France  
Halmstad University, Sweden

**Opponent**

Professor Dr. Christophe Gernigon  
Faculty of Sport and Physical Education Sciences  
University of Montpellier  
Montpellier, France

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In happiness and health,

 Saara

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Saara Haapanen

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# 1 INTRODUCTION

The quality of athletes' experiences associated with their performances depends on contextual, situational, and individual factors. Both the social environment and individual variables influence the way athletes think, feel and behave (Deci & Ryan, 2000; Lazarus, 2000; Nicholls, 1989). Psychological, biological, and social constructs interact to predict and impact the well-being and performance of athletes. Psychobiosocial states related to performance have been considered to be multimodal, situational, and dynamic manifestations of complete human functioning. The current dissertation draws from the assumptions of the theoretical framework of individual zones of optimal functioning model (IZOF), (Hanin 1997, 2000) which recognizes individual differences in the experiences related to athletic performance and subsequent functional impact.

Previous research (Bortoli et al., 2011, 2014; Ruiz, Haapanen, et al., 2017) has established the utility and feasibility of applying motivation and emotion-related theoretical frameworks to the study of individual and environmental antecedents of athletes' experiences. The IZOF model is used in the current dissertation as a framework that aims to describe, predict and explain athletes' experiences consisting of several form (display) components and specific content and intensity within a certain context and time. In addition to the IZOF model, this dissertation draws from the tenets of two of the most prominent theories of motivation, achievement goal theory (Nicholls, 1989) and self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2017) to investigate environmental and individual antecedents of athletes' motivation and emotion-related experiences. These two motivational theories, widely applied within the field of sport and exercise psychology, are considered the most comprehensive theoretical frameworks in the study of cognitive, emotional, and behavioral patterns in the sports context (Duda, 2013). This work extends previous literature by investigating environmental and individual antecedents of motivation and emotion-related experiences of athletes involved in high-level competition. In particular, the current dissertation investigates the interplay between environmental variables such as athletes' perceptions of the motivational climate and individual aspects such as athletes' perceived competence, achievement

goals, competition appraisals as potential antecedents of the so-called psychobiosocial states in high-level Finnish and North American athletes. In addition, this study examines the temporal relationships between motivational and emotional constructs associated with athletes' performances.

Individual thoughts, experiences, and behaviors are influenced by the social situation created by others (Nicholls, 1989; Ryan, 2019). In sports, the coach-created social environment influences the welfare and optimal functioning of sports participants (Duda & Balaguer, 2007; Reinboth & Duda, 2004). According to self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2017), a social environment can be more or less autonomy-supportive, depending on the extent to which athletes' feelings and preferences are considered (Mageau & Vallerand, 2003), which will influence the quality of athletes' motivation. Perceptions of competence, which is considered one of three basic psychological human needs, together with a need for relatedness and autonomy, are expected to result in more self-determined motivation and guide achievement behavior (Duda, 2007; Nicholls, 1989).

Achievement goals or athletes' evaluations of their ability and success are a factor in determining how a possibly stressful situation is cognitively appraised (Adie et al., 2010, 2008; Jones et al., 2009; McGregor & Elliot, 2002; Quested et al., 2011). Two dimensions have been used to classify achievement goals, competence, and valence (Elliot, 1999; Elliot & McGregor, 2011). Competence can be evaluated using self-referenced criteria (comparing with oneself) or using other-referenced criteria (in comparison with others). Valence (positive or negative) relates to how competence is construed in terms of approaching success or avoiding failure. Goals related to attaining self-referenced competence have been consistently found to be associated with positive achievement-related cognitions, emotions, behaviors, and optimal performance in sport (Adie & Bartholomew 2013; Duda, 2005) while goals that involve achieving other-referenced competence have been related to both maladaptive and adaptive outcomes (Dewar & Kavussanu, 2012). Achievement goals will be examined in the current dissertation as possible predictors of psychobiosocial states.

The way individuals appraise environmental demands, often described as stressors (Fletcher et al., 2012; Lazarus & Folkman, 1987) can lead to different physical, psychological, and behavioral responses. Since competitive sport involves multiple stressors (Nicholls et al., 2005; Reeves et al., 2009), this dissertation will also examine how athletes perceive their environment and the possibilities for coping with task demands. Athletes' perceptions about their stressors in terms of how they can deal with the task demands influence both athletic performance and their well-being, specifically, if individuals do not adaptively cope with these stressors (Arnold et al., 2017; Lazarus, 2000, Ruiz et al., 2021).

Most previous research examining athletes' motivation and emotional related experiences has mainly included cross-sectional designs involving singles samples of athletes. Thus, this dissertation aimed to extend current research investigating environmental and individual antecedents of variations in athletes'

motivation and emotional experiences in two distinct samples of high-level athletes from Finland and North America. In addition, these relationships were explored at two different time points within a competitive season.

## **2 REVIEW OF THE LITERATURE**

### **2.1 Athletes' Psychobiosocial States**

The concept of a psychobiosocial state underscores the subjective experience of emotion. Psychobiosocial states are defined as the set of experiences in which athletes' functioning is manifested in terms of performance, namely form, content, intensity, time, and context. Form, content, and intensity dimensions are used to describe the structure of subjective experiences, while time and context dimensions characterize the dynamics of the athlete's experience. All these dimensions can help provide a comprehensive description of a performance state involving their displays (either expression or suppression). The following section describes these dimensions and modalities in more detail.

#### **2.1.1 Conceptualization of Psychobiosocial States**

Psychobiosocial states are conceptualized as situational, multimodal, and dynamic indicators of human behavior (Hanin, 2000). The form or way in which psychobiosocial states are displayed involves several modalities including psychological (motivational, volitional, cognitive, emotional), biological (bodily reaction, kinesthetic), and social (communicative, operational) aspects. Athletes' experiences can be functional (helpful) or dysfunctional (detrimental) for their performances. In addition, the emotional modality is defined based on their hedonic tone (i.e., pleasant or unpleasant) as well as the performance functionality (i.e., functional or dysfunctional). The interaction between both hedonic tone and functionality dimensions leads to four emotion categories: pleasant functional experiences, unpleasant functional experiences, pleasant dysfunctional experiences, and unpleasant dysfunctional experiences. Performance functionality reflects an athlete's interpretation of the interaction between environmental factors (e.g., situational demands) and individual factors (e.g., perceived resources, options for coping).

According to the IZOF model (Hanin 2017; Ruiz, Raglin, & Hanin, 2017) subjective experiences are the result of individuals' appraisals of their

relationship with their environment. Emotions also result from assessing the probability of achieving relevant goals. Situational emotional experiences progressively develop into emotional patterns through the repetition of sporting activities. These patterns of emotions are particular to the task, individual, and setting. Examples of adjectives athletes may use for the emotion modality include, 'nervous' and 'joyful'.

The cognitive modality of psychobiosocial states involves attention processing, which includes the ability to be alert, react to relevant stimuli over an extended period of time, exert deliberate mental effort on relevant stimuli in a given situation, concentration, the aptitude to coordinate two or more activities at once or the ability to orient attention (Moran, 2011). Examples of adjectives to describe the cognitive modality include 'focused' and 'distracted'.

Two aspects relate to motivation and volition, which are distinct and successive psychological states. Motivational and volitional modalities relate to goals, desires, life purpose, motivations, and commitments (Achtziger & Gollwitzer, 2008; Heckhausen & Gollwitzer, 1987; Ruiz, Haapanen et al., 2017). The motivational modality is the precursor in the decision-making process where individuals develop their intentions and processes related to deliberation on rewards and expectations for choosing goals and the suggested courses of action (Hanin, 2010). Motivation is the phase of goal setting that precedes a goal-pursuit phase. Examples of adjectives for the motivational modality include 'motivated' and 'interested'. The decision-making process launches the individual into the post-decisional volitional state. The volitional modality considers aspects related to the proper course of action needed to pursue a goal regardless of obstacles (Hanin, 2010). The volitional modality is captured by adjectives such as 'determined' and 'persistent'.

The bodily modality refers to biological or psychophysiological accompaniments of emotions, such as feelings of tension/relaxation or activation/deactivation (Thayer, 1989), or feelings in a specific body part (Robazza & Bortoli, 2003). Bodily descriptors include words such as 'tired' and 'breathless'. The motor-behavioral modality relates to an athlete's awareness of movement characteristics and motor coordination. Examples of adjectives related to this modality include words like 'relaxed' and 'sharp'. The operational modality relates to the perception of the effectiveness of execution patterns (task or action). Words such as "smooth" or "clumsy" describe operational aspects of athletes' experiences. Finally, the communicative modality is used to describe verbal or non-verbal communication exchanged directly or indirectly while executing a task. Examples of adjectives to describe this communicative aspects include "connected" and "related" (Hanin, 1992). This multimodal conceptualization of psychobiosocial states has been supported by extensive empirical evidence (Ruiz et al., 2016; for reviews see Hanin, 2000, Ruiz, Raglin et al., 2017).

The intensity dimension refers to the quantitative feature of performance-related experiences and can be either subjective or objective on a selected modality. The intensity of psychobiosocial states is crucial in the prediction of

performance. The impact of psychobiosocial states on task execution is assumed to result from the interaction between high-intensity levels of functional states and low-intensity levels of dysfunctional states. Poor performance is predicted when the opposite occurs (Hanin, 2000). Research findings have supported this so-called in- and out-of-zone concept in the prediction of performance (e.g., Hanin, 1997, 2000; Robazza et al., 2002; Robazza, Bortoli, et al., 2004; Robazza, Pellizzari, et al., 2004).

The time dimension refers to the temporal pattern related to whether psychobiosocial states are experienced before, during, or after a performance. Context refers to interpersonal, situational, and intergroup environmental characteristics that lead to the experience of psychobiosocial states resulting in specific content (e.g., pleasant vs. unpleasant experiences) and influencing their intensity. Athletes' experiences can be categorized as 1) situational subjective experiences (e.g., how an athlete feels at a specific moment), 2) relatively stable patterns (e.g., how an athlete usually feels), and 3) meta-experiences (e.g., athletes' knowledge, beliefs, and attitudes about their own experiences (Hanin, 2004).

The association between psychobiosocial states and performance and well-being is presumed to be dynamic and bidirectional, which means that pre-performance psychobiosocial states influence subsequent performance. Moreover, the ongoing performance impacts the content and intensity of mid-event and post-event psychobiosocial states (Hanin, 2004; Ruiz et al., 2017).

Functional psychobiosocial states are thought to reinforce beneficial appraisals and exert positive effects in regard to the performance process and outcomes (Ruiz, Bortoli et al. 2021). In contrast, the opposite is also true, with dysfunctional psychobiosocial states enhancing negative situational appraisals, eventually resulting in detrimental effects on performance processes, outcomes, and well-being. According to the IZOF model, it is expected that athletes who have high intensities of functional psychobiosocial states and low intensities of dysfunctional states will have the best performance and well-being. In contrast, the opposite is also true, in that high intensities of dysfunctional states and low intensities of functional states will lead to poor or sub-optimal performance and ill-being outcomes.

This dissertation examines all aspects of athletes' psychobiosocial states associated with their practice and competition contexts. To gain a better understanding of what specifically leads to both functional and dysfunctional psychobiosocial states, the dissertation focuses on the influence of environmental variables, such as the role of the coach and individual factors, namely perceived competence, achievement goals, and competition appraisals.

### **2.1.2 Measurement of Psychobiosocial States**

Individualized profiling is fundamental in identifying functional and dysfunctional psychobiosocial states as well as core action components of optimal performance, which are thought to be the basis for regulation (Ruiz, Appleton, et al., 2021). Self-report measures have dominated the existing



literature on emotions. Criticism of previous assessment measures relates to the range of emotions included in such instruments which is usually limited and selected by researchers. Thus, these instruments may not capture the wide range of athletes' individual experiences. One option to overcome this limitation is to provide stimulus lists including different descriptors, thereby providing athletes with the option to select the ones that best describe their experiences. An example of such an assessment is the individualized profiling of psychobiosocial states scale (IPP) (Ruiz et al., 2016). The IPPS, which extends previous individualized emotion profiling procedures (IEP) (Hanin, 2000), was developed to assess the eight modalities of psychobiosocial states (e.g., cognitive, emotional, motivational, volitional, bodily, motor-behavioral, operational, and communicative). The IPPS includes six items to assess the emotional modality comprised of functional pleasant states, functional anxiety, functional anger, dysfunctional states that are pleasant, dysfunctional anxiety, and dysfunctional anger. The rest of the state modalities are measured through the functionality dimension, and this includes functional or dysfunctional cognitive, motivational, volitional, bodily, kinesthetic, operational, and communicational items.

This instrument has been used to measure state-like experiences (e.g., situational experiences; Ruiz et al., 2019) and trait-like experiences (e.g., Robazza, et al., 2016) in groups of athletes. It has been utilized to assess the content, intensity, and perceptions of the functional impact of athletes' states in recalled best and worst successful performances (Middleton et. al., 2017; Mueller et al., 2018; Ruiz et al., 2016) as well as in the assessment of actual experiences in practice (Ruiz, Haapanen, et al., 2017) and competition (Robazza et al., 2018) settings. Versions of these measurements to assess athletes' experiences have been used in English, Finnish, and Italian. This assessment procedure has also been used to assess psychobiosocial states in the physical education context (Bortoli et. al., 2018).

## **2.2 Athletes' Motivation**

Motivation is the basis of the self-determination theory (Deci & Ryan, 1985, 2000; Ryan 2019), which is centered on the idea that motivation varies on a continuum from intrinsic motivation to amotivation. Individuals are self-determined in their behavior, and their goal-directed interests can have consequences on their psychological (and physical) well-being. Hence, goal-directed behavior is presumed to be regulated by intentions that are either autonomous or controlling. The most self-determined type of motivation is intrinsic and occurs when an individual finds enjoyment or interest in an activity. Integrated motivation refers to identifying with other aspects of oneself; the sport is viewed as essential and is in line with deeply held values and beliefs. Inherent enjoyment is derived from the activity, but behaviors are completed to obtain extrinsic benefits. Identified regulation is placed next on the continuum and occurs when something is done out of choice and freely, even if it is not pleasurable. Introjected regulation occurs

when athletes' actions are still internalized, but their behavior is regulated by self-imposed pressure (i.e., to avoid guilt/shame). The least self-determined type of regulation is external regulation. It arises when engagement intends to obtain a separable goal, such as a reward or to satisfy an internal demand. Lastly, amotivation is the lack of any sort of motivation.

These forms of motivation have been categorized into autonomous motivation, which includes intrinsic motivation as well as integrated and identified regulation, which refers to behaviors that individuals display when they feel like they are agents of their own behavior. On the other hand, controlled motivation, which includes introjected and external regulation, refers to behaviors that individuals exhibit when they feel compelled due to some external or internal pressure (Deci & Ryan, 2000; Langan et al., 2016; Lonsdale et al., 2008). According to self-determination theory, autonomous motivation is presumably associated with positive outcomes, while controlled motivation tends to be related to dysfunctional outcomes (Deci & Ryan, 1985; Ryan & Deci 2017).

The self-determination theory formally includes six sub-theories, which were developed to aid in the explanation of motivation-based phenomena. The first of these sub-theories is the cognitive evaluation theory (Deci & Ryan, 1985), which focuses on the effects of social environments on intrinsic motivation, specifically on how variables, such as interpersonal controls, rewards, ego-involvement, may decrease intrinsic motivation and interest. Cognitive evaluation theory features the essential roles of autonomy support and competence in nurturing intrinsic motivation, which is crucial in sport.

A second sub-theory of the self-determination theory is the basic psychological needs theory (Ryan & Deci, 2002), which is a conceptual framework that helps explain the repercussions of the perceived social environment on participants' well-being. Particularly, the basic needs theory suggests that all people possess three innate psychological needs that are required for growth and positive progress. The need for autonomy relates to individuals' volition towards their choices and decision-making (Deci & Ryan, 1985). The need for autonomy can also be achieved when individuals believe their behaviors to be harmonious with their integrated sense of self (deCharms & Carpenter, 1968). Competence is a basic need fulfilled when individuals master tasks within their social environment and comprehend the capacity to assert influence (White, 1959). Finally, the need for relatedness is met when people feel a sense of belonging in a specific situation (Baumeister & Leary, 1995). The basic needs theory suggests that satisfaction of the three basic needs through interactions with the social environment can result in optimum functioning (Deci & Vansteenkiste, 2004). It is assumed that if the perceived social environment does not meet these psychological needs, individuals' well-being can be undermined and their health can deteriorate (Ryan & Deci, 2000, 2002).

A third sub theory is organismic integration theory (Deci & Ryan 1985, 2000) which refers to the various forms of extrinsic motivation. The subtypes of extrinsic motivation are external regulation, introjection, identification, and

integration which fall on a continuum of internalization. This theory states that the more internalized, the more autonomous the individual will be, with the social context either helping or hindering this internalization. This sub-theory specifically highlights the support for autonomy and relatedness as significant factors in internalization.

A fourth sub-theory is the causality orientations theory, (Deci & Ryan, 1985, 2017) which explains individual differences in humans' tendencies to orientate to environments and regulate their behaviors. This mini theory is based on and assesses three different types of causality orientations: autonomy, control, and the impersonal (or amotivated) causality orientation. This theory proposes that individuals differ in the relative strengths of these different orientations, but that everyone has each of the three to some degree.

The goal contents mini theory (Kasser & Ryan, 1996) is based on the distinctions concerning intrinsic and extrinsic goals and how they impact wellness and motivation. Goals can provide basic need satisfactions and therefore are differentially associated with well-being. Extrinsic goals (i.e., praise, financial, fame) are more likely associated with lower wellness and greater ill-being (Niemi et al., 2009). On the other hand, intrinsic goals such as personal growth, community, and building close relationships have a more positive effect and are better adhered to (Vansteenkiste et al., 2006).

Finally, the relationships motivation mini theory (Deci & Ryan, 2014) is concerned with interactions and relationships. Not only are interactions desirable for most people but rather they are essential to adjustment and well-being. These warm interactions in which autonomy and autonomy support are experienced through a relationship are deeply satisfying and in addition to fulfilling the need for relatedness and autonomy they also aid to fulfil the need for competence.

Previous research has supported the idea that autonomy support from the coach predicts basic need satisfaction for autonomy, relatedness, and competence. For example, autonomy support from the coach predicted basic need satisfaction for all three basic needs, which in turn predicted greater subject vitality among a sample of 539 adult sport players (Adie et al., 2008). On the other hand, athletes who had low levels of autonomy were more vulnerable to feeling both physically and emotionally exhausted. The path from autonomy support to subject vitality was partially mediated by autonomy and competence. Similar findings were identified by Reinboth et al. (2004) who observed that the degree of mastery focus, autonomy support, and social support corresponded positively with the needs of competence, autonomy, and relatedness. Here, competence and autonomy predict greater levels of intrinsic interest and vitality. Lower levels of perceived competence were linked with repeated accounts of headaches and physical ill-being. In addition, the relevant literature has supported this idea equally within twenty different cultures, including African, Asian, Australasian, Latin, and European. It also concurred that basic needs predict pleasant emotions and life satisfaction (Sheldon et al., 2012).

Athletes' perceived competence is important to their well-being and performance. It is also known as perceived ability, self-efficacy, or confidence

(Kremer et al., 2012). In addition to being an innate psychological need, demonstrating competence in sport is a major motive for individuals in achievement settings. Previous research in perceived competence has determined it is a mediator of emotional responses (Bortoli et al., 2009), performance (Duda, 2007), and persistence (see Feltz & Lirgg, 2001). As previously discussed, this is an essential construct within both achievement goals (Nicholls, 1989) and self-determination theories (Deci & Ryan, 2000; Ryan 2019). According to Duda (2001, 2007), competence is the most distinguishable feature of achievement motivation. Perceived competence is known to predict the type of goals that athletes may adopt. For instance, high perceived competence is predicted to facilitate approach goals due to the high possibility of success. In comparison, low perceived competence is predicted to facilitate avoidance goals due to the possibility of failure (Duda, 2007; Elliot, 1999, Elliot & Conroy, 2005; Elliot & McGregor, 2001).

Perceived competence has proven to be a moderator in both performance goals (approach and avoidance) relationships. Law et al. (2012), for instance, conducted four studies on undergraduate students in a psychology course (for extra course credit) to explore whether perceived competence moderated the relationship between performance-approach and performance-avoidance goals. All four studies produced supportive data, suggesting the association between the two performance goals is decreased when perceived competence is high. Results were observed between and within-subject levels of analysis with experimental and correlational methods. Standardized and novel achievement goal assessments as well as multiple operationalizations of perceived competence (task difficulty, general competence perceptions, and specific competence expectancies) were used in addition to a variety of types of focal tasks (a classroom exam, puzzle task, and experiences in different achievement domains). This research suggests that perceived competence moderates the extent to which performance-approach and performance-avoidance goals are interrelated. Performance-approach goals may be somewhat unaffected by performance-avoidance goals if the perceived competence is high. However, when perceived competence is low to moderate and performance-approach goals are pursued in conjunction with performance-avoidance behaviors, outcomes are not as beneficial. This does not suggest that performance-approach goals may be discarded in favor of performance-avoidance goals when perceived competence is lower or when the task is difficult. Rather, performance approach and avoidance goals occur in unison in these instances. From this standpoint, it seems individuals do not switch from performance approach to performance-avoidance goals when faced with challenges or doubts. Instead, they retain their performance-approach goals and add in performance-avoidance goals in a type of multiple-goal pursuit (see Barron & Harackiewicz, 2001). This concept is not typically talked about in the achievement goal literature.

In addition, a more recent study explored perceived competence and psychobiosocial states as mediators in the correlation between psychological variables of essential significance in improving sports participation and

preventing burnout in youth athletes (Morano et al., 2020). The need for competence was identified as the most significant variable with both direct and indirect effects on burnout components, specifically on a reduced sense of sports accomplishment. Bortoli and colleagues (2009) called for future research to examine perceived competence as a variable influencing athletes' psychobiosocial states. Hence the current study investigated perceived competences role as a consequence of autonomy-support as well as an antecedent of performance-related psychobiosocial states.

### **2.2.1 Coach-created Climate and Athletes' Motivation**

Self-determination theory research has investigated factors from the social environment that either help or hinder autonomous regulation (Ryan & Deci, 2000). Autonomy-supportive contexts potentiate the satisfaction of the need for autonomy while supporting the basic psychological needs for competence and relatedness (Ryan, 2019). Autonomy support is the degree to which socializing factors take the target individual's viewpoint. It includes meaningful rationales and relevant tasks as well as language or behaviors that are likely to be experienced as pressure towards particular behaviors is not used. Moreover, coaches act in ways that encourage choice and self-initiation (Grolnick et al., 1997). Autonomy support from coaches is a key factor in the social environment. An autonomy-supportive climate is one in which the coach considers the participants' perspectives, uses non-controlling language, promotes choice, and allows for decision-making (Ryan & Deci, 2000). An autonomy-supportive coach supplies meaningful information while reducing external demands. The coach avoids controlling behaviors (prevents ego-involvement) and acknowledges others' feelings (Adie et al., 2008). By contrast, in a controlling environment, the coach uses intimidation practices that can control participants' behavior, excessive personal control, generated deadlines, pressuring language, rewards, and surveillance (Bartholomew et al., 2009). Controlling events tend to weaken autonomous regulation, leading to worse performance and greater ill-being (Ryan & Deci, 2000).

Autonomous motivation has been linked with higher adaptive consequences than controlled motivation across different contexts (see Deci & Ryan, 2008 for a review). In sport, self-determination theory assumes autonomous motivation is nurtured through assistance from the perceived coach-created social environment. Desirable motivational outcomes and processes are associated with more autonomy-supportive coaching behaviors (Adie et al., 2008). Research indicates that autonomy support results in autonomous regulation, effective performance, and psychological well-being (see Deci & Ryan, 2000, 2008, for reviews). It has consistently been found that coaches who create autonomy-supportive environments promote autonomy. This predicts optimal functioning (Yeates et al., 2019), potentially reduces burnout (Chang et al., 2019, Goodger et al. 2007), and is conducive to successful performance (Mulvenna et al., 2020). Findings from the sport self-determination theory-based literature determine repercussions of an interpersonally controlling environment on diminishing self-

determined behavior (or promoting controlled regulation), which results in diminished psycho-physiological functioning (Bartholomew et al., 2011).

Temporal stability and reciprocal relationships among perceived autonomy support from the coach, athletes' intrinsic motivation, and task-involving peer motivational climates were explored in youth athletes over a one-year training period (Jõesaar et al., 2012). Results showed moderately high stability over a one-year period for perceived autonomy support from the coach and task-involving peer motivational climates. After a one-year period, perceived autonomy support from the coach predicted task-involving peer climate positively, but not in the opposite direction. Measured concurrently in sports contexts, both an autonomy-supportive climate and task-involving peer climate revealed a significant direct effect on athletes' intrinsic motivation (Jõesaar et al., 2012). Another model established a longitudinal direct effect of coach autonomy support and task-involving peer climate assessed initially on successive intrinsic motivation. These results demonstrate the value of perceived autonomy support from the coach in predicting athletes' intrinsic motivation over a period of time.

Trigueros and colleagues (2019) analyzed the effect of coaches on emotional intelligence and on levels of self-esteem, anxiety, motivation, and resilience among 547 semi-professional sports athletes. Results indicated coach-created autonomy support positively predicted emotional intelligence, while perceived control from the coach predicted emotional intelligence negatively. Emotional intelligence positively predicted self-determined motivation and self-esteem, but it negatively predicted anxiety. A positive relationship was found between self-esteem and self-determined motivation, while anxiety was negatively related. Lastly, self-determined motivation positively predicted resilience. In the educational setting, comparable findings exist, for instance, those of Benita and colleagues (2014) who conducted two studies to test whether the experiences of participants' autonomy support and autonomy suppression would impact mastery goals and psychological consequences. The first study (Benita et al., 2014) randomly assigned college students to one of three handwriting groups (autonomy-supportive, autonomy-suppressive, and neutral). Results indicated that an autonomy-supportive context led to more mastery goals and more positive emotional experiences compared to the other two groups. The second study (Benita et al., 2014) was then expanded to a natural setting and examined learners' motives about a particular class. Results indicated stronger relationships between mastery goals with enjoyment, interest, and with behavioral engagement when students' autonomy was high instead of low.

Previous studies (Bortoli et al., 2009, 2011, 2015; Ruiz, Haapanen et al., 2017; Ruiz et al., 2019) have investigated the relationship between motivational climates created by the coach as conceptualized within achievement goal theory and athletes' psychobiosocial states. However, research exploring the relationships between perceptions of a coach-created autonomy-supportive climate and psychobiosocial states is scarce. This dissertation aims to contribute to the existing literature by exploring the role of coach-created autonomy-supportive climates as antecedents of psychobiosocial states.

## 2.2.2 Social Environment and Athletes' Achievement Goals

The current dissertation integrates tenets from achievement goal theory (Nicholls 1984, 1989) and self-determination theory (Deci & Ryan, 1985, 2000; Ryan 2019) because they both accentuate the role of social variables (e.g., competition, normative feedback, cooperation, and social evaluation) as antecedents of achievement-related behavior. The key element of both is the motivational coach-created climate as it either helps or hinders an athlete's basic needs satisfaction (Duda & Appleton 2016; Smith et al., 2016).

Within achievement goal theory (Nicholls, 1984), perceptions of mastery and performance climates generated by the coach impact dispositional goals which affect emotional experiences, cognition, and behavior in achievement settings. It has been suggested that the environment established by a significant person (e.g., the coach) influences athletes' goal orientations (Ames, 1992). A climate that emphasizes effort, social relationships, learning, cooperation, improvement, and a positive approach to mistakes as a natural part of the learning process is a mastery (or task-involving) climate. On the other hand, in a performance (or ego-involving) climate the coach emphasizes intra-team competition and social comparison, individuals are faulted when they make mistakes or underperform a normative-based evaluation. Research has shown that adaptive emotions, cognitions, and behaviors such as satisfaction, well-being, motivation, and perseverance tend to be promoted in a mastery climate, while a performance climate tends to result in maladaptive affective, cognitive, and motivational responses. This includes a lack of motivation, dissatisfaction, task avoidance, and reduced effort (for a review, see Lochbaum & Gottardy 2015).

Previous research with British athletes found positive outcomes in athletes' who perceived their motivational climate as empowering, which included task involvement, autonomy-support, socially supportive characteristics, as well as experiencing happiness (Ruiz et al., 2021). Empowering climates are presumed to fulfill the basic psychological needs of an individual and are correlated with healthy and sustained engagement in the activity and autonomous striving, which promotes an athlete's overall health (Duda & Appleton, 2016). Empowering climates have been found to have indirect effects on happiness and excitement through autonomous motivation and task orientation. A disempowering climate is assumed to foresee controlled reasons for engagement, which has negative consequences on athletes' experiences and well-being (Duda & Appleton, 2016). Research supports this contention as disempowering climates are positively associated with unpleasant emotions such as anxiety, dejection, and anger via ego orientation and controlled motivation (Ruiz et al., 2021).

Individual goal orientations that an athlete internalizes are influenced by the coach (Ames 1992). An early conceptualization suggested a dichotomous approach (Dweck, 1986; Nicholls, 1984). Two main ways in which an athlete evaluates their ability and success were distinguished: perceptions of ability that are self-referenced (task or mastery orientation) or perceptions of ability that are other referenced (ego or performance orientation). Mastery orientation focuses on learning, effort, and improving ability. These individuals strive for self- or

task-referenced standards of competence. For these individuals, success is exhibited via self-improvement or task mastery. On the other hand, performance orientation is when social comparison is used to judge their ability and success at a particular task. In performance orientation, the focus is on attaining other-referenced standards of competence and interpreting their own success by outperforming teammates or others. Mastery and performance orientation are considered to be antecedents of emotions as well as autonomous motivation. Research has consistently indicated that a mastery climate is associated with pleasant emotional states, enjoyment, achievement-related cognition, prosocial behavior, interest, commitment, intrinsic motivation, perceived improvement, life satisfaction, morale functioning, satisfaction with coaching, and healthy functioning in sport (Adie & Bartholomew 2013, Barkoukis & Hagger, 2013; Duda, 2005; Kipp et al., 2008; Liukkonen, et al., 2010; Standage et al., 2003). Mastery climates are related to a wide variety of adaptive motivational outcomes, including perceived competence, moral attitudes, intrinsic forms of motivational regulation, pleasant affective states, self-esteem, objective performance, practice, and competitive strategies, and experiencing flow states (Harwood et al., 2015). Alternatively, athletes who have a performance climate have been associated with worry, anxiety, social self-consciousness, competitiveness, extrinsic motivation, antisocial behavior, motivation for social status and recognition as well as hypercompetitive attitudes (Bortoli, Messina et al., 2012; Duda et al., 2014; Sarrazin et al., 2002; Tenenbaum & Eklund 2014). Performance climates have been negatively associated with pleasant affect and feelings of autonomy and relatedness, while they have been associated positively with negative affect, maladaptive strategy use, extrinsic regulation and amotivation, perfectionism, and antisocial moral attitudes (Harwood et al., 2015).

Generally, adaptive outcomes such as commitment, enjoyment, and confidence have an increased chance of occurring in a mastery climate (Jaakkola et al., 2016, 2017). However, maladaptive outcomes such as boredom, anxiety, worry, and reduced enjoyment are more often reported in a performance climate (Bortoli et al., 2012; Cumming et al., 2007; Vazou et al., 2006). This is not only the case in sports but also in physical education settings as reported in a meta-analytic review conducted by Braithwaite and colleagues (2011). Results from the review indicated an emphasis on doing better than others and social comparison instead of individual efforts, skill mastery, and attainments that may create feelings of apprehension. In addition, research has shown negative emotional experiences, especially for athletes with perceptions of low competence. Similar results also emerged from a systematic review of sports and physical education settings which studied 39 studies and included 34,156 individuals (Harwood et al., 2015).

Research in Italian youth sports has provided evidence about the usefulness of studying pleasant and unpleasant psychobiosocial states and how they are linked to achievement goals and motivational climate (Bortoli et. al., 2009). Results implied that both a perceived mastery climate and mastery orientation were positively related to pleasant psychobiosocial states. In comparison,



performance orientation was negatively related to the majority of the unpleasant psychobiosocial states. Dysfunctional states were not measured in the study by Bortoli et al. (2011). In young male soccer players, perceptions of a performance climate were associated positively with antisocial behavior and unpleasant psychobiosocial states (Bortoli et al., 2012).

To summarize, it is generally assumed that a coach-created climate that emphasizes performing better than others and highlights social comparison, is associated with athletes' unpleasant experiences and quality of engagement in the activity. On the other hand, motivational climates where coaches praise individual efforts and focus on skill mastery and attainments, are associated with more pleasant experiences, better quality of task engagement, and overall more adaptive outcomes.

### **2.2.3 Correlates of Achievement Goals**

In attempts to address inconsistent evidence regarding outcomes of performance goals, the dichotomous goal approach (mastery vs. performance) was revised and the hierarchical model of achievement motivation was established (Elliot, 1999; Elliot & Church 1997; Elliot & McGregor, 2001). This conceptualization assumed two competence dimensions: self-, task-, or other-referenced (definition) as well as approach and avoidance (valence). This results in the wide use of the 2×2 achievement goal framework in sport (Conroy et al., 2003) which presumed the importance of four achievement goals. The four goals were categorized as mastery-approach goals which occur when athletes attempt to achieve self-referenced competence, mastery-avoidance goals occur when athletes avoid self-referenced incompetence, performance-approach goals which relate to athletes attempt to achieve competence through doing as well as is feasible when compared to others (i.e., normative competence), and lastly, performance-avoidance goals which occur when athletes avoid circumstances where attaining competence compared to others is uncertain. The following section presents antecedent factors and consequences of adopting different competitive goals.

There are different antecedents to the types of goals that athletes can adopt. An athlete who believes in performing a task competently is expected to increase their tendency to approach circumstances in which he or she can improve their personal performance and/or perform well in comparison to others (i.e., both approach goals mastery or performance). Previous research has indicated the antecedents of mastery-approach goals in the sports domain include perceived competence (Morris & Kavussanu, 2008) and autonomy support (Benita et al., 2014). Perceived competence has also been found to negatively predict mastery-avoidance goals (Isoard-Gauthier et al., 2013). Mastery-avoidance goals have also been negatively predicted by mastery climates (Morris & Kavussanu, 2008) and positively predicted by performance climates (Isoard-Gauthier et al., 2013) as well as fear of failure (Conroy & Elliot, 2004). Performance-approach goals have been predicted by performance climates (Morris & Kavussanu, 2008) as well as sports ability belief (Stenling et al., 2014) and fear of failure (Nein & Duda,

2008). Finally, performance-avoidance goals have been predicted by performance climates and perceived competence (Morris & Kavussanu, 2008).

Elliot's model (2001, 2005) of approach and avoidance achievement goals also attempts to explain several possible consequences of goal-adoption. Elliot and Conroy (2001, 2005) initially assumed that mastery-avoidance goals would have fewer positive outcomes than mastery-approach goals and fewer adverse consequences than performance-avoidance goals. Research has shown that mastery-approach goals are linked with pleasant affect, greater meta-cognitive regulation, perceived usefulness and importance of the activity, reduced boredom, relative autonomy, intrinsic motivation, help-seeking, tolerance, effort, situational interest, satisfaction, intentions to continue in sports, utility value, preferences for the activity, and reduced amotivation (e.g., Adie et al., 2010; Mulvenna et al., 2020; Van Yperen et al., 2014). Mastery-avoidance goals have been linked with increased unpleasant affect, a stronger preference for the activity, physical activity participation, effort, tolerance, and intentions to participate in sport (Lochbaum & Gottardy, 2015). Performance-approach goals have been associated with both adaptive and maladaptive outcomes (Lochbaum et al., 2015, 2017, 2019, 2020). Positive outcomes of performance-approach goals, for instance, include pleasant affect, self-confidence, decreased boredom, greater meta-cognitive regulation, intentions to participate in sport, value (intrinsic and utility), performance, effort, introjected and external regulation, and satisfaction (Cetinkalp 2012; Li et al., 2013; Lochbaum & Gottardy, 2015; Lochbaum et al., 2017, 2020). Nevertheless, performance-approach goals have also been associated with maladaptive processes and outcomes such as threat appraisals, self-handicapping, emotional and physical exhaustion, anxiety, worry, unpleasant affect, and negative reactions to imperfection (Adie et al., 2008; Cetinkalp, 2012; Isoard-Gauthier et al., 2013; Li et al., 2011; Papaioannou et al., 2012; Stoeber et al., 2008). Performance-avoidance goals are linked with unpleasant affect, anxiety, decreased boredom and interest, threat appraisals, identified, introjected, or external regulation, dissatisfaction, and decreased intentions to continue in sport (Elliot & McGregor, 2001; Isoard-Gauthier et al., 2013; Nicholls et al., 2014; Papaioannou et al., 2012; Stenling et al., 2014).

An integrative model of approach and avoidance goals has also been proposed based on the concept of nonlinear dynamic systems. This perspective is conceptualized as relevant to competence, benefit, and threat towards the self in either a static or dynamic fashion. This model (Gernigon et al. 2015) extends previous work as it includes social-cognitive functions and allows for ebb and flow based on the course of action and events (Gernigon et al 2010). This falls in line with Nicholl's (1989) idea that the dynamics of states result from dispositional states and the characteristics of the situation. The fluctuation of goal involvement in sport can change depending on the outcomes of recent actions, history of events, opportunities for attack, ability to control the situation, feelings, emotions, and progression of the score (Gernigon et al., 2004). This model suggests that the dispositional, contextual, and situational levels all have an effect on achievement goals and that they may tend to change depending on the

moment. Although the current dissertation did not measure the dynamics of achievement goals it is important to note that goals can be dynamic and are not necessarily fixed.

To address the equivocal findings regarding performance-approach goals, Mulvenna and colleagues (2020) explored the possible interactive effects between the motivational climate and achievement goals. They examined the most appropriate climate and goal to achieve optimal functioning on a novel basketball shooting task. Three approach goals were examined: task-approach goals, self-approach goals, and other-approach goals. These goals were assigned under different climates at the same time and used the distinction of autonomy-supportive vs. controlling motivational climates while measuring athletes' physiological responses at the same time. Specifically, they tested a novel sports task and examined whether the motivational climate supporting the achievement goal adoption (task-approach, self-approach, and other-approach goals) had differing results on the participants' psycho-physiological functioning and performance. Results indicated that there was support for the distinctive relationships between motivational climate and approach-based goals. Task-approach goal pursuits led to optimal psycho-physiological functioning (as did self-approach goals). An autonomy-supportive climate was also found to be conducive to performance. A mastery-approach goal under controlling circumstances leads to the appraisal of a shooting task as threatening compared to the mastery-approach autonomy-supportive environment. Approach-based goals with an autonomy-supportive climate increased participants' performance significantly when comparing pre- and post-shooting tasks. A controlling climate reported significantly higher physiological activity (heart rate and systolic blood pressure) post-task, as did other approach goals compared to participants within an autonomy-supportive environment (Mulvenna et al., 2020).

In summary, research indicates that mastery-approach goals are the achievement goals that have the most desirable consequences whereas performance-approach goal profiles are associated with both adaptive and maladaptive outcomes. Performance-approach goals are more desirable to mastery-avoidance goals which appear to be preferable to performance-avoidance goals.

#### **2.2.4 Coach Created Climate and Achievement Goals**

A hierarchical conceptualization of the motivational climate (Duda & Appleton, 2016) integrates the social-environmental dimensions emphasized within both achievement goal and self-determination theories. Motivational climates that are autonomy-supportive, task-involving, and socially supportive are assumed to lead to more adaptive outcomes compared to climates with ego-involving features. Empirical evidence has shown links between the constructs of a task-involving motivational climate and an autonomy-supportive climate (Duda & Appleton, 2016). A coach-created task-involving climate has features that overlap with coach-created climates that are autonomy-supportive. Coaches who are autonomy-supportive provide justifications for tasks and limits, acknowledge

the feelings and perspectives of others, and relate with their athletes and provide opportunities for initiative-taking and independent work. They also provide choice within specific rules and limits, provide non-controlling competence feedback, avoid controlling behaviors, and prevent ego-involvement (Mageau & Vallerand, 2003). It is suggested that together, these behaviors represent an interpersonal style that is autonomy supportive. The role of perceived competence is underlying in guiding achievement behavior.

Self-determination theory interprets competence as a human need and if this need is satisfied, self-determined motivation is promoted. From this perspective, individuals can pursue a goal for a variety of reasons, not just to prompt a goal but also to help develop their consequential effects (Elliot & Thrash, 2001). Therefore, the same goal may lead to different outcomes depending on the fundamental reasons for pursuing it. The term “goal complexes” (Senko & Tropiano, 2016) comes from the idea that each complex combines the goal and reason, instead of comparing and isolating the two. As an example, a basketball player in her final game of the championship, who is performing for autonomous reasons (e.g., enjoyment of the sport) and pursuing an approach-based goal (e.g., to work on using skills learned in practice to improve her layup), is projected to experience a variety of desirable well-being and other adaptive performance outcomes. In contrast, her teammate could also be in pursuit of winning the game, but for very distinct reasons (e.g., her controlling father will buy her a new car if she wins) she has performance-avoidance goals (she does not want to look like she has worse lay-ups compared to her teammates, so she avoids them and passes to her teammate instead). Although they are playing the same game, with the same overall goal of winning, and on the same team, they will experience a different pattern of outcomes (maladaptive consequences due to controlling reasons). Consequently, it has been proposed that there is an alternative set of suggested antecedents in how an individual perceives the environment (e.g., perceived autonomy support from the coach) and the consequential goal effects (Michou et al., 2013). It has been suggested that in complex goal relationships, researchers should test goal complexes and incorporate principles from both achievement goal and self-determination theories to better understand such complex goal relationships and their underlying motivational context (Michou et al., 2016; Vansteenkiste, Lens et al., 2014). According to the self-determination theory (Deci & Ryan, 2000; Ryan, 2019), the psychological processes and constructs are universal to all cultures and across genders, while also spanning through all developmental periods.

### **2.2.5 Coach-Created Climate and Psychobiosocial States**

Individuals’ motivation has been a mediator of the relationship between motivational climate and psychobiosocial states (e.g., Bortoli et al., 2009, 2011, 2012, 2014). These relationships are dynamic and bidirectional. Psychobiosocial states have also been examined as mediators, as antecedents, and as consequences. Bortoli and colleagues (2014), for instance, examined psychobiosocial states to mediate the relationship between motivational climate

and individuals' motivation in physical education settings. Pleasant and unpleasant states in young students mediated the relationship between the motivational climate and an individual's motivation as conceptualized on the continuum (Bortoli et al., 2014).

To further extend research and to help clear up the uncertainty in previous work regarding the temporal ordering of variables, Ruiz and colleagues explored two possible sequences within the relationship between coach-created motivational climates, athletes' motivation, and emotions. In the first sequence, motivation regulations were placed as mediators of the coach-created motivational climate and emotional relationship. In the second sequence, emotions were assumed to mediate the relationship between motivational climate and motivation regulations (Ruiz, Haapanen et al., 2017). Results from these studies indicated that a perceived mastery climate led to positive changes in athletes' autonomous motivation. Partial support was found for the relationship between performance climate and the variability in controlled motivation. Paths that were negatively significant between mastery climates and the intensity of dysfunctional anxiety and dysfunctional anger were reported. Positive paths emerged from performance climate to reported impact of dysfunctional anger (Ruiz, Haapanen et al., 2017). Findings suggest that the perceptions of a motivational climate impact and carry over to athletes' emotional experiences, specifically on anger and anxiety (Ruiz, Haapanen et al., 2017). Results are in line with the achievement goal theory (Nicholls, 1989) and the self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2017) in that a mastery climate is related to more adaptive achievement patterns, while a performance climate is related to more maladaptive patterns.

Intervention studies in physical education settings further support the idea that the environment is effective in creating and/or changing a particular psychological atmosphere. Bortoli and colleagues (2015), for instance, conducted an intervention study involving female students and found the ratings were higher for experienced pleasant/functional states in mastery climates, while the ratings were higher for unpleasant/dysfunctional states in performance climates. When the intervention was complete, participants of the performance group experienced lower ratings in the perceived mastery climate and higher ratings in the perceived performance climate when compared with their classmates in the mastery-involved group. An additional consequence of the intervention was lower ratings in pleasant/functional psychobiosocial states and higher ratings in unpleasant/dysfunctional psychobiosocial states in the performance-involved group. Results indicate that teachers' created achievement-motivational climates can impact students' perceptions and prompt psychobiosocial states depending on the motivational climate created (Bortoli et al., 2015).

Bortoli and colleagues (2017) conducted a second intervention study and similar results were found. Young females were assigned to one of two groups. Group one (mastery/performance) did eight mastery-involving lessons followed by eight performance-involving lessons. Group two (performance/mastery) did the reverse. Results revealed changes in psychobiosocial states and self-

determined motivation in the second group (performance/mastery), with young females reporting lower ratings of pleasant/functional psychobiosocial states and self-determined motivation from Time 1 to Time 2, and a lower self-determination index ratings at time three, which suggests the lasting effects of performance-involving experiences. Changes were more evident in the performance/mastery group. This further suggests a detrimental carryover effect of a performance-involving experience, perhaps due to the enduring emotions of frustration and disengagement from a performance climate created by the coach. The mastery climate was positively correlated with pleasant/functional psychobiosocial states, intrinsic motivation, and integrated regulation. On the other hand, a performance climate was positively related to unpleasant/dysfunctional psychobiosocial states, external regulation, and amotivation (Bortoli et al., 2017).

To examine the sequential relationships between the environment, motivation, and emotion, Ruiz and colleagues (2019) explored the interaction between motivational climate, motivation, and athletes' emotions over three months in a sample of Finnish athletes. As expected, a mastery climate predicted positively autonomous motivation, and perceived functional anger. Mastery climate was also a negative predictor of the intensity of anxiety and dysfunctional anger. Performance climate was a positive predictor of controlled motivation, the intensity and perceived impact of functional anger, and the intensity of dysfunctional anger. Latent change score modeling revealed distinct patterns of relationships. Emotion predicted changes in motivational regulations three months after the first assessment in the case of anger. Dysfunctional anger predicted the change in both autonomous and controlled motivation, thereby providing further evidence about the motivating effects of anger (Ruiz & Hanin, 2011). Motivational regulations predicted changes in emotions, with controlled motivation predicting both changes in anger and anxiety. This supports the detrimental consequences in athletes' responses to this type of motivation (Ryan & Deci, 2017). Reciprocal effects emerged in the case of controlled motivation and anxiety. These results are in line with Hanin's (2000) assumptions about the variability in intra-individual emotion intensity and with Lazarus' (2000) suggestions that emotions are initiated and maintained through causal cognitive, motivational, and relational aspects. The results concur with the notion that individuals' emotions stem from evaluations of their own personal meaning of the interaction with the environment and others, as well as opportunities for coping with situational demands.

Overall, findings emphasize the important part of psychobiosocial states in the relationship between motivational climate and an individual's motivation. Research indicates that coaches should consider that individuals experience functional and dysfunctional reactions (emotional and non-emotional) and varying motives derived from their instructional activity and the climate they create. This dissertation aims to further extend this line of research by exploring how the coach-created environment and individual variables lead to functional and dysfunctional psychobiosocial states.

## 2.3 Athletes' Evaluations: Challenge and Threat Appraisals

According to Lazarus and Folkman (1984), athletes perceive stress in two main ways, namely a challenge appraisal and a threat appraisal. Athletes appraise their environment as challenging when they believe the demands of the environment can be conquered, resulting in personal growth, mastery, and other gains. On the other hand, the environment is perceived as a threat the situation is seen as a potential threat to their personal well-being, which results in loss of self-esteem. A threat state happens when an athlete's personal resources are not enough to deal with task requirements, resulting in the potential for imminent psychological harm. Empirical research has supported the idea that the motivational context and achievement goals help to determine how an athlete cognitively evaluates a potentially stressful performance (Adie et al., 2010, 2008; Jones, et al., 2009; McGregor & Elliot, 2002; Quested & Duda, 2011). The variability in how an individual appraises their environment (e.g., sports competition) is pertinent to how achievement goals are related to indications of an individual's welfare and emotions (Adie, Duda et al., 2008).

Considering situational demands and personal resources, appraisals that are positive (i.e., challenges) and negative (i.e., threats) are motivational states which depend on an individual's assessment of anticipated benefits and harms in pertinent person-environment interactions (Lazarus & Folkman, 1984). A positive appraisal indicates that the individual has enough perceived personal resources to manage task demands, while a negative appraisal happens when task demands are more than personal resources (Sammy et al., 2021). Personal characteristics, task demands, and environmental factors interact to determine individual appraisals, and they are important for sports expertise and learning new skills (Renshaw et al., 2019). The relationships between the environment, the task at hand, and individual variables all interact to lead to pleasant or unpleasant functional states and high or low action monitoring levels. Ruiz et al. (2020) argue that depending on the situation, athletes can shift between pleasant and unpleasant states and levels of action monitoring in a functional state. Transitions among states can shift along intersections of action monitoring, valence, and performance functionality. Shifts and transitions are viewed along a continuum of multiple states, which are underpinned by different high/low action monitoring conditions and different levels of pleasant/unpleasant experiences.

Aspects such as perceptions of challenge, fatigue, competitive pressure, or other random events, can shift an athlete from low to high levels of action monitoring or pleasant to unpleasant functional states, so the athlete can manage external and/or internal demands to be able to adapt to any situation. When there is an imbalance of perceived demands and personal resources, a resulting negative appraisal leads to dysfunctional states, which are usually unpleasant, and a step-by-step control of action results (rather than action monitoring).

Dysfunctional states seem to further enhance negative appraisals of the situation and can result in detrimental effects on the process of performance and outcome.

Research has indicated that challenge appraisals are related to facilitative performance, more effective attentional control, performance satisfaction, higher self-esteem, emotions being perceived as helpful, task-relevant cue attention, and coping strategies (Jones et al., 2009; Nicholls et al., 2012; Skinner & Brewer 2004). Both functional and dysfunctional emotions can be experienced in a challenging state, dysfunctional emotions are only related to a threat state (Adie, Duda et al., 2008). Research has shown individuals experience bodily sensations that result in increased cardiac activity in addition to a decreased peripheral vascular resistance during challenge-responses (Jones et al., 2009). Threat appraisals, on the other hand, have been shown to lead to hindered performance, attentional focus on task-irrelevant cues, less effective movements, less smiling, decreased performance satisfaction, harmful emotions, avoidance posture, distraction and disengagement orientated coping strategies (Nicholls et al., 2012). Concerning bodily reactions, a threat response has been defined by higher cardiac activity, but there has been either no difference or an increase in peripheral vascular resistance, which typically results in a blood pressure rise (Blascovich & Mendes, 2000). To summarize, challenge appraisals are linked with more positive outcomes when compared to threat appraisals.

### **2.3.1 Challenge and Threat Appraisals and Achievement Goals**

More recently, Thompson and colleagues (2020) conducted a two-part study. The first part of the study examined cyclists during competition and investigated a link between appraisals of challenge and perceived goal attainment through pleasant emotions and mastery-oriented coping behaviors. Appraisals of threat had an inverse relationship to goal attainment through unpleasant emotions and both coping styles (distraction- and disengagement-oriented). The second part of the study included an intervention in the lab where a causal influence of stress appraisals on psychological variables, performance, and cortisol was examined. Athletes were assigned randomly to either a stress appraisal or a control group. There were four stress groups assigned as follows: "harm/loss", "benefit", "challenge", or "threat". Three-time trials of 16.1km with the appropriate stress performance feedback were conducted. Before and after each time trial, salivary cortisol samples, emotions, appraisals, and coping psychometrics data were collected. The first study, which examined competitions, discovered a sequential correlation between appraisals of stress as challenging and perceived goal attainment through pleasant emotions and task-oriented coping behaviors. Appraisals of stress as a threat were related inversely to goal attainment through unpleasant emotions and both coping strategies (distraction- and disengagement-oriented). In the second part of the study, the temporal orientation of appraisals of stress affected objective cycling time trial performance. The "benefit" group had significantly facilitated performance, while the "harm/loss" group had appraisals of stress that significantly inhibited performance. The groups who appraised stress as "threat", "challenge", and "benefit" had observed cortisol spikes, with a de-



cline being detected within the "harm/loss" group. This suggests that whilst the process of winning is physiologically stressful, the fear of defeat may be more stressful than losing itself (Thompson et al., 2020). Results indicated that appraisals of stress influence both objective and subjective performance, in addition to responses to stress that are both neuroendocrine and psychological.

It is worth mentioning a newer theory called the evaluative space approach to challenge and threat (Uphill et al., 2019). This theory combines the evaluative space model (Cacioppo et al., 1997), the biopsychosocial model of challenge and threat (Blascovich & Tomaka, 1996), and the theory of challenge and threat states in athletes (Jones et al., 2009) in an attempt to resolve uncertainties and to employ neurobiological indications associated with approach and avoidance motivation (Elliot & Covington, 2001). This view does not see challenge and threat as two distinct variables (such is the idea in the current work). Instead, the evaluative space approach to challenge and threat suggests that challenge and threat are not on opposite ends of a single and bipolar continuum. Rather, it implies that athletes can be a) challenged, (b) threatened, (c) challenged and threatened, or (d) neither challenged nor threatened by a specific situation. This line of thought argues that appraisals of sports situations can be simultaneously challenging and threatening, which can be beneficial. While the current dissertation suggests that the appraisal of a situation as a threat is generally harmful to performance and leads to dysfunctional states, an appraisal of a challenge leads to helpful performances and functional psychobiosocial states.

The IZOF model is used in the current dissertation as it is holistic and includes biological responses in addition to social cues from the environment as well as psychological responses. Although the current study does not specifically measure physiological responses (i.e., systolic and diastolic blood pressure), it does allow athletes to choose descriptor words like "physically charged", "physically tense", and "sluggish" to help describe their functional and dysfunctional states.

## **2.4 Beyond Psychobiosocial States: Multiple Performance States**

The process of performance is influenced by a myriad of factors. Since data has been collected, a new theory has emerged which helps to more fully explain the process of performance and the process of emotion and action regulations. Multi-states (MuSt) theory (Ruiz et al., 2021) has recently emerged and expanded the ideas from the IZOF model (Hanin, 2000, 2007), the multi-action plan (Bortoli et al., 2012; Robazza et al., 2016), the identification-control-correction program (Hanin & Hanina, 2009), cognitive-motivational relational theory (Lazarus, 2000), and the task execution design approach (Hanin et al., 2016). MuSt theory extends aspects from these models by considering action control and monitoring elements of performance which are important for self-regulation. Although the current dissertation did not measure nor include core action components or action monitoring, MuSt theory remains useful to help better explain the process

of performance from a theoretical perspective. The concept of psychobiosocial states is central to multi-states (MuSt) theory which accounts for the variety of performances athletes can experience during training and competitions. MuSt theory focuses on the description of experiences related to a variety of performances as well as on the prediction of performance, and self-regulation, which includes emotion- and action-centered strategies. The theory adopts the idea that the content and intensity of psychobiosocial states are determined by interpretation (positive or negative) of person-environment interactions, which includes how an individual appraises their dealings with the environment, their own resources, and their ability to cope with the task demands. It also considers that an athlete perceives a specific performance situation to be very individual.

MuSt theory is also valuable to the current dissertation as it also considers the theory of challenge and threat states in athletes (Jones et al., 2009; Meijen et al., 2020; Uphill et al., 2019). Moreover, the theory helps to explain that what may be perceived as beneficial to one athlete may be perceived as harmful by another. In diving, for example, fear can be perceived as beneficial for performance and a certain level of fear may result in behaviors that keep the diver safe. As a more specific example, let us consider a scenario with two divers. Diver one has previously hit the diving board, so this diver may experience moderate levels of fear, which may lead the diver to focus on being at the appropriate distance from the diving board. This level of fear ensures that the diver jumps away from the board to clear it instead of passing too closely over the board, thereby avoiding hitting their head. However, when the intensity level of fear is high, this may elevate to an unmanageable amount, which may be perceived as harmful. The diver may become focused on task-irrelevant cues, and prior negative experiences (e.g., previously hitting the board), which may result in forced task execution (e.g., releasing a flip too early or too late). In turn, this can lead to poor performance or even injury. The same intensity level of fear a diver one experiences as optimal may lead to diver two having tense muscles that ought to be relaxed, thereby deteriorating the execution of the dive. Thus, a certain level of fear may be helpful as it can result in the development of a positive meta experience of fear (e.g., fear is helpful). Nonetheless, higher intensities of fear may be perceived as harmful and could lead the diver to develop a negative meta-experience (e.g., fear is harmful).

MuST theory explains that self-regulation strategies include the regulation of feeling states (performance functionality) as well as attention monitoring/control, and valence resulting in a 2x2x2 interplay model. This results in four performance types. The type 1 state of MuST theory is a flow-like state and is usually triggered by a challenge appraisal. This state has little action monitoring/control and functional and pleasant states are experienced which makes this psychophysiological experience highly self-rewarding and hardly experienced. It is specifically challenging to reach this state if it is sought after.

The type 2 state is also prompted by a challenge appraisal but requires more action monitoring. Here, functional states can be pleasant or unpleasant depending on the difficulty of the situation. The type 2 state is more frequently

experienced and can be attained with attention directed at previously identified core action components. This tends to ease the transition to a more autonomous execution and prevents distraction from task-relevant cues.

In the type 3 state, the performer perceives the situation to be threatening. This threat perception can be due to stress or unpredictable circumstances, and in an attempt to deal with demands (or performance recovery), the performer tends to be distracted from task-relevant cues. This results in disproportionate reinvestment of attention to the performance of automated skills, energy loss, decreased movement fluidity, and automaticity (van Ginneken et. al., 2017). Performers in a type 3 state usually report dysfunctional and unpleasant states.

In the type 4 state, the performer also perceives the situation to be threatening and has low energy expenditure in goal-directed behaviors, low task engagement, and unfocused attention. Insufficient self-awareness or unstructured meta-experiences may trigger poor performance even if pleasant emotions are experienced. An example could be the relief an athlete feels after they make a mistake. They may then believe their chance of winning is not great due to their mistake so they stop expending so much effort and start disengaging from the activity. Another example could be an overconfident athlete who may assume a win before the competition is over and starts relaxing, thereby using less energy or fewer resources.

To conclude, MuSt theory helps explain the self-regulation strategies of athletes which includes psychobiosocial feeling states, valence, and performance functionality allowing for a broader understanding of the performance process. In addition to providing a step-by-step procedure for the potential to enhance performance outcomes (Ruiz et al., 2021) through, 1) identifying psychobiosocial states (and core actions), 2) acceptance of states, and prediction of performance, 3) use of self-regulation strategies. MuSt theory is the closest model to the current hypothesized model used in this dissertation.

## **2.5 Cultural Influences**

Previous research typically applies a cross-sectional design and involves participants from the same country. A review of studies examining relationships between autonomy support, perceived competence, achievement goals, competition appraisals, and psychobiosocial state variables can be found in Table 1. With that being said, the idea of “cross-cultural research” has been gaining popularity within the field of sports psychology. Cultural diversity and cross-cultural communication aspects have been growing (Ryba et al., 2012). A realization that theories and research findings cannot necessarily be generalized across countries and cultures is occurring (e.g., Oishi et al., 2004). Sport psychology professionals are starting to apprehend the idea that these aspects need to be explored specifically within cultures to gain an understanding of athletes within specific cultural settings. One cannot assume that certain theories, meanings, and perspectives have equivalent meaning and salience across two

individual cultures unless it has been studied specifically. Cross-cultural comparisons of antecedents in the emotion motivation performance relationship cultures have not been conducted.

As can be seen in appendix 12.1, there is a lack of cross-cultural research which explores the environmental, motivation, and emotional relationships across groups in sport. There has been some work in the physical education setting, for instance, motives to participate were examined to explore possible differences across three countries (Slovenia, Croatia, and Germany). Differences were found across the three countries for a six-dimensional latent structure of sports motivation. The assumption for inconsistency across countries was that cultural differences existed (Kondric et al., 2013). Although a step in the right direction for cultural comparison has been made, more advanced methods, such as structural equation modeling instead of principal components analysis, need to be used.

In other cases, studies claim to be cross cultural but are merely validated a measurement tool in a different language. For instance a recent study titled, "cross cultural validation of the attention questionnaire of rehabilitated athletes returning to competition" explored injury rehabilitation in Italian athletes (Conti et al. 2020) and validated a scale, but it was not a cross cultural study as it only looked at Italian athletes. While other studies on cross-cultural aspects have focused on why young athletes participate (e.g., Wang & Wiese-Bjornstal, 1996) and how this differs across cultures, with a majority focusing on Western vs. Eastern (Kim et al., 2003; Wang & Wiese-Bjornstal, 1997) cultures. Differences in sporting culture have been found in achievement motivation in American and Japanese samples, for instance (Isogai et al., 2003). It was reported that goal orientations were not associated with each other for the Americans, although the two factors were correlated positively for the Japanese. Researchers suggested Eastern cultures may determine their success in sport in terms of a general factor (incorporating comparison with others and personal improvement), while the American culture seems to judge success in sport in two separate considerations (personal improvement and comparison with others). Other research on young people's motivation to participate in physical activity compared three cultural backgrounds, namely Chinese, Chinese American, and non-Chinese American (Yan & McCullagh 2004). Results revealed that the American children (both Chinese and non-Chinese American) partook in sports or physical activities for skill improvement and competition, whereas Chinese children were motivated by socialization and wellness. In other work, (Hamamura et al. 2008) state that culture is the broadest sense of context, and their research has indicated that East Asians tend to be more avoidance-oriented and less approach-oriented when compared to western cultures. Researchers suggested that individuals from other cultures may be subjected to socio-cultural effects, which subsequently results in culture-associated variability in the motivation to partake in sport or physical activity. It was suggested that the inter-cultural differences (gender and age-related) in sports motivation are greater than the intra-cultural differences (Yan & McCullagh 2004).

With that being said, limited research has been conducted cross-culturally in high-level sports. One can assume that socio-cultural influences also affect environments in high-level sports settings and that these differences can and should be explored. Finland, for instance, has a generally feminine culture where soft values, such as modesty, are encouraged, while masculine cultures in North America promote hard values, such as competitiveness (Hofstede, 1991, 2022). There is a cultural factor that is used in the business world that uses data and scores each culture and country on six different dimensions which are called the 6-D Model. The model is based on the work of a Dutch social psychologist, Geert Hofstede, who pioneered cross-cultural groups and organizational research. The 6-D Model developed by Hofstede was not only the earliest but also seems to be the most popular to measure culture on a global scale. He stated, that culture is the software of the mind. It ranks among the strongest influences on human behavior (Hofstede, 1991,2011). The 6-D Model specifically looks at the organizational culture of a country and assigns it a score. The Hofstede method has been used in large companies since 1985 (e.g., IKEA, Siemens, and IBM) to align cultural context and improve intercultural communication.

Furthermore, the Finnish culture regarding self-confidence is quite different compared to North American cultures. Self-deprecation, for instance, is an expression of "off-record politeness" (Brown & Levinson 1978), and in Finland, it is an appropriate way of presenting oneself. It is preferred over assertiveness or aggressiveness (Kirra, 2000). This outlook is also displayed in the Finnish proverb "Oma kehu haisee" ("Self-praise is no recommendation", literally translates to "Self-praise stinks"). In Finnish culture, humble self-presentation, and modesty, rather than assertiveness, is encouraged (Sallinen-Kuparinen, 1986), and their own accomplishments are often downplayed. One must assume if the cultural norm is to self-preserve and be humble, there is probably something in the culture that may encourage lower levels of perceived competence. (There has been no research to support this idea, so this is something that should further be explored in future research). As a culture, Finns are regarded as quiet people who are efficient with words; they say what they need to as concisely as possible and then return to their thoughts. In addition, expressing one's anger openly is discouraged. Emotions are bottled up with obvious effect, and 'wearing your heart on your sleeve' is considered distasteful within the culture. As can be concluded from these previous statements, clear cultural differences exist and are apparent between the quiet Finnish culture and the more well-known 'loud' and 'less humble' characteristics of North American culture. Since no previous research has been conducted that compared the sporting cultural differences between these contexts, this study aims to provide a basis for comparison which will hopefully lead to further investigation.

### **2.5.1 Cultural Differences Across Countries: Finnish Coaching Styles**

After an extensive review of the relevant literature, it was discovered that there does not seem to be any research that specifically explores the coaching style within Finnish sport. Therefore, I borrowed and expanded on the following

elements from cultural studies that have been conducted in the management and business fields within Finland. One can assume that similar coaching styles occur in the sports setting as the coach is in the leadership role within high-level sport.

There are many parallels as the coach is the person of power in the relationship, much like a boss. Both roles are responsible for providing competence feedback, telling individuals what to do, setting expectations and assessments, and both coaches and 'bosses' create a climate that is either mastery or performance inducing. Therefore, there are many similarities between a coach and a 'boss' or an individual who is in a management role. From a cultural standpoint, Finns are characterized by egalitarian commitment (i.e., gender-neutral words in the language), and relatively high intellectual autonomy and harmony (Schwartz, 1994). This suggests qualities, such as preferences for cooperation, rather than competition (mastery-orientation), self-transcendence, trust in followers, autonomy preferences in organizing work, and openness for change and ideas. Generally, it seems that leadership is more focused on development rather than 'maintaining the status quo'.

Since research on Finnish leaders seems to be focused on the world of business, one can only assume that many of these characteristics also transcend to the field of sport. Finns are not fans of small talk and would rather go straight to the matter in business negotiations, so implementing can start immediately (Lämsä, 2010; Swallow 2001). Impatience, problem-solving skills, handling chaotic circumstances, rapid decision making, and business honesty are natural qualities for Finns (Ekwall & Karlsson 1999). According to sociologists (e.g., Ekwall & Karlsson 1999; Lämsä, 2010), a characteristic stereotype is that Finns say what they think, expect others to do the same, and that they are outspoken. If a Finnish person says 'yes', they also mean that the same will hold true in the refusal and they are not afraid to express negative thoughts out loud, even if it leads to conflict. Research on work culture in Finland emphasizes team spirit, providing effective communication, having open dialogue, and allowing for a consensus in decision making. Finnish leaders also pay notice to the organizational design in detail (Kakabadse et al., 1997). Many of these qualities would lead one to believe that the leadership style in the Finnish culture is very autonomy-supportive and mastery involved, and the author assumes that this is similar in high-level sports.

## **2.5.2 Cultural Differences Across Countries: North American Coaching Styles**

After an extensive literature review (see Appendix 12.1) and similar to Finland, limited studies have been conducted that specifically explore the leadership style of coaches in North America. There is hardly any literature that examines variables central to this dissertation cross-culturally. With that being said, one study conducted examined coach efficacy as a precursor of coaching leadership style in sport (college level). This study claimed to be international, although it only looked at the difference between Canadian and American coaches, in the current dissertation the sample of Canadians and North Americans are grouped

into one sample “North Americans”. The Sullivan and Kent (2003) study explained that the coaches in the sample were professionals (full-time) who were all at an equal level of competition, although there was reason to suggest that the organizational and competitive cultures of the American and Canadian university athletics may be different. Analysis of variance was conducted, and it was discovered that there were no significant differences between samples, thereby helping to support our argument that Americans and Canadians are very similar in sporting culture. The research assessed five coaching styles of leadership (Leadership Scale for Sports; Chelladurai & Saleh, 1980) and four factors of coaching efficacy (Coaching Efficacy Scale; Feltz et al., 1999). The sample of North American coaches scored as follows: instruction 1.83, democratic 2.78, autocratic 3.48, social support 2.52, positive feedback 1.57 motivation 7.4, strategy 7.76, character-building 8.04, technique 7.97. These results suggest that the North American coaching leadership style is one in which coaches become more confident in their motivating roles. They were closer to their image of the “ideal leader” and engaged in more positive behaviors, such as using positive feedback and appropriate training and instruction (Sullivan & Kent, 2003).

More broadly, North American culture shares the notion that behavior in play, work, and school is based on the idea that humans aim to “strive to be the best they can be” and that “the winner takes all”. Due to this, Americans have a propensity to talk freely and enjoy displaying their “successes” and achievements in life. Being able to show one’s success seems to be more important than actually being successful (Hofstede, 2022). One can assume that this carries over to the world of sport.

Culture can play a huge role in influencing behaviors and performance, both within and outside of sport. There seems to be a lack of resources to measure the idea of culture in sport, which makes it challenging to compare samples. The current dissertation aims to examine variables within each sample to discover how both individual and situational variables interact among Finnish and North American athletes.

### **3 PURPOSE OF THE STUDY AND HYPOTHESES**

The purpose of this dissertation was to examine the antecedents of psychobiosocial states in two samples of high-level athletes from Finland and North America. As presented in the literature review section, and Table A in the appendix there has been a plethora of research conducted on environmental, situational, and individual variables concerning psychobiosocial states. What has not been conducted is a hypothesized model that incorporates these variables together to discover how they interact to lead to functional or dysfunctional psychobiosocial states. Therefore, this dissertation aims to fill that gap in research, allowing for a more thorough understanding of the antecedents of psychobiosocial states in high-level athletes. The first aim of the dissertation was to examine the relationships between autonomy-supportive coach-created climate, perceived competence, approach and avoidance achievement goals, competition appraisals, and functional and dysfunctional psychobiosocial states (see hypothesized model in Figure 1). The second aim of the dissertation was to investigate the causal relationships between autonomy support, perceived competence, and competitive goals (mastery and performance) on competitive appraisals and psychobiosocial states over a three-month time period. Specifically, one model included the links from autonomy support, perceived competence, and approach goals to challenge appraisals and functional states at Time 1 and Time 2, three months later (see Figure 2). A second model included the links from autonomy support, perceived competence, and avoidance goals to threat appraisals and dysfunctional psychobiosocial states at Time 1 and Time 2 (see Figure 3).

#### **3.1 Hypotheses**

In light of the first study aim, the following hypotheses were drawn:



Hypothesis 1: Perceptions of a coach-created autonomy-supportive environment, perceived competence, approach goals (mastery and performance), and challenge appraisals would be positively related to athletes' functional psychobiosocial states (see Figure 1).

Hypothesis 2: Perceptions of a coach-created autonomy-supportive environment and perceived competence would be negatively related to avoidance goals (mastery and performance), threat appraisals, and dysfunctional psychobiosocial states. Moreover, avoidance goals are expected to be positively related to threat appraisals and dysfunctional states (Figure 1).

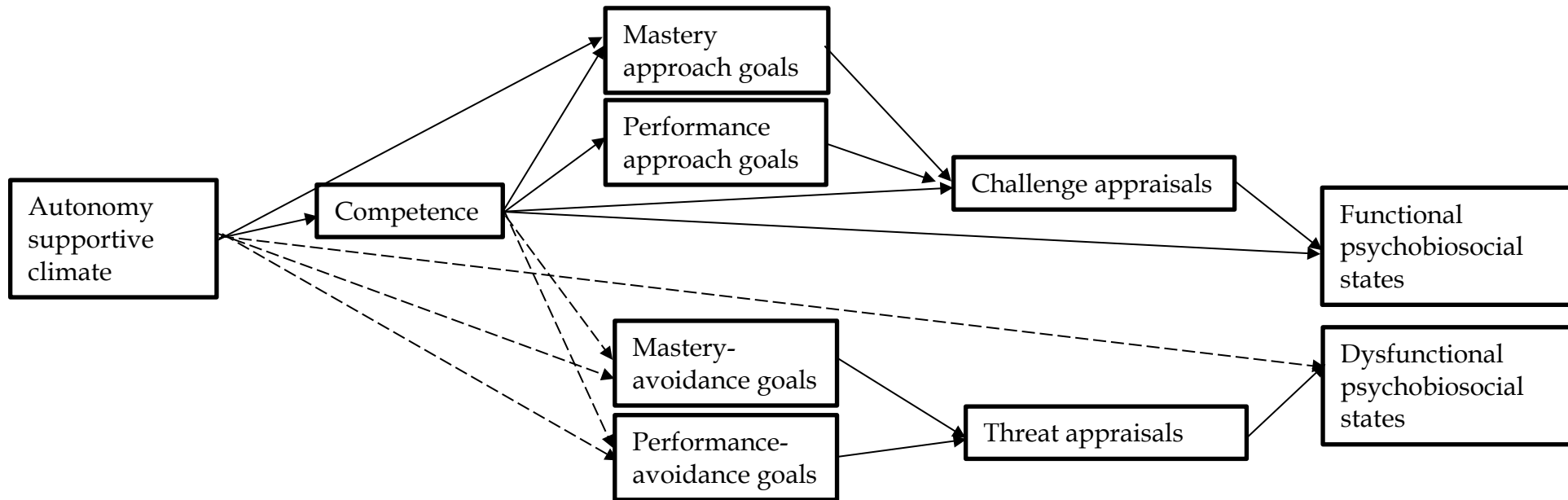
Regarding the second aim of the dissertation, the causal relationships between appraisals and psychobiosocial states were examined over a three-month time period (Figure 2). The following hypotheses were developed:

Hypothesis 3: Challenge appraisals at Time 1 (T1) were expected to positively predict functional psychobiosocial states at Time 2 (T2).

Hypothesis 4: Threat appraisals at T1 were expected to positively predict dysfunctional psychobiosocial states at T2.

**Figure 1**

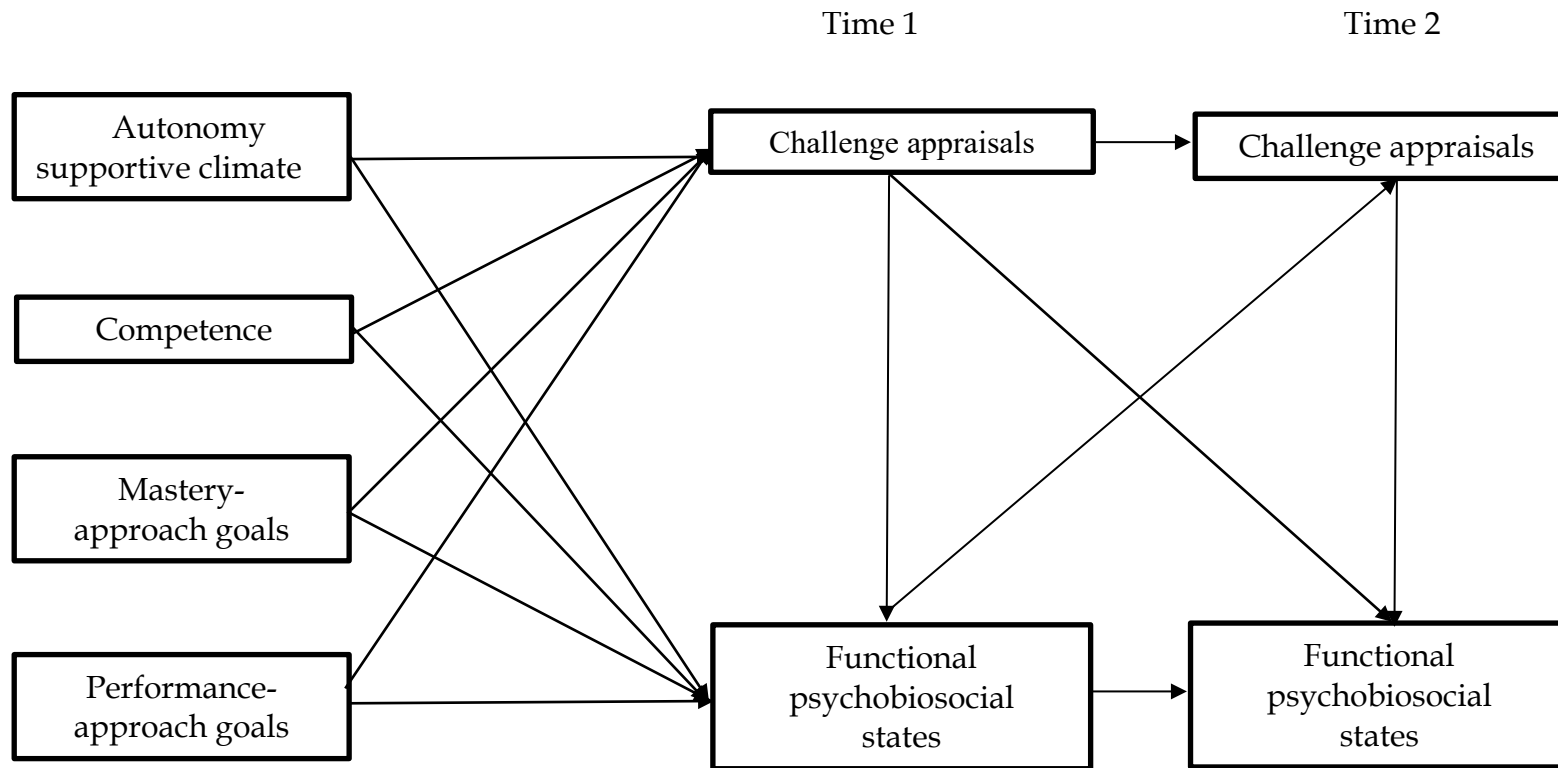
*Proposed relationships between the social environment (autonomy support) and individual variables (approach and avoidance goals, perceived competence, competition appraisals) and athletes' functional and dysfunctional psychobiosocial states (Model 1).*



*Note.* Solid lines denote positive relationships and dashed lines denote negative relationships

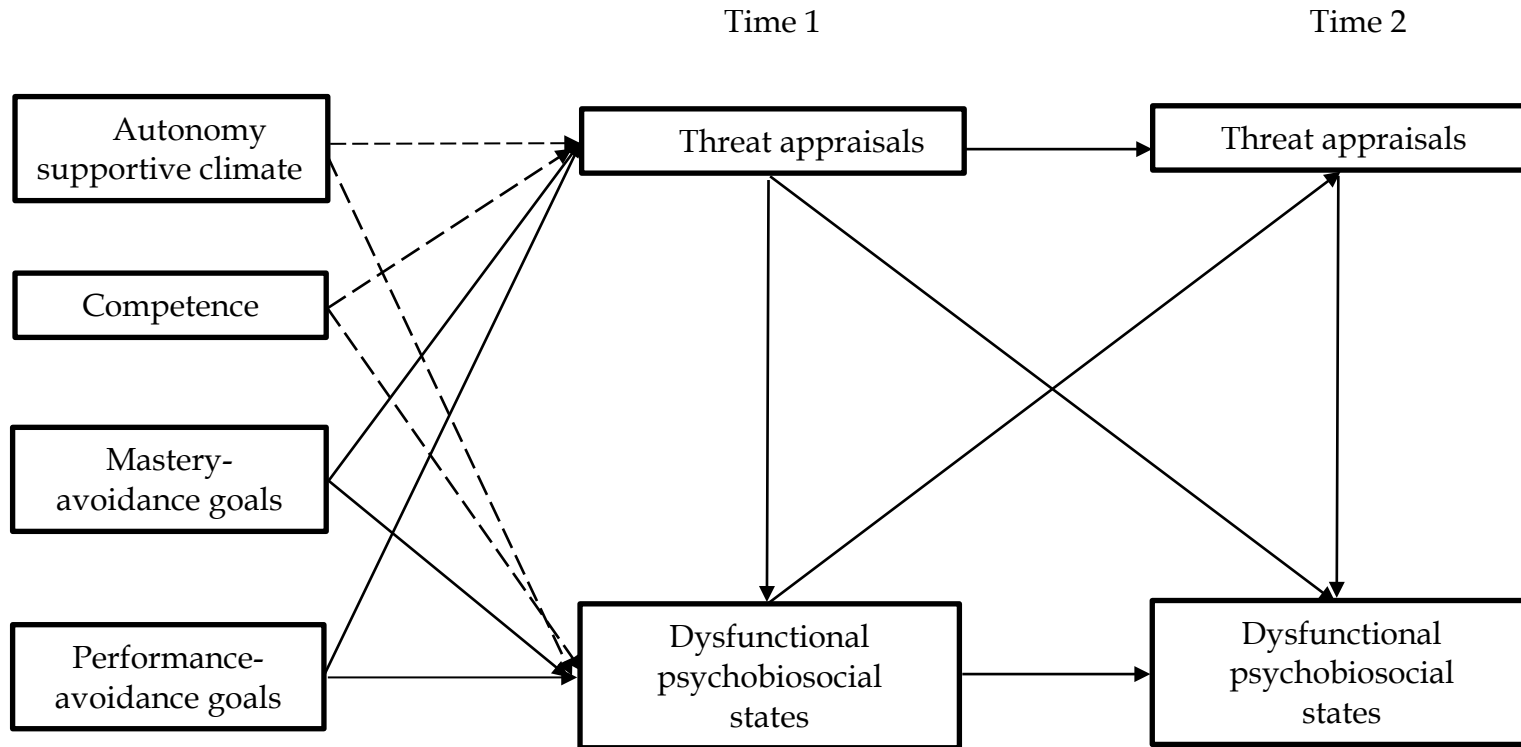
**Figure 2**

*Proposed relationships at T1 and T2 (3 months later) over a 3s-month time period between autonomy support, competence, and mastery and performance-approach goals on challenge appraisals and functional psychobiosocial states (Model 2)*



**Figure 3**

*Proposed relationships at T1 and T2 (3 months later) between autonomy support, competence, and mastery and performance-avoidance goals on threat appraisals and dysfunctional psychobiosocial states over 3 months (Model 3)*



*Note.* Solid lines denote positive relationships and dashed lines denote negative relationships

## **4 MATERIALS AND METHODS**

### **4.1 Study Approval and Procedure**

The study was approved by the Ethical Committee at the University of Jyväskylä as part of a broader project entitled “Psychobiosocial states in sport achievement settings: A study of their antecedents with a focus on motivational aspects”. A copy of the ethical approval can be found in Appendix 12.2. Participants were recruited via sports schools, training centers, clubs, universities, and organizations in central, southern, and northern parts of Finland. In regards to the North American sample, participants were recruited from the midwestern United States and Central Canada. Coaches were contacted via in-person, phone, or email methods to recruit their athletes. Written consent from participants was obtained from all athletes after the purpose of the study was explained, voluntary participation was emphasized, and confidentiality of results was assured. Athletes under the age of 18 gave their assent and a guardian provided written consent. The questionnaires were administered either individually or in small groups, in a quiet place, close to or at the participants training facilities, and for one occasion questionnaires were administered on a bus on the way to a competition. Data collection took place before a performance session. Questionnaire administration took approximately 30 minutes.

### **4.2 Participants**

Study participants included 727 competitive athletes from two samples. According to the Swann et. al. (2015) definition, both samples of high-level athletes range from “semi-elite” to “successful-elite” athletes. The Finnish sample consisted of 484 athletes (275 females, 209 males), ranging in age from 16 to 39 years ( $M = 20.3$ ,  $SD = 4.2$ ). Two hundred and ninety-one athletes were competitive at local to national levels and 203 participants had competed at the international level (Euro-

pean or World Championships). Finnish athletes had been competing for an average of 10.06 (*SD* 4.9) years and trained an average of 13.73 (*SD* 5.4) hours per week. Three hundred and sixty-five athletes were from team sports (e.g., soccer, hockey, and basketball) and 129 were from individual sports (e.g., diving, cycling, and skiing).

The North American sample consisted of 243 athletes (129 females, 114 males), ranging in age from 14 to 53 years ( $M = 19.5$  *SD* 6.1). Ninety-three athletes were competitive at the state and regional levels and 150 athletes competed at national or international levels. Athletes have been competing for an average of 10.63 years (*SD* 4.9) and on average, they trained for 17.01 (*SD* 4.9) hours per week. Eighty-nine athletes were from team sports (i.e., hockey, basketball, soccer) and 154 athletes from individual sports (i.e., diving, figure skating, Nordic skiing).

### **4.3 Instruments**

The following instruments were used in data collection:

#### **4.3.1 Perceived Autonomy Support**

Perceived coach-created autonomy support was measured using six items from the Health Care Climate Questionnaire (HCCQ) (Williams et al., 1996). The items were adapted to discover the degree to which athletes perceived their coach to be autonomy-supportive (e.g., "I feel that my coach provides me with choices and options"). The responses were rated on a Likert-type scale from 1 (strongly agree) to 7 (strongly disagree). Previous research has reported this scale to be a valid instrument with an acceptable internal consistency with Cronbach's alphas  $<.72$  (Williams et al., 1999).

#### **4.3.2 Perceived Competence**

Perceived competence was measured with the five-item subscale of the Intrinsic Motivation Inventory (IMI) (McAuley et al., 1989). Scale items reflect the overall levels of perceived competence one experiences as a function of engaging in a task (e.g., "I think I am pretty good at my sport"). The scale items are rated on a 5-point Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The IMI sub-scale has been reported to be a valid and reliable instrument with an acceptable internal consistency with Cronbach's alphas  $<.70$  (Benita et. al., 2014; McAuley et al., 1989; Pope & Wilson, 2012).

#### **4.3.3 Approach and Avoidance Achievement Goals**

Approach and avoidance achievement goals were measured with the 12-item Achievement Goal Questionnaire for Sport (AGQ-S) (Conroy et al., 2003). Four

achievement goals were measured with three questions for each subscale: 1) mastery-approach goals (e.g., “I want to perform as well as it is possible for me to perform”), 2) mastery-avoidance goals (e.g., “I worry that I may not perform as well as I possibly can”), 3) performance-approach goals (e.g., “It is important for me to perform better than others”), and 4) performance-avoidance goals (e.g., “I just want to avoid performing worse than others”). Athletes were asked about different ways in which they can avoid incompetence or strive for success by indicating the extent to which they think each item is true to them on a 1 (not at all true of me) to 7 (very true of me) Likert-type scale. The AGQ-S scores have demonstrated evidence of construct validity (TLI = .95, CFI = .97, RMSEA = .044) and internal consistency (Cronbach’s  $\alpha > .70$ ) of the scale (Gråstén et al., 2018). Other studies have also found high Cronbach’s alphas .80, .92, and .94 for mastery, performance-approach, and performance-avoidance goals, respectively (Benita et al., 2014).

#### **4.3.4 Competitive Appraisals**

Competitive appraisals were measured with a 10-item adapted version of the challenge and threat construal measure (McGregor & Elliot, 2002). Athletes were asked to reply to the stem, “How would you typically think before such a competition?” For example, an item from the challenge scale is, “I view the competition as a positive challenge”, while one from the threat scale is “I think the competition could be threatening to me”. All replies were indicated on a 7-point Likert-type scale ranging from 1 (not at all true) to 7 (absolutely true). The challenge and threat sports competition measure has yielded high internal consistency and predictive validity in sports settings with acceptable Cronbach’s alphas for the subscales, mastery-approach  $< .65$ , mastery-avoidance  $< .90$ , performance-approach  $< .93$ , and performance-avoidance  $< .86$  (Adie et al., 2008; Conroy et al., 2003; Muis & Winne, 2012; Turner et al., 2014).

#### **4.3.5 Psychobiosocial States**

Psychobiosocial states were measured with the Psychobiosocial States Scale (PBS-S scale; Ruiz et al., 2019), which is based on the Individualized Profiling of Psychobiosocial States (Ruiz et al., 2016). The scale assessed eight different state modalities (i.e., cognitive, emotional, volitional, motivational, bodily-somatic, motor-behavioral, operational, and communicative) and targets the functional and dysfunctional modalities of a psychobiosocial state. The scale includes 20 rows of items (with 3–4 descriptors each) that are classified as functionally helpful or harmful for performance. For example, functional pleasant states (“joyful, enthusiastic, carefree, confident”), functional anger (“aggressive, fighting spirit, fierce”), dysfunctional anxiety (“apprehensive, worried, troubled, concerned”), and dysfunctional anger (“resentful, furious, annoyed, irritated”). Firstly, athletes were invited to respond to the question, “How do you feel right now in relation to your performance?” Then they selected the word that best describes their feelings. Next, athletes were invited to score the intensity on a

scale ranging from 0 (nothing at all) to 4 (very much). Factor structure and reliability have been supported, and acceptable internal consistency for the scale has been reported, functional states Cronbach's alpha =.74, dysfunctional states Cronbach's alpha =.78 (Ruiz et al., 2016).

#### **4.4 Back Translation Protocol**

The multi-scale questionnaire package was used to assess study variables. For the purpose of the study, the health care climate questionnaire (Williams et al., 1996), intrinsic motivation inventory (McAuley et al., 1989), achievement goal questionnaire for sport (AGQ-S, Conroy et al., 2003), and challenge and threat construal measure (McGregor & Elliot, 2002) were translated to Finnish using a back-translated standardized protocol (see Duda et al., 2014). The back-translation procedure was as follows: First, an individual who speaks both Finnish and English translated the scales into Finnish. Then, a panel of three native Finnish speakers who were academics familiar with the scales examined the translated versions. Discrepancies were considered and efforts were made to ensure that the meaning remained unchanged. Then, the Finnish versions were translated back into English. Finally, the original was compared with the translated English versions to make sure that the meaning and the purpose of the original items were retained.



## 5 DATA ANALYSIS

Data were screened for normal distribution, missing values, and potential outliers. Sixteen cases were excluded from further analysis, seven cases with several missing values (>5%), and nine were identified as outliers (Mahalanobis' distance,  $p < .001$ ). Multivariate analysis of variance (MANOVA) was used to determine if there were significant differences between mean values for the studied variables across samples. Structural equation modeling (SEM) was used to examine all hypothesized models. Specifically, mean scores of observed variables were used to examine relationships between the social environment (autonomy support) and individual variables (approach and avoidance goals, perceived competition, competition appraisals), and athletes' functional and dysfunctional psychobiosocial states (Model 1). To address the second study purpose, a cross-lagged panel analysis was conducted to examine the causal relationship between autonomy support, perceived competence, and approach goals and their relationship with functional psychobiosocial states over a three-month time period (Model 2). Cross-lagged panel design was used to examine the relationships between autonomy support, perceived competence with mastery- and performance-avoidance goals, threat appraisals, and dysfunctional psychobiosocial states over the same time period (Model 3).

SEM analyses were performed in Mplus 8.2 (Muthén & Muthén, 2017), and the missing-data function was used while adjusting for non-normality with the MLR estimator in Mplus (robust full information maximum likelihood estimator). The model fit was determined, considering the following indices chi-square ( $\chi^2$ ), the comparative fit index (CFI), the Tucker-Lewis Index (TLI), standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). Good model fit is assumed when the values of CFI and TLI are close to .95, the SRMR is less than .08, and the RMSEA is less than .06 (Hu & Bentler, 1999).

## 6 RESULTS

### 6.1 Descriptive Statistics

As can be seen in Table 1, Finnish athletes reported moderate perceptions of autonomy support and competence. They indicated very high scores for mastery-approach achievement goals and moderate scores for mastery-avoidance, performance-approach, and performance-avoidance achievement goals. Challenge appraisals were high, while threat appraisals and functional states were low. Finnish athletes reported low levels of dysfunctional states. North American athletes experienced high levels of autonomy support, perceived competence, mastery-approach and mastery-avoidance achievement goals, and moderate levels of performance-approach and performance-avoidance goals. Challenge appraisals were high and threat appraisals were moderate, with low functional states and very low levels of dysfunctional states.

In the case of Finnish athletes, the level of autonomy support was fairly low when compared with the North Americans. A one way ANOVA resulted in significant differences for the following variables: autonomy support  $F(1,725) = 321.47$   $p < .001$ , perceived competence  $F(1,725) = 49.24$ ,  $p < .001$ , mastery-approach goals  $F(1,725) = 10.530$ ,  $p < .001$ , mastery avoidance goals  $F(1,725) = 56.02$ ,  $p < .001$ , performance-approach goals  $F(1, 725) = 15.38$ ,  $p < .001$ , performance-avoidance goals  $F(1,725) = 4.26$ ,  $p = .04$ , and threat appraisals  $F(1725,) = 49.71$ ,  $p < .001$ . There were no significant differences between challenge appraisals or functional nor dysfunctional psychobiosocial states.

For the Finnish athletes', the highest scores included mastery-approach goals, followed by challenge appraisals. Moderate scores for perceived competence, mastery-avoidance, performance-approach, and performance-avoidance scores were found. Threat appraisal scores were low with high scores for functional psychobiosocial states and low levels of dysfunctional states. Similar to the Finnish athletes, for the North American athletes', the highest scores included mastery-approach goals, followed by challenge appraisals. Mastery-avoidance and perceived competence were higher for North American

athletes with moderate scores reported for both performance-approach and performance-avoidance scores. Threat appraisal scores were low with high scores for functional psychobiosocial states and low levels of dysfunctional states.

Two items (functional anxiety and pleasant dysfunctional psychobiosocial states) were removed from the PBS-S states scale to improve model fit. After removing these two items from the PBS-S scale, all measures had Cronbach's alpha coefficients within an acceptable range. Finnish scales ranged from .71 to .86 and the North American scales ranged from .73 to .87.

**Table 1***Descriptive Statistics, Cronbach's Alphas, and McDonald's Omega*

Variables	<i>Finnish Athletes n=484</i>					<i>North American Athletes n=243</i>				
	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>a/ω</i>	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>a/ω</i>
1. Autonomy Support	3.69	0.73	-0.52	0.25	0.86/.86	5.05	1.31	-0.58	-0.11	0.91/.91
2. Perceived Competence	4.84	0.93	-0.28	0.14	0.75/.69	5.38	1.07	-1.11	1.72	0.86/.78
3. Mastery-approach	6.17	0.81	-1.14	1.24	0.73/.75	6.37	0.77	-1.20	0.56	0.72/.72
4. Mastery-avoidance	4.30	1.41	-0.20	-0.63	0.84/.84	5.15	1.48	-0.72	-0.15	0.88/.89
5. Performance-approach	4.18	1.51	-0.19	-0.69	0.87/.87	4.66	1.64	-0.38	-0.75	0.89/.87
6. Performance-avoidance	3.66	1.37	0.10	-0.44	0.71/.86	3.90	1.69	0.15	-0.86	0.86/.71
7. Challenge Appraisal	5.63	0.96	-0.52	-0.17	0.85/.78	5.68	1.13	-1.09	1.23	0.87/.82
8. Threat Appraisal	2.53	1.09	0.81	0.23	0.85/.80	3.18	1.31	0.43	-0.50	0.80/.85
9. Functional States	2.36	0.59	-0.16	0.16	0.78/.78	2.29	0.73	-0.30	0.15	0.83/.86
10. Dysfunctional States	1.14	0.68	0.71	-0.02	0.82/.81	1.22	0.83	0.80	0.19	0.84/.85

### 6.1.1 Bivariate correlations

Bivariate correlations for the study variables for Finnish athletes are reported in Table 2. Autonomy support was positively correlated with perceived competence, mastery-approach and performance-approach goals, challenge appraisals, and functional psychobiosocial. It was negatively correlated with threat appraisals and dysfunctional psychobiosocial states. No significant relationships were found between autonomy-support and mastery-avoidance or performance-avoidance goals. In addition to autonomy support, competence was positively correlated with mastery-approach and performance-approach goals, challenge appraisals, functional psychobiosocial states, and negatively related to mastery-avoidance, threat appraisals, and dysfunctional psychobiosocial states. Perceived competence was not significantly related to performance-avoidance goals. In addition to autonomy support and competence, mastery-approach goals were positively correlated with performance-approach goals, challenge appraisal, functional psychobiosocial states, and negatively correlated with threat appraisals and dysfunctional psychobiosocial states. Mastery-approach goals were not correlated with mastery-avoidance goals. Mastery-avoidance goals were positively correlated with both performance-approach and performance-avoidance goals, threat appraisals, and dysfunctional psychobiosocial states, while they were negatively correlated with challenge appraisals. Performance-approach goals were positively correlated to performance-avoidance goals as well as both challenge and threat appraisals. Performance-approach goals were not related to either psychobiosocial state. Performance-avoidance goals were positively correlated to threat appraisals and dysfunctional emotions. They were not significantly correlated with functional states. Challenge appraisals were positively correlated to functional psychobiosocial states and negatively correlated with threat appraisals and dysfunctional psychobiosocial states. Threat appraisals were positively correlated with dysfunctional psychobiosocial states and negatively correlated with functional psychobiosocial states. Functional and dysfunctional psychobiosocial states were negatively correlated.

In the case of North American athletes, autonomy support was positively correlated with perceived competence, a mastery-approach climate, and challenge appraisals, and it was negatively correlated with both performance-approach and performance-avoidance goals as well as threat appraisals. No significant relationships were found between autonomy support and mastery avoidance, or psychobiosocial states. In addition to autonomy support, competence was positively correlated with mastery-approach goals, challenge appraisals, functional psychobiosocial states, and negatively related to mastery-avoidance, threat appraisals, and dysfunctional psychobiosocial states. Competence was not significantly associated with performance-approach goals, nor with performance-avoidance goals. In addition to autonomy support and competence, mastery-approach goals were positively correlated with mastery-avoidance and performance-approach goals, challenge appraisal, functional

psychobiosocial states, and negatively correlated with threat appraisals and dysfunctional psychobiosocial states. Mastery-avoidance goals were positively correlated with both performance-approach and performance-avoidance goals, and threat appraisals, while they were negatively correlated with challenge appraisals. They were not correlated with psychobiosocial states. Performance-approach goals were positively correlated to performance-avoidance goals, threat appraisals, and dysfunctional psychobiosocial states. They were not correlated with challenge appraisals or functional psychobiosocial states. Performance-avoidance goals were positively correlated to threat appraisals and dysfunctional emotions and negatively related to challenge appraisals. Challenge appraisals were positively correlated with functional psychobiosocial states and negatively correlated with threat appraisals and dysfunctional psychobiosocial states. Functional and dysfunctional psychobiosocial states were negatively correlated.

**Table 2***Bivariate correlations among study variables for Finnish athletes (lower diagonal) and North American athletes (upper diagonal)*

Variables	1	2	3	4	5	6	7	8	9	10
1. Autonomy Support	1	.30 **	.23 **	-.10	-.14 *	-.18 **	.27 **	-.27 **	.11	-.12
2. Perceived Competence	.27 **	1	.22 **	-.13 *	.02	-.02	.32 **	-.13 *	.19 **	-.16 *
3. Mastery-approach	.23 **	.27 **	1	.20 **	.20 **	.08	.32 **	-.16 *	.23 **	-.18 **
4. Mastery-avoidance	-.08	-.24 **	.07	1	.26 **	.41 **	-.23 **	.45 **	-.02	.12
5. Performance-approach	.07	.18 **	.27 *	.10 *	1	.69 **	.03	.31 **	.07	.13 *
6. Performance-avoidance	-.03	-.05	.07	.44 **	.41 **	1	-.18 **	.43 **	.05	.15 *
7. Challenge Appraisal	.21 **	.30 **	.36 **	-.21 **	.09 *	-.07	1	-.35 **	.22 **	-.23 **
8. Threat Appraisal	-.19 **	-.25 **	-.20 **	.51 **	.12 **	.33 **	-.48 **	1	.00	.24 **
9. Functional States	.13 **	.33 **	.25 **	-.04	.03	.02	.33 **	-.13 **	1	-.22 **
10. Dysfunctional States	-.25 **	-.24 **	-.11 *	.30 *	.06	.19 **	-.15 **	.35 **	-.26 **	1

*Note.* \*  $p < 0.05$ , \*\*  $p < 0.01$

## 6.2 Comparison of Groups

A MANOVA was conducted to test for differences across samples, and it resulted in significant differences across countries: Pillai's trace = .523,  $F(20,274) = 15.024$ ,  $p < .005$ ,  $\eta^2 = .523$ , for gender Pillai's trace = .270,  $F(20, 274) = 5.07$ ,  $p < .005$ ,  $\eta^2 = .270$ , and the level of competition Pillai's trace = .109,  $F(20,274) = 1.68$ ,  $p < .05$ ,  $\eta^2 = .109$ . A follow-up analysis across countries indicated that across samples, autonomy support, perceived competence, mastery-avoidance, performance-approach, challenge appraisals, and dysfunctional psychobiosocial states reported higher scores in the North American sample at Time 1. At Time 2, similar results were found. North Americans had statistically higher mean values for autonomy support, competence, mastery-approach, mastery-avoidance, challenge, threat, and dysfunctional states. A follow-up analysis across gender revealed that at Time 1, males had higher mean scores in performance-approach and challenge appraisals, while females at Time 1 were higher in mastery-avoidance and threat appraisals. At Time 2, males were higher in autonomy support, competence, performance-approach, challenge appraisals, and dysfunctional states, while females were higher in mastery-avoidance, performance-avoidance, and threat appraisals. International-level athletes were higher in mastery-avoidance, while national-level athletes were higher in challenge and dysfunctional states at Time 1 and challenge appraisals at Time 2.

## 6.3 Antecedents of Psychobiosocial States

### 6.3.1 Antecedents of Psychobiosocial States of Finnish Athletes

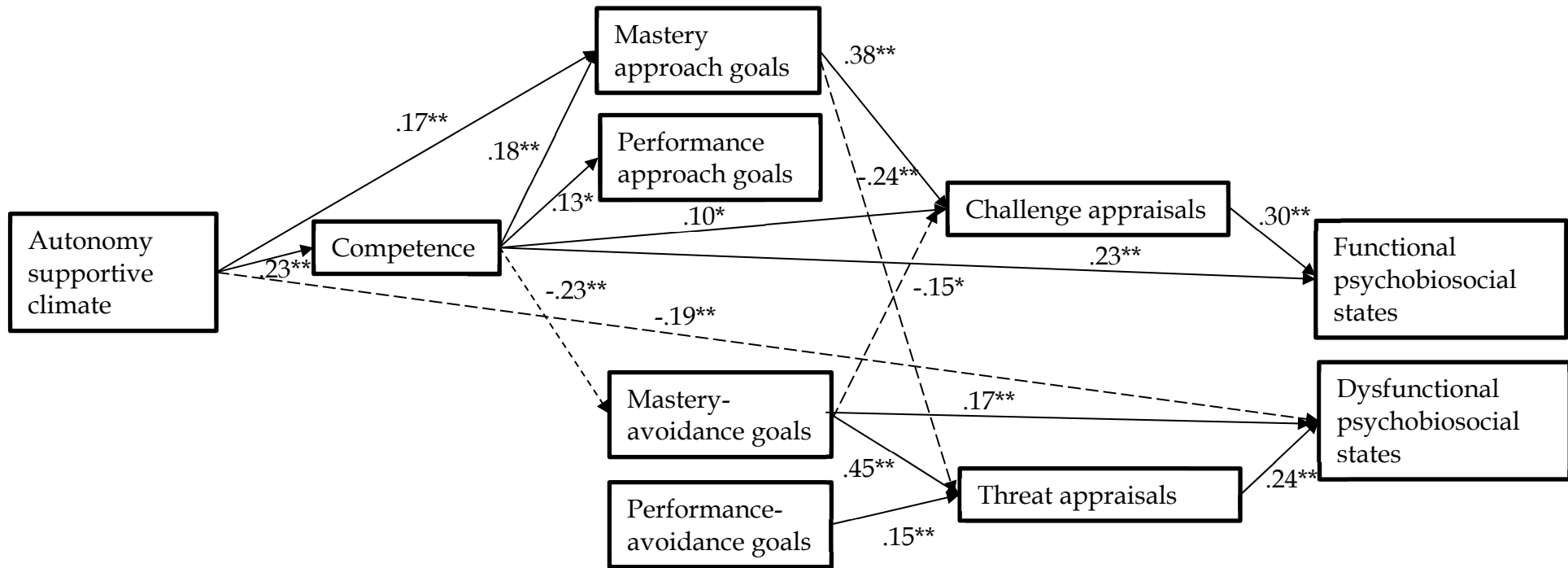
In the case of Finnish athletes, the structural model including the relationships between autonomy support, perceived competence, mastery and performance-approach and avoidance goals, competition appraisals as well as functional and dysfunctional psychobiosocial states fitted data well:  $\chi^2(828) = 44.00$ ,  $p < .001$ , CFI = .96, TLI = .92, RMSEA = .05, SRMR = .04. Hypothesis one was partially supported as perceptions of an autonomy-supportive climate positively predicted competence and mastery-approach goals (see Figure 5) but did not predict performance-approach goals. As expected, autonomy support was negatively related to dysfunctional states, which partially supports hypothesis 2. No other negative relationships were significant with autonomy support. Competence was a positive predictor of both approach goals, challenge appraisals, and functional psychobiosocial states (hypothesis 1). Perceived competence had no significant negative relationships with other variables. Mastery-approach goals predicted challenge appraisals but did not directly predict functional psychobiosocial states as was hypothesized. Mastery-approach goals negatively predicted threat appraisals, but performance-approach goals did not, nor did they negatively predict dysfunctional states. As



hypothesized, both mastery and performance-avoidance goals positively predicted threat appraisals and mastery-avoidance predicted dysfunctional states, but performance-avoidance did not. Mastery-avoidance predicted challenge appraisals as hypothesized, while performance-avoidance goals did not. Neither of the avoidance goals were related negatively to functional psychobiosocial states, which is contrary to the hypothesis. Challenge appraisals positively predicted functional psychobiosocial states as was expected, but did not negatively predict dysfunctional states, which is contrary to the hypothesis. In line with the hypothesis, threat appraisals positively predicted dysfunctional psychobiosocial states but did not negatively predict functional psychobiosocial states.

**Figure 4**

*Environmental and Individual Antecedents of Functional and Dysfunctional States in Finnish Athletes, (n = 484)*



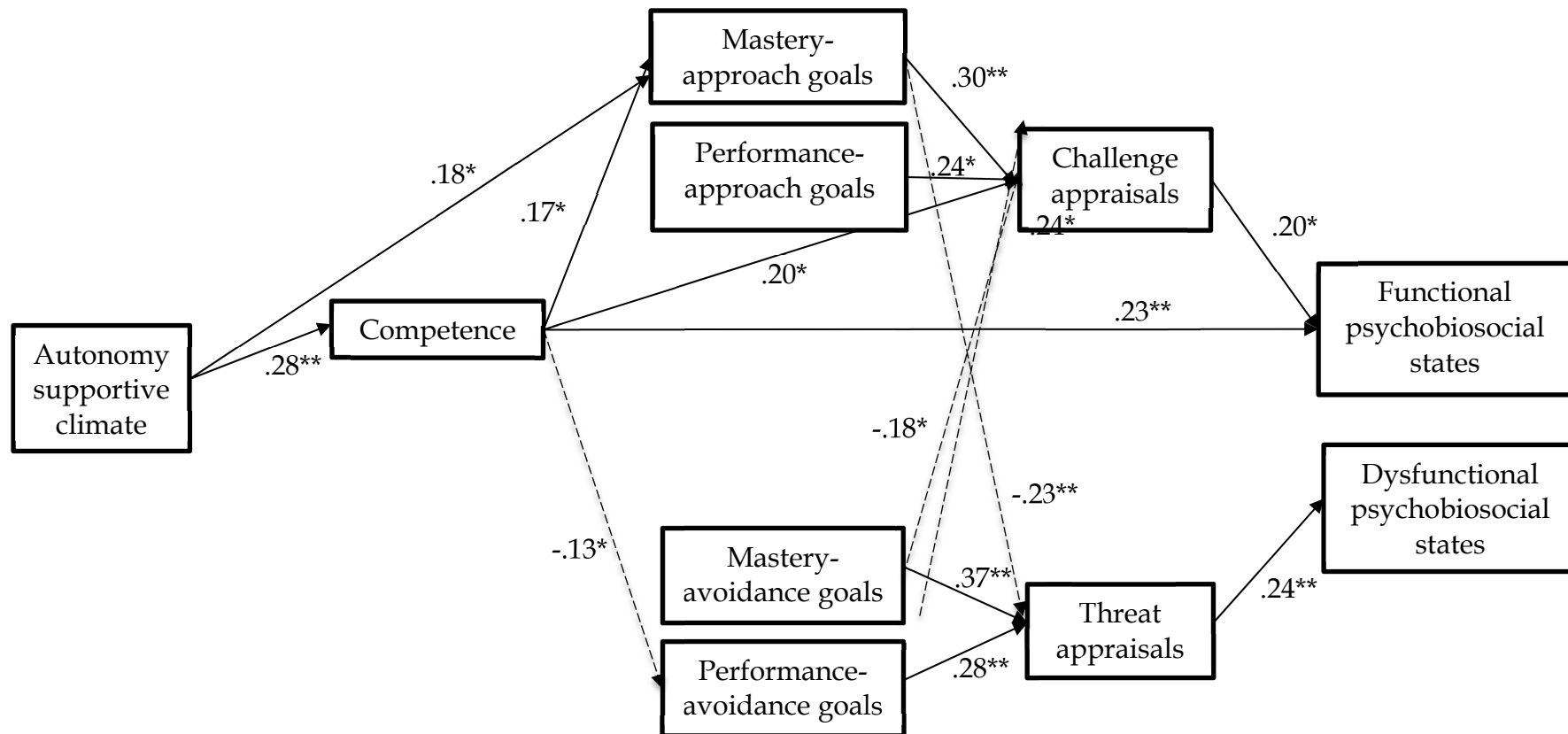
*Note.* All coefficients presented are standardized and significant (\*  $p < .05$  \*\*  $p < .001$ ).

### 6.3.2 Antecedents of Psychobiosocial States of North American Athletes

In the case of North American athletes, the model including autonomy-supportive climate, achievement goals, competitive appraisals and psychobiosocial states fitted data well,  $\chi^2(42) = 343.00, p < .001, CFI = .92, TLI = .84, RMSEA = .07, SRMR = .07$ . As can be seen in Figure 6, the first hypothesis was partially supported as an autonomy-supportive climate predicted competence and mastery-approach goals. Contrary to our hypothesis, there were no significant relationships between autonomy support and performance-approach goals, challenge appraisals, or functional psychobiosocial states. Moreover, autonomy support was not negatively related to either of the avoidance goals, threat appraisals, or dysfunctional psychobiosocial states. Our hypothesis was partially supported as competence predicted mastery-approach goals and, interestingly, challenge appraisals did not predict performance-approach goals or functional psychobiosocial states. The hypothesis was partially supported as competence negatively predicted performance-avoidance goals but was not significantly related to mastery-avoidance goals as was hypothesized. Both mastery- and performance-approach goals were positively related to challenge appraisals as hypothesized, but neither goal was directly related to functional psychobiosocial states as predicted. Mastery-approach goals were negatively related to threat appraisals, but performance-approach goals were not. Both mastery-avoidance and performance-avoidance goals positively predicted threat appraisals as hypothesized and negatively predicted challenge appraisals, although they did not positively predict dysfunctional states or negatively predict functional psychobiosocial states. Our hypothesis was fully supported, and challenge appraisals positively predicted functional psychobiosocial states. Challenge appraisals were not significantly related to dysfunctional states. In line with expectations, threat appraisals positively predicted dysfunctional psychobiosocial states, but no significant relationships were found with functional psychobiosocial states.

**Figure 5**

*Environmental and Individual Antecedents of Functional and Dysfunctional States in North American Athletes (n = 243)*



*Note.* All coefficients presented are standardized and significant (\*  $p < .05$ ; \*\*  $p < .001$ ).

### **6.3.3 The Role of Autonomy Support, Perceived Competence, Achievement Goals, and Competition Appraisals in Predicting Psychobiosocial States Across Samples**

Autonomy support in both samples positively predicted competence and mastery-approach goals. Contrary to our hypothesis, there were no positive significant relationships with autonomy support and performance-approach goals, or any direct relationship with challenge appraisals, or functional psychobiosocial states. Autonomy support was not significantly related to either of the avoidance goals.

Interestingly, an autonomy-supportive climate was a negative predictor of dysfunctional emotions for the Finnish sample, but not for the North Americans. In both cultures, perceived competence positively predicted mastery-approach and challenge appraisals. Perceived competence also predicted all four variables for the Finnish athletes. For the North American athletes, performance-approach goals and functional psychobiosocial states were not significantly related positively to competence.

Interestingly, performance-avoidance goals were negatively predicted by perceived competence in the American sample. Mastery-avoidance goals were negatively predicted by competence in the Finnish sample. Two of the four hypothesized variables directly and positively predicted challenge appraisals in both cultures were mastery-approach goals and perceived competence. For the American athletes, performance-approach goals also positively predicted challenge states. Both avoidance goals showed negative relationships with challenge appraisals for the North Americans, while only mastery-avoidance was negatively associated with challenge appraisals for the Finnish athletes. Threat appraisals, in line with the hypothesis for both cultures, were positively predicted by mastery-avoidance goals and performance-avoidance goals, which in turn lead to dysfunctional psychobiosocial states. For the American athletes, threat appraisals were negatively predicted by mastery-approach goals. Functional psychobiosocial states were positively indicated by challenge appraisals and competence for both cultures. Contrary to our hypothesis, an autonomy-supportive climate did not play a role in positively predicting functional states in either sample.

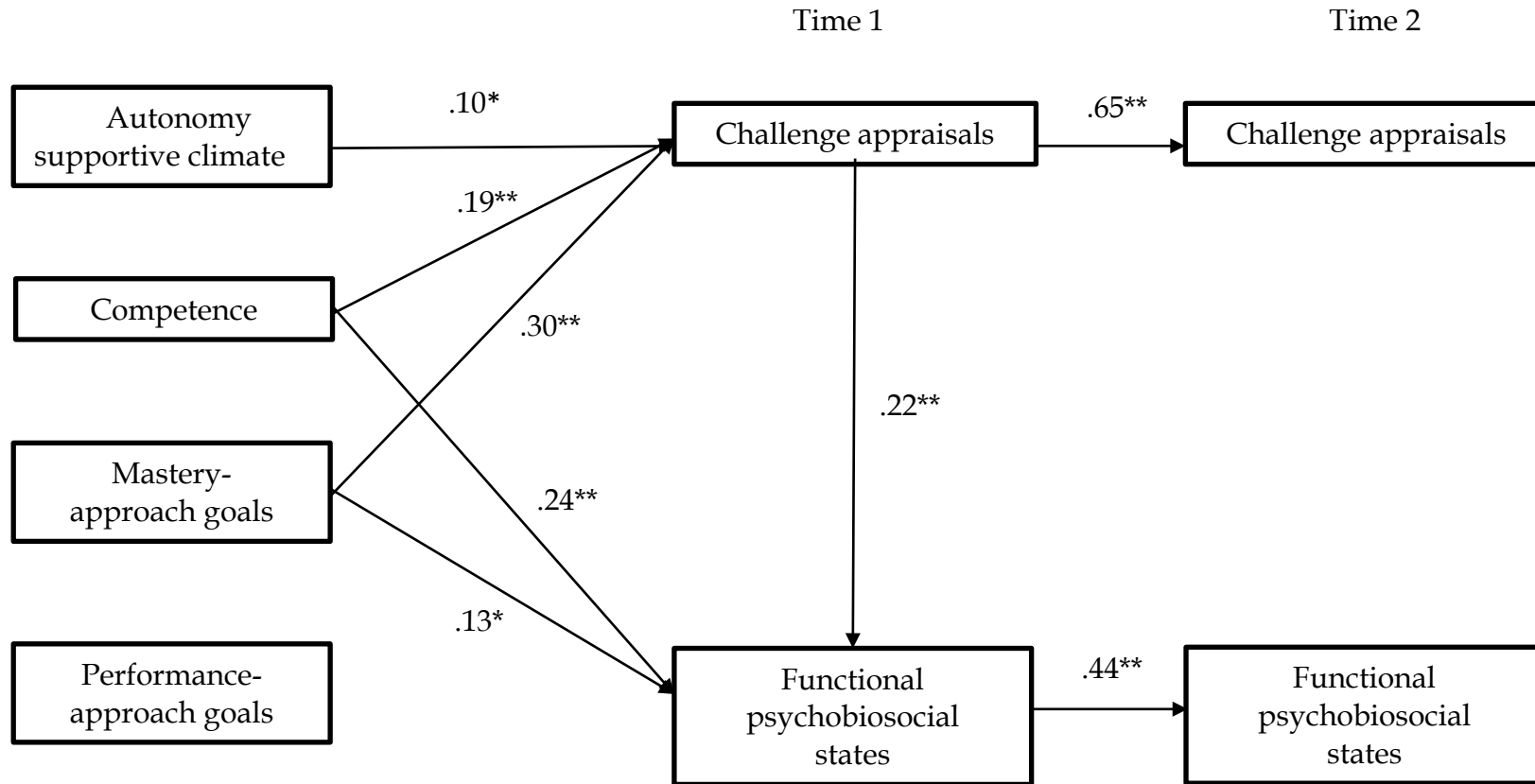
In both samples, dysfunctional psychobiosocial states were positively predicted directly by threat appraisals. A positive direct relationship from mastery avoidance to dysfunctional emotions was also found for the Finnish sample, but this was not the case among the North American athletes. Interestingly, dysfunctional psychobiosocial states were also negatively predicted by autonomy support in the Finnish sample but not for the North Americans.

#### 6.3.4 Antecedents of Psychobiosocial States Over Three-months in the Finnish Sample

A cross-lagged analysis was conducted to test the stability of the relationships between autonomy support, perceived competence, and approach goals (mastery and performance) on challenge appraisals and functional psychobiosocial states at Time 1 and Time 2 (three months later). In the case of Finnish athletes, the model fit the data well,  $\chi^2(22)=304.48, p < .001$  CFI = 1.00, TLI = 1.02, RMSEA=.98, SRMR .02 (see Figure 7). Autonomy support positively predicted challenge appraisals but did not lead to functional psychobiosocial states at Time 1. As expected, competence predicted both challenge appraisals and functional psychobiosocial states at Time 1. In addition, mastery-approach goals positively predicted both challenge and functional psychobiosocial states at Time 1. Contrary to the hypothesis, performance-approach goals did not predict challenge appraisals or functional states at either Time 1 or 2. Neither autonomy support, competence, nor approach goal predicted challenge or functional psychobiosocial states at Time 2. Challenge appraisals at Time 1 predicted functional psychobiosocial states at Time 2 as was hypothesized. Challenge appraisals at Time 1 did not predict functional psychobiosocial states at Time 2, which was not in line with our hypothesis. Challenge appraisals at Time 1 positively predicted challenge appraisals at Time 2. Functional psychobiosocial states at Time 1 positively predicted functional psychobiosocial states at Time 2.

**Figure 6**

*Antecedents of Functional Psychobiosocial States at Time 1 and Time 2 (three months later) for Finnish Athletes (n = 484)*



*Note.* All coefficients presented are standardized and significant (\* $p < .05$ , \*\*  $p < .001$ ).

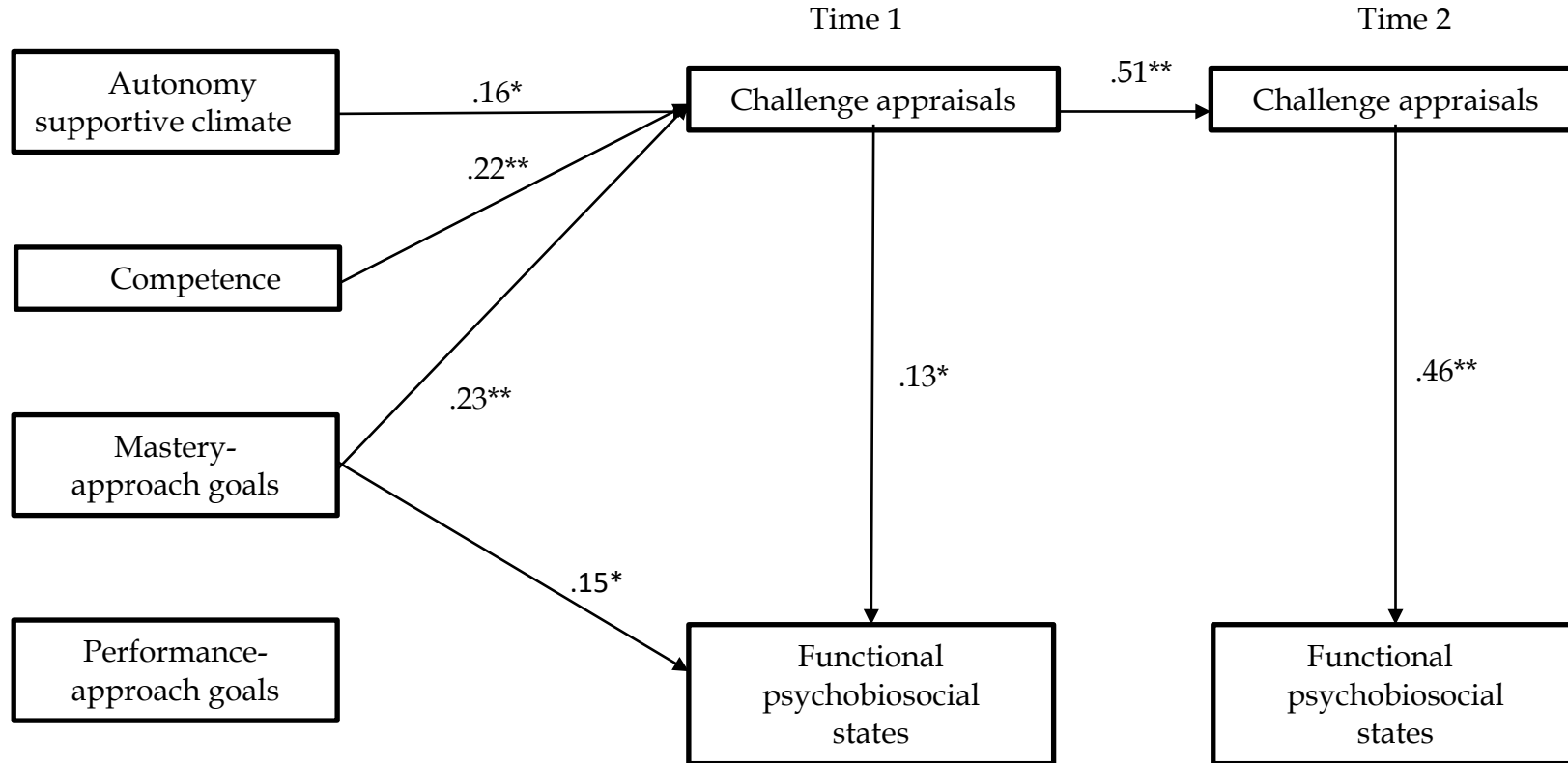
### 6.3.5 Antecedents of Psychobiosocial States Over Three-months in the North American Sample

As can be seen in Figure 8, the model that includes autonomy support, perceived competence, approach goals (mastery and performance) on challenge appraisals and functional psychobiosocial states in the North American sample had an acceptable fit  $\chi^2(22) = 127.99, p < .001, CFI = .94, TLI = .83, RMSEA = .06, SRMR = .04$ . Figure 8 demonstrates that similar to the Finnish sample, for the North American athletes, autonomy support led to challenge appraisals, but did not lead to functional psychobiosocial states at Time 1. As hypothesized, competence positively predicted challenge appraisals at Time 1, but it did not predict functional psychobiosocial states at Time 1. According to the hypothesis, mastery-approach goals positively predicted both challenge appraisals and functional psychobiosocial states at Time 1. Contrary to our hypothesis, and similar to the Finnish athletes, performance-approach goals were not significantly related to other variables (at Time 1 or Time 2). Neither autonomy support or competence, nor approach goal predicted challenge or functional psychobiosocial states at Time 2. As hypothesized, challenge appraisals at Time 1 positively predicted functional emotions at Time 1. Challenge appraisals at Time 1 did not predict functional psychobiosocial states at Time 2, which was not in line with our hypothesis. Once again, this is similar to the Finnish athletes. As expected, challenge appraisals at Time 1 positively predicted challenge appraisals at Time 2.



**Figure 7**

*Antecedents of Functional Psychobiosocial States at Time 1 and Time 2 (three months later) for North American Athletes (n = 243)*



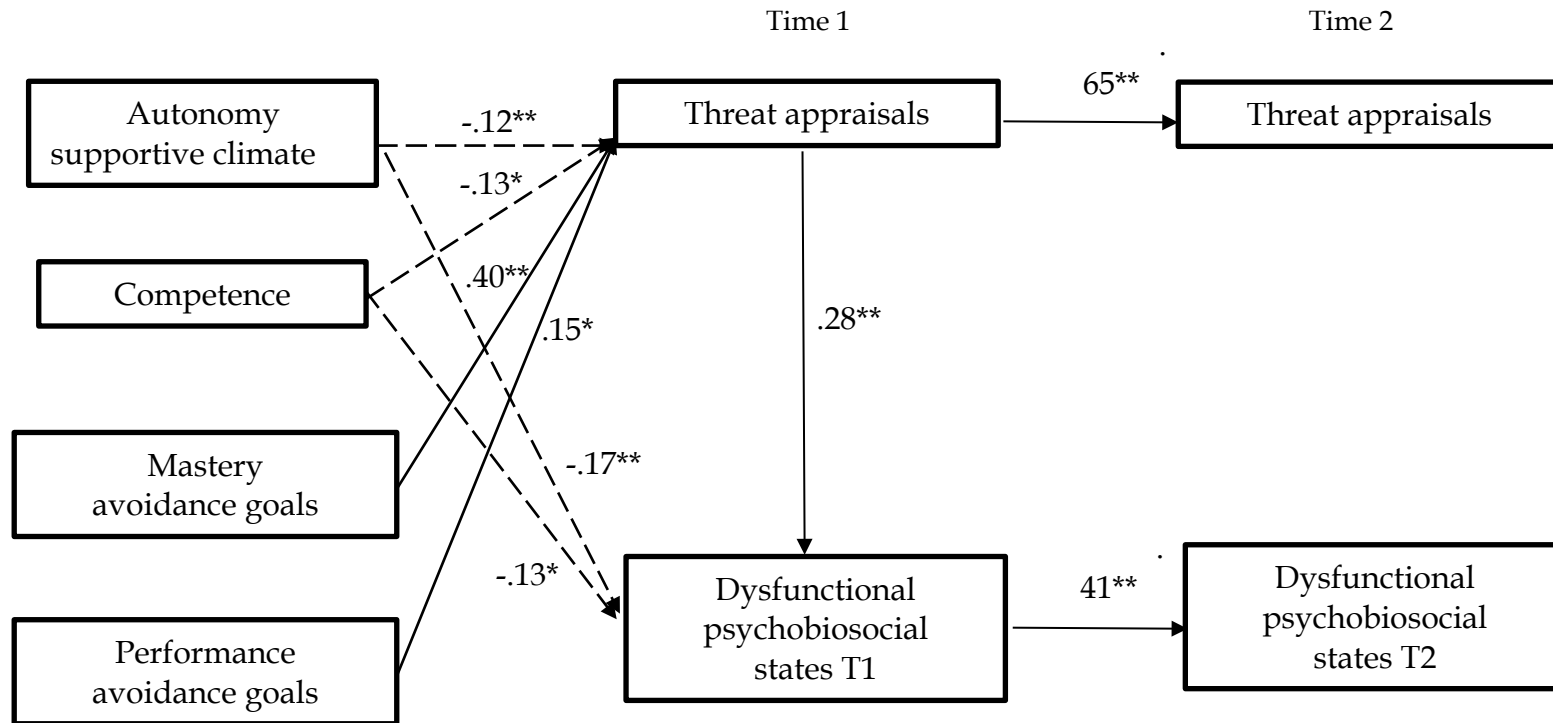
*Note.* All coefficients presented are standardized and significant (\* $p < .05$ , \*\*  $p < .01$ ).

### 6.3.6 Antecedents of Dysfunctional Psychobiosocial States in the Finnish Sample

Figure 9 demonstrates that for the Finnish athletes, an acceptable fit was found for the model that tested autonomy support, perceived competence, and avoidance goals (mastery and performance) on threat appraisals and dysfunctional psychobiosocial states across 2 time periods, namely  $\chi^2 (22) = 402.67, p < .001, CFI = .98, TLI = .96, RMSEA = .04, SRMR = .04$ . The hypothesis was well supported in the Finnish sample. An autonomy-supportive climate negatively predicted both threat appraisals and dysfunctional psychobiosocial states at Time 1 but not at Time 2. Perceived competence negatively predicted both threat appraisals and dysfunctional states at Time 1 but not at Time 2. In the sample of the Finnish athletes, both avoidance goals (mastery and performance) positively predicted threat appraisals at Time 1 but not at Time 2. Meanwhile, avoidance goals showed no significant relationships with dysfunctional psychobiosocial states at Time 1 nor at Time 2. As hypothesized, threat appraisals at Time 1 positively predicted threat appraisals at Time 2, and dysfunctional psychobiosocial states at Time 1 predicted dysfunctional psychobiosocial states at Time 2.

**Figure 8**

*Antecedents of Dysfunctional Psychobiosocial States at Time 1 and Time 2 for Finnish Athletes (n = 484)*



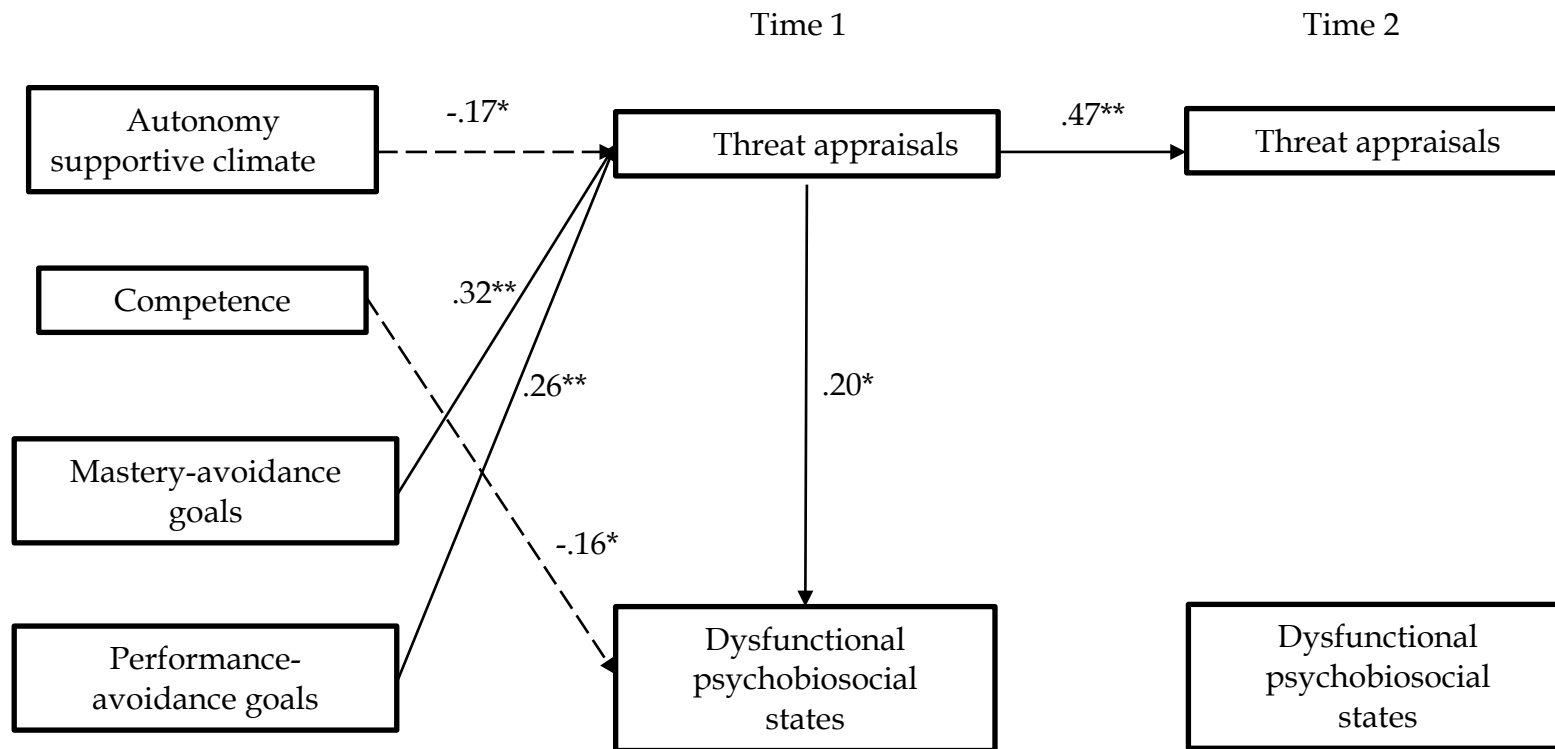
*Note.* All coefficients presented are standardized and significant ( $*p < .05$ ,  $** p < .001$ ).

### 6.3.7 Antecedents of Dysfunctional Psychobiosocial States in the North American Sample

Figure 10 demonstrates that for the North American athletes, an acceptable fit was found for the model that tested autonomy support, perceived competence, and avoidance goals (mastery and performance) on threat appraisals and dysfunctional psychobiosocial states across 2 time periods, namely  $\chi^2 (22) = 161.43, p < .001, CFI = .92, TLI = .85, RMSEA = .06, SRMR = .06$ . The hypothesis was partially supported in the North American sample. An autonomy-supportive climate negatively predicted threat appraisals at Time 1 but not at Time 2, autonomy support was not related to dysfunctional states at Time 1 or 2. Perceived competence negatively predicted dysfunctional states at Time 1 but not at Time 2. Similar to the Finnish athletes, both avoidance goals (mastery and performance) positively predicted threat appraisals at Time 1 but not at time 2. In line with the Finnish athletes, avoidance goals showed no significant relationships with dysfunctional psychobiosocial states at Time 1 or at Time 2. As hypothesized, threat appraisals at Time 1 positively predicted threat appraisals at Time 2, while dysfunctional psychobiosocial states at Time 1 were not related to dysfunctional psychobiosocial states at Time 2.

**Figure 9**

*Antecedents of Dysfunctional Psychobiosocial States at Time 1 and Time 2 (three months later) for North American Athletes (n = 243)*



Note. All coefficients presented are standardized and significant (\* $p < .05$ , \*\*  $p < .001$ ).

## 7 DISCUSSION

This dissertation aimed to examine how the social environment and individual variables influence the intensity of functional and dysfunctional psychobiosocial states. Specifically, it explored the roles of perceived coach autonomy support, perceived competence, achievement goals, and competition appraisals across two samples of high-level athletes from Finland and North America. Often, research has been isolated to one country and/or to one moment in time (as can be seen in Appendix 12.1). In addition, the hypothesized models have never been investigated before, and this was the first time that these variables (coach autonomy support, perceived competence, achievement goals, challenge and threat appraisals, and functional and dysfunctional psychobiosocial states) were examined within high-level sport. This dissertation extends current research as it observes relationships across two distinct samples from different countries and across a three-month period. It highlights the importance of exploring athletes in specific environments and helps to provide evidence that the coach has an influence on not only athletes' individual performance states but their perceived competence, the types of goals athletes adopt, and how they appraise competitions. This dissertation also discovered that certain variables and relationships between variables, specifically performance-approach achievement goals, perceived competence, and competition appraisals present differently in each sample. Another novel finding of this research was the stability of both functional and dysfunctional states across a three-month period was positively significant in the Finnish sample, however, this was not the case in the North American sample. This expands existing knowledge as it provides further evidence for the importance of diving deeper and exploring different samples of athletes. Potential explanations for these findings are discussed more in detail below.

## 7.1 The Role of Perceived Autonomy Support from the Coach

Overall, it seems that findings generally fall in line with previous work, (Deci & Ryan, 2008; Mulvenna et al., 2020) which indicates that autonomy support predicts perceived competence and mastery-approach goals in both samples of Finnish and North American athletes. An autonomy-supportive climate was a direct negative predictor of dysfunctional psychobiosocial states for the Finnish sample, but not for the North Americans. Perhaps this is because the scores for autonomy support were so much higher in the North American samples, as indicated by a MANOVA. It seems that not many – if any – studies have been conducted on Americans or Canadians which examine perceived coach autonomy support and other variables of interest. Therefore, this may be a distinctive characteristic of the North American sample. This might be the case because Finland is more of a feminine society, and quality of life and enjoying one's activities are encouraged over winning and being the best (masculine), which tends to be the case in North America. Perhaps North Americans may tend to rely more on their coach for support.

Before the current work, it does not seem that autonomy support has been examined as a direct predictor of psychobiosocial states. Instead, what has been explored is the individual variable of autonomy support, which has been linked with functional psychobiosocial states (Ruiz, Haapanen et al., 2017). Instead of repeating previous work, this dissertation helped to bring forth the idea that it is crucial to examine the coach-created autonomy-supportive environment as an antecedent of psychobiosocial states. An autonomy-supportive environment supports the athlete's experience, performance, and overall well-being. The novel finding that an autonomy-supportive climate was a direct negative predictor of dysfunctional states is very intriguing as it could suggest that through coaching behaviors, individual dysfunctional states can be minimized. This may result not only in better performance but also in better psychological well-being. It is suggested that the relationship between autonomy support and psychobiosocial states is explored more fully across cultures and sports to discover if this is unique to the Finnish sample or if it can be replicated in other samples. Contrary to our hypothesis, autonomy support was not directly related to performance-approach goals, challenge appraisals, or functional psychobiosocial states in either sample nor did it negatively relate to either of the avoidance goals.

Perceived competence is said to be the most distinguishable feature of achievement motivation (Duda, 2001, 2007). This seems to be the case in the current dissertation. Specifically for the Finnish athletes, perceived competence was positively related to both mastery and performance-approach goals, challenge appraisals, and functional psychobiosocial states. It was negatively related to mastery-avoidance goals. This could suggest that it may not be autonomy support that plays the largest role in the prediction of competition appraisals and functional and dysfunctional psychobiosocial states. Rather, it may be perceived competence that plays a stronger predicting role. Otherwise, it may be a combination of both autonomy support and perceived competence.

This may be the case because an environment that is perceived as autonomy-supportive not only satisfies the need for autonomy but can also support the other two basic needs of competence and relatedness (Ryan, 2019).

Additionally, it is suggested that the role of perceived competence may have a broader effect on individual and situational variables depending on the level of autonomy support. Without differences in other variables, the level of autonomy support was much lower in the Finnish sample. This suggests that the perceived lower level of autonomy support from the environment might lead to a more internalized level of perceived competence, which in turn affects other relationships (i.e., achievement goals, competition appraisals). For the Finnish athletes, perceived competence also predicted performance-approach goals and functional psychobiosocial states. This suggests that it may be more important for Finnish coaches to work with athletes on increasing competence as it is correlated with many beneficial variables. In a more feminine country like Finland, more internal factors may play a role, highlighting the importance of taking additional steps to ensure this need is supported in athletes (i.e., creating a mastery-involved climate, providing choices, and task-relevant feedback). Although still perceived as important, competence did not play the same role for the North American sample. This was in line with previous work (e.g., Morris & Kavussanu, 2008), and it was only positively related to mastery-approach goals and challenge appraisals, while it was negatively related to performance-avoidance goals. The relationship between avoidance goals and perceived competence is interesting in that perceived competence positively predicted mastery-avoidance for the Finnish athletes in line with previous studies (e.g., Nein & Duda 2008), but negatively predicted performance-avoidance goals for the North Americans. This aligns with previous research. (e.g., Isoard-Gauthier et al., 2013)

Perhaps it highlights a difference in culture, suggesting that the Finnish athletes tend to want to avoid doing worse than they have before, while the North Americans may be more concerned with avoiding performing worse than others. This may be due to more performance-based outcomes in the North American society (i.e., athletic scholarship) or just the general tendency that North American culture is more performance- or ego-oriented when compared to Finland (personal experience and Hofstede 2010, 2022). Another possible reason for this unique finding may be that the sample was of high-level athletes. Oftentimes studies are conducted in youth sports or at the intercollegiate level in North America to obtain class credit. As shown in Table, 1 the majority of research studies are conducted in European countries. It is typical for a North American to expect payment (or some sort of other credit) for research studies as it is the norm. This is not the case in Europe where in most countries, funding is discouraged for research participation. Generally, it is much more challenging to recruit participants who are high-level athletes for research studies in North America when compared to European countries.

In both cultures, the approach goals predicted challenge appraisals and the avoidance goals predicted threat appraisals. This falls in line with both theory and previous research (e.g., Bortoli et al., 2011). Athletes who experience mastery-



approach goals are focused on learning, improvement, and mastery of the task. As previous and current research results suggest, this led to challenge appraisals in the two samples. Moreover, both avoidance goals showed negative relationships with challenge appraisals for the North Americans, while only mastery-avoidance goals were negatively associated with challenge appraisals for the Finnish athletes. In a general comparison with mastery-approach goals, it is believed that mastery-avoidance goals have more of a maladaptive pattern of consequences (Elliot & McGregor 2001), such as associations with threat appraisals (Nicholls et al., 2014) as was the case in the current study.

For the Finnish sample, only mastery-avoidance was positively related to dysfunctional psychobiosocial states, but not in the North American sample. This is similar to previous work which has found mastery-avoidance to be linked with negative or unpleasant affect (e.g., Schantz & Conroy, 2009).

Perhaps this is related to the finding that perceived competence was negatively linked with mastery-avoidance goals for the Finnish athletes, but not for the North Americans, which suggests that the role of perceived competence might account for this finding. It seems as though mastery-avoidance plays a slightly different role in the Finnish sample. Although previous studies have examined mastery and performance climates with psychobiosocial states, there is limited work that explores the approach and avoidance valence and examines psychobiosocial states. Therefore, the current dissertation contributes productively to new literature.

Previous research has determined performance-approach goals to have the most inconsistent findings as both adaptive (Lochbaum & Gottardy, 2015; Lochbaum et al., 2017, 2020) and maladaptive outcomes have been found (for a review, see Papaioannou et al., 2012).

This was not the case in the current dissertation. In both the Finnish and the North American samples, performance-approach goals positivity predicted challenge appraisals. Over the three-month time period in both samples, there were no significant paths found with performance-approach goals and other variables in the study. As suggested by Mulvenna et al. (2020), this may support the idea that the unique effects of approach goals may be based on the motivational context. Another possible reason for this might be that all the athletes in the study were of a high level, and previous research has tended to focus on recreational athletes or youth sports (see Appendix 12.1). At this high level of performance, athletes need to have performance-approach goals to achieve success, but they also have the skills and abilities because they are at the top level of their respective sports. Hence, it is suggested that a difference in competitive level may play a role. In lower-level athletes, performance-approach goals probably tend to lead to more negative effects as they are not yet top performers and do not yet have the ability or the skill to try to outperform others. Therefore, when they try and are unsuccessful, they experience more maladaptive outcomes.

Previous work has conceptualized performance-avoidance achievement goals as the most maladaptive of the four achievement goals and has linked it with unpleasant affect, anxiety, threat appraisals, self-handicapping, identified,

introjected, or external regulation, dissatisfaction, and decreased intentions to continue in sport (Elliot & Mc Gregor, 2001; Isoard-Gautheur et al., 2013; Nicholls, et al., 2014; Ntoumanis et al., 2009; Papaioannou et al., 2012; Sterling et al., 2014). For the Finnish athletes, performance-avoidance goals only predicted threat appraisals. For the North Americans, performance-avoidance goals were positively associated with threat appraisals and negatively associated with challenge appraisals. This suggests that performance-avoidance goals in North American athletes may be more complex and could play a larger role in the individual and environmental relationship. The drive and motivation for performance-avoidance behaviors in North Americans may be stronger in an attempt to avoid performing worse than others. This may be a cultural difference as competitiveness among peers seems to be more likely in North America when compared to Finland.

It is interesting to note that both avoidance goals showed negative relationships with challenge appraisals for the North Americans. Again, this may be attributed to the idea that the Finnish culture is somewhat more independent, and these high-level athletes are striving to avoid performing worse than they previously have. On the other hand, North American athletes do not only want to avoid performing worse than they previously have, but they also want to avoid doing worse than others. If athletes are more focused on avoidance behaviors, it will be challenging for them to also focus on approach behaviors or the task at hand. This is probably related to the aggressive competitive culture in sports within North America. As performance-avoidance goals are those in which one is avoiding doing worse than others, perhaps it is not as trendy to compare yourselves to others in the Finnish culture. Finland is an individualistic and feminine society (Hofstede, 2022) and one may assume that Finnish athletes may be more focused on trying to improve compared to their previous performance, or they may be more focused on task mastery. For both samples, challenge appraisals were related to functional psychobiosocial states and threat appraisals were related to dysfunctional psychobiosocial states as was hypothesized. This also falls in line with previous work (Jones et al., 2009; Nicholls et al., 2012; Skinner & Brewer 2004).

Functional psychobiosocial states were positively predicted by challenge appraisals for both samples, and dysfunctional psychobiosocial states were positively predicted by threat appraisals. These relationships fall in line with previous work (e.g., Adie et al., 2008) and our hypothesis. As previously mentioned, for the Finnish athletes, functional psychobiosocial states were predicted by competence, unlike for the North Americans. It seems as though perceived competence may play more of a relevant role in the Finnish sample when compared to the North Americans. Interestingly, a positive direct relationship from mastery avoidance to dysfunctional emotions was also found in the Finnish sample. This means that athletes, who had goals that involved doing worse than previously, were linked to dysfunctional psychobiosocial states. This could be because these athletes are focused on the past, which is out of their control. As such, it would make sense that a focus on the past would not lead to

mindful or present participation in things one can control and, therefore, to more dysfunctional psychobiosocial states.

Along those same lines, an autonomy-supportive climate in the Finnish sample negatively predicted dysfunctional states. This was not the case for the North American sample. Perhaps for the North Americans, other factors are in play and an autonomy-supportive climate is not as predictive of psychobiosocial states.

Both cultures are somewhat unique, but generally, it can be concluded that an autonomy-supportive environment affects an individual's competence and achievement goals, which in turn, can result in functional and dysfunctional psychobiosocial states. To explore these relationships more fully, a second model examined what specifically leads to functional psychobiosocial states over a three-month time period. Based on the previous findings presented in the theoretical background section of this dissertation, a model was designed that would examine if autonomy support, perceived competence, mastery-approach, and performance-approach goals would predict competition appraisals that were perceived as challenging and lead to functional psychobiosocial states.

## **7.2 The Temporal Relationship of Perceived Autonomy Support, Perceived Competence, and Achievement Goals on Competition Appraisals and Psychobiosocial States**

As hypothesized, over the three-month time period challenge appraisals at Time 1 were predicted by an autonomy-supportive climate, perceived competence, and mastery-approach goals for both samples. For the Finnish athletes, functional states at Time 1 predicted functional states at Time 2, while no significant relationships were found for this relationship in the North Americans. However, in the North American sample, competence was not significantly related to functional states as we expected, as was the case for the Finnish athletes. It may be that because North American athletes rate their autonomy support as being much higher (as indicated by MANOVA), which suggests that they may receive the need satisfaction for perceived competence through autonomy support from their coach. This may not be the case for Finnish athletes in the sample.

Performance-approach goals did not predict challenge appraisals as was hypothesized for either sample. This might be the case because the athletes in our samples were very experienced competitors. Challenge appraisals at Time 1 predicted challenge appraisals at Time 2 in both samples. Challenge appraisals predicted functional psychobiosocial states at Time 1 for both samples. For time 2, this relationship was only significant for the North American sample. Perhaps this may again be due to North American being at a slightly higher level of competition. Athletes at higher levels tend to train and compete all year round so perhaps the three-month time period did not matter as much as it may have for the Finnish athletes. The Finnish athletes were recruited mostly via federations

and sports schools, so the timing of competitions and training during various times of year may have played a role. It also could have something to do with the different types of sports and the specific timing of data collection. For instance, skiers participated in the North American sample, while no skiers were included in the Finnish sample. The first-time data was collected from the skiers during the summer when they were doing a rollerblading workout in Minnesota as it was summer and there was no snow.

In addition to gaining a better understanding of how functional psychobiosocial states come about, the aim was to explore what leads to dysfunctional emotions and the appraisal of the situation as a threat. The third model examined whether social and/or individual variables, specifically autonomy support, perceived competence, mastery-avoidance, and performance-avoidance goals, have an effect on threat appraisals and dysfunctional psychobiosocial states over three months and examined how these relationships play out in two samples from different countries. In both samples, autonomy-support negatively predicted threat appraisals as hypothesized. In the Finnish sample, autonomy-support also negatively predicted dysfunctional states, which was not the case for the North Americans. In both cultures, competence negatively predicted dysfunctional psychobiosocial states. In the Finnish sample, competence also negatively predicted threat appraisals as hypothesized, but this was not the case for the North American athletes. In both samples, threat appraisals at Time 1 positively predicted threat appraisals at Time 2 and dysfunctional psychobiosocial states at Time 1. Dysfunctional states at Time 1 predicted dysfunctional states at Time 2 for the Finnish athletes but not for the North American athletes. Both mastery-avoidance and performance-avoidance goals were positively related to threat appraisals at Time 1. For the Finnish sample, dysfunctional psychobiosocial states at Time 1 positively predicted dysfunctional states at Time 2. This was not the case for the North American athletes. Contrary to the hypothesis, threat appraisals at Time 2 did not predict dysfunctional psychobiosocial states at Time 2 in either sample. It was interesting to note that the model did not work the same way for athletes from different cultures. Previous work has suggested that the achievement goal theory and the self-determination theory should hold true across cultures (Ryan & Deci, 2017; Nicholls et al., 2005). With that being said it is important to acknowledge the specific differences between cultures and what works in one will not necessarily hold true in another. This should also apply to different sports teams within the same country. For instance, an American soccer team may have completely different needs and expectations from the team members and the coach when compared to another American soccer team, which may be completely different from an American water polo team. The unique culture created within a team will vary from team to team and across countries. This dissertation extends previous research as it is the first of its kind to explore the specific variables of autonomy support, perceived competence, mastery and performance-approach and avoidance goals, competition appraisals, and their effect on functional and dysfunctional states. Not only is this the first study to explore these specific relationships, but it is the first to do so across two very

different samples from different cultures. Results of the current study support the idea that each culture is unique and what may work in one culture may be different in another (Shelton, 2012).

### **7.3 Cultural Aspects in Finland and North America**

After extensive investigation and specifically in terms of the variables examined in this dissertation (see Appendix 12.1), it can be concluded that there is a lack of research that compares cultures in a measurable form. The only adequate resource found that would allow for comparison across cultures was the Hofstede (2022) cultural factor but it is limited to the world of business.

The current study also acknowledges that cultural differences exist within and across the two samples of athletes, and it recognizes that even within specific teams, cultural differences can exist. Athletes bring in their own experiences that they have adopted from their upbringing or socio-cultural group as well as the culture that the coach creates. There are very limited studies done in athletics in cultural studies. With that being said, there was a study done on Finnish swimmers which examined acute cultural adaptation using the self-determination theory to assess how the Finnish swimmers adjusted to an Australian swimming culture. It revealed immediate differences in the two cultural groups (Ryba et al., 2011). The study explored how Finnish swimmers used components of autonomy, relatedness and competence to adapt to the Australian swimming culture and explained their experiences of the acute cultural adaptations and adjustments that were required to perform. It was suggested that relationships with teammates and their own Finnish coach allowed them to successfully acclimate to a new culture. These results help support the idea of how valuable the coach-created climate is in sport and well-being and its effect on athletes. One participant in the study shared “while in Finland the situation is different because swimmers can interact with the coach, every now and then one can go and talk to the coach”, which suggests that coach autonomy support is strong when comparing athletic cultures between Finland and Australia. Another swimmer said, “It is individual coaching (in Finland) and in Australia, you’re put in a group of people who are swimming the same thing”. This suggests that the Finnish coaching style was more autonomous and individualized (Ryba et al., 2011). Despite the growing interest in cross-cultural aspects of sport psychology, very few cross-cultural studies exist with even less in elite level sport. As each culture is unique, it is suggested that research is conducted to discover what type of variables lead to success and optimal well-being, a tool like the 6D- Model by Hofstede but for sport would be very valuable (Hofstede, 2022).

## 7.4 Practical Implications

As supported by previous work (e.g., Deci & Ryan, 2000; Ryan 2019), the coach-created climate is invaluable in sport. It is the coach who can create an environment that is autonomy-supportive, which will lead to perceived competence, approach goals, challenge appraisals, and functional psychobiosocial states. By contrast, a controlling coach can create an environment that leads to maladaptive outcomes and has negative effects on an athlete's well-being. Coaches who create an autonomy-supportive climate (giving choice in the task, basic needs are met, task-relevant feedback, etc.) will have athletes who experience more beneficial outcomes and have better overall well-being. In addition, it is also suggested that coaches do whatever possible to increase perceived competence in athletes. Perceived competence showed more relationships in the Finnish athletes, which suggests that for the Finnish sample, competence was a variable that had more influence over beneficial outcomes (approach goals, challenge appraisals, and functional psychobiosocial states). This demonstrates that in Finnish samples, the coach should focus on behaviors and coaching styles that increase perceived competence. Coaches would also benefit from increasing perceived competence in the North American sample, although not as many resulting relationships were found. Another notable factor is cultural differences. What works for one athlete, in one team, in one sport, or even in one country does not necessarily transfer to other athletes, teams, sports, or countries.

Longitudinally, how an athlete appraises a competitive situation does not seem to change over a three-month time period. This suggests the importance of engaging in behaviors that would increase the likelihood of challenge appraisals from the beginning. As previously suggested, (i.e. Adie et al., 2010, Bortoli et al., 2011, 2014) this includes elements such as creating an autonomy-supportive climate and increasing perceived competence to make challenge appraisals more likely. It is also interesting to note that both functional and dysfunctional states at Time 1 predicted functional and dysfunctional states at Time 2 for the Finnish sample, but not for the North American sample. Perhaps this has something to do with the Finnish sample being more stable or consistent whether that be in coaching, the environment, or the culture it is challenging to say.

To summarize, and as previous research suggests (see Deci & Ryan, 2000, 2008) a coach would have the most beneficial outcomes through learning how to create an autonomy-supportive climate that would support the need for competence. This is how to increase the chances of better performance, overall well-being, and functional psychobiosocial states. Results from the current dissertation help demonstrate the value of perceived autonomy support from the coach in predicting athletes' appraisals, perceived competence, achievement goals, appraisals, and psychobiosocial states. This is something that is in the control of the coach. It is my view that every coach should be taught the value of creating and supporting an autonomy-supportive environment as it has numerous benefits.

## 7.5 Limitations and Future Research

The current dissertation has some limitations, for instance, one of the main variables explored was perceived coach autonomy support, but a 'high control' environment was not measured. Instead, it was assumed that a lack of autonomy support would suggest a controlling environment. Other research may suggest that low autonomy support is not the same as 'high control'. Therefore, this may suggest that the models, specifically model three which explores what leads to dysfunctional psychobiosocial states, may not accurately incorporate the motivational concepts from the self-determination theory. As a controlling climate was not measured, a component may be missing that may have an effect on competition appraisals. A mastery-approach goal under controlled conditions, for instance, leads to appraisals of a shooting task as significantly more threatening than the comparison group in the mastery-approach autonomy-supportive condition (Mulvenna et al., 2020). The current study assumed that a climate high in autonomy is low in controlling behavior, but this is just an assumption as a controlling climate was not measured.

In addition to self-report responses, the human body experiences physiological responses during a performance (Jones et al., 2009). For instance, an increase in cardiac activity along with a decrease in peripheral vascular resistance is experienced during a challenge-response, while a threat response is characterized by increases in cardiac activity (Blascovich & Mendes, 2000). Thus, significantly higher physiological activity (heart rate and systolic blood pressure) has been reported post-task, along with other approach goals compared to participants within an autonomy-supportive environment (Mulvenna et al., 2020). The current dissertation did not measure any physiological responses; therefore, future research should include physiological responses to better understand the process of elements contributing to optimal performance states.

One of the notions of MuSt theory (Ruiz & Robazza, 2021) is that an amalgamation of action-regulation strategies and emotion is more beneficial than focusing on one aspect alone (Robazza & Ruiz, 2018). According to MuSt theory (Ruiz & Robazza, 2021), core action components are considered basic movement behaviors that can be action-related, for instance, 'timing', 'effort', 'positioning', 'grip', 'aiming', 'rhythm', and 'acceleration' (Bortoli et al., 2012; Meijen, 2020). The current dissertation did not measure action regulation, action management, or any other core action components. Action regulation may be a large piece of the puzzle as it tends to be within the athletes' control and can be trained. Therefore, it is suggested that this component is included in future work to contribute to a more thorough understanding of the full process of optimal performance.

There are two other theories, the Evaluative Space Approach to Challenge and Threat (ESACT) (Uphill et al., 2019) and the Evaluative Space Model (ESM) (Cacioppo et al., 1997) which have been used to help explain challenge and threat in sport. These theories view challenge and threat as two distinct variables at opposite ends of a continuum rather than bipolar single variables. They imply

that people can be challenged, threatened, challenged, and threatened, or neither challenged nor threatened by a specific situation. This viewpoint argues that sports situations as both challenging *and* threatening can be beneficial, while the current dissertation suggests that competition appraisals that are perceived as a threat are maladaptive for performance. The current study used challenge and threat as single bipolar variables with the concept of one being beneficial, while the other was not. Future research may find it valuable to include both a continuum and a bipolar measurement when exploring challenge and threat competition appraisals.

As the hypothesized models fit the theoretical frameworks, there were variations across samples. Cultures can differ in the extent to which they support the satisfaction of peoples' basic needs (Shelton, 2012). In Asian societies, for instance, the need for autonomy is less well-supported, as generally evidenced by lower autonomy need satisfaction scores. This may account for the lower levels of positive emotion and subjective well-being seen in those cultures (Shelton, 2012). This may have been the case for autonomy support in the Finnish sample, as levels were much lower for the Finnish athletes when compared to the North American athletes as shown through an ANOVA (3.69 vs. 5.05). In turn, it may have influenced the resulting relationships.

Finnish culture may be more like Asian cultures in that the need for autonomy is less supported which, according to theory, should lead to lower levels of functional psychobiosocial states. This was not the case in either of our samples. Rather, it is suggested that this may just be a cultural difference, as mentioned in section 8.3, The Hofstede 6D-Model ranks Finland lower in power distance, masculinity, and individualism. These cultural variables may play a larger role than was initially expected. Culture is difficult to measure, and this is something future research should explore. It was challenging for the author to find resources on cultural differences between countries in sport, and even more so for two distinct countries from different continents. It seems that when cross-cultural studies in sports are conducted it is within the same continent. An example of this is coaches in Canada and the USA (Sullivan & Kent, 2003) or youth soccer across five European countries (Quested et al., 2013). In addition, resources on how to study culture in sport are scarce. It appears that something like the Hofstede model (that looks at business culture) needs to be created for athletes. The culture of business is studied immensely, and although there is some transfer across fields, a tool to measure culture in sport would be valuable. This would allow for studying not only what the specific culture is in sport, but also how this varies across cultures and athletes within the same sport. The cultural environment in one basketball team, for instance, may differ from another basketball team in the same country. This dissertation provides support that relationships can differ across cultures. In addition, it suggests that research should be conducted within a specific team to examine how athletes perceive autonomy support, perceived competence, achievement goals, competition appraisals, and psychobiosocial states before implementing interventions or making coaching changes. By gaining a better understanding of these relationships, the coach can determine what to focus on in their coaching



behaviors and what may lead to functional versus dysfunctional states within their specific team.

Another limitation was that the current study uses high-level athletes from three countries. Finland has a total population of 5.53 million (2021), while Canada has 38.19 million (2021) and the USA has 332 million (2021). Just in terms of numbers, one can assume that it is more challenging to reach a higher competitive level such as “nationals” in North America when compared to Finland. As an example from my personal experience, as a diver in Canada and the United States, I was considered “good” or “average”, and I competed at Nationals in Canada (not in the United States, only zones). In Finland, I was ranked number one. As the best in the country, I was honored to represent Finland internationally at Grand Prix events, world championships, and almost the Olympics (while in Canada, I barely finaled at nationals). For this reason, the level of competition across samples may not be accurate enough to compare, and it is assumed that the level of competition in the North American athletes is of a slightly higher level when compared to the Finnish athletes.

Finally, as can be seen in Appendix 12.1, not a lot of research is conducted on North American athletes. It is challenging to compare the findings of the current dissertation with other North Americans because there are not many studies conducted on this population. Therefore, it is suggested that future research explores more Canadian and American athletes.

## 8 CONCLUSION

In both samples, our hypothesized model was mostly supported. Perceptions of an autonomy-supportive climate positively predicted perceived competence and mastery-approach goals, which positively predicted challenge appraisals and functional psychobiosocial states. Perceived competence was negatively related to mastery-avoidance goals, which in turn was a positive predictor of threat appraisals and dysfunctional psychobiosocial states.

A few unique findings were uncovered through this research, interestingly perceived competence was not associated with performance-approach goals in the North American sample as we hypothesized. In accordance with the hypothesis, the association was positive in the Finnish sample.

Interestingly, performance-approach goals differed across samples. In the Finnish sample, competence predicted performance-approach goals, and they were not associated with challenge appraisals. The opposite was true for the North American sample, perceived competence did not predict performance-approach goals, although performance-approach goals predicted challenge appraisals. This is a unique and interesting finding that should be explored in other cultures. Another interesting finding was that in the North American sample both avoidance goals negatively predicted challenge appraisals. Neither avoidance goal was associated negatively with challenge appraisals in the Finnish sample.

Challenge appraisals at Time 1 positively predicted functional states at Time 1 and challenge appraisals at Time 2 (three months later) in both samples. Contrary to what was hypothesized, challenge appraisals at Time 1 did not predict functional psychobiosocial states at Time 2. Functional psychobiosocial states at Time 1 predicted functional psychobiosocial states at Time 2 for the Finnish sample but not in the North American Sample.

Similarly, threat appraisals at Time 1 were positive predictors of threat appraisals at Time 2 and dysfunctional states at Time 1. However, threat appraisals at Time 1 did not predict dysfunctional states at Time 2. Dysfunctional psychobiosocial states at Time 1 predicted dysfunctional psychobiosocial states at Time 2 for the Finnish sample but not in the North American Sample. It is

interesting to note that psychobiosocial states were stable across time in the Finnish sample but not in the North American sample. This further supports the idea that experiences can be very different across cultures.

The first and biggest contribution of this research is that it was conducted in high-level sport. Oftentimes, high-level athletes are hard to gain access to. The second unique contribution to research in this dissertation examined a unique holistic comprehensive model, which included both individual, and social environmental variables. The model extends previous research as it broadens the viewpoint to explore a combination of factors that are within the control of the athlete and/or the coach. Before this research, relationships between variables tend to have been explored as direct effects, focusing solely on individual or environmental variables within one specific sample and at one period of time. Through examining the effects of an autonomy-supportive coach-created environment with a broader lens one can gain a better understanding of what leads to optimal wellbeing and functional psychobiosocial states. This research not only expanded the types of variables that are usually explored, but it applied a new hypothesized model across two very distinctive cultures, which to my knowledge has not previously been done. In doing so, this research helps to highlight the importance of exploring how an autonomy-supportive climate affects individual aspects (perceived competence, achievement goals, and competition appraisal) and resulting functional and dysfunctional psychobiosocial states.

## 9 PUBLISHED RESEARCH AND PRESENTATIONS

This dissertation was part of a broader project entitled “Psychobiosocial states in sport achievement settings: A study of their antecedents with a focus on motivational aspects”. This research project aimed to investigate theoretical and empirical relationships between motivational aspects (e.g., motivational climate, achievement goals) and psychobiosocial states in sports achievement settings in a sample of athletes from Finland and North America. Previous findings from the project have been published in journals and have been presented at international conferences.

Below is a summary of what has already been conducted as part of this larger project:

### **Peer-reviewed papers:**

Ruiz, M., Robazza, C., Tolvanen, A., Haapanen, S., Duda, J.L. 2019. Coach-Created Motivational Climate and Athletes’ Adaptation to Psychological Stress: Temporal Motivation-Emotion Interplay. *Frontiers in Psychology*, 10: 617.

Ruiz, M., Haapanen, S., Tolvanen, A. Robazza, C, & Duda, J. 2017. Predicting athletes; functional and dysfunctional emotions: The role of motivational climate and motivation regulations. *Journal of Sports Sciences*, 35(16): 1598–1606.

### **Conference papers:**

Haapanen, S., Ruiz, M., Tolvanen, A. Robazza, C. Antecedents of athletes’ behavioral regulations in high-level sport across two sporting cultures. Poster presentation at the 29th Annual AASP Conference, Las Vegas NV October 15–18, 2014

Haapanen, S., Ruiz, M., Duda, J.L., & Robazza, C. 2012. “Motivational climate, goal orientations, and behavioral regulations as predictors of

- competition appraisal". Poster presentation at *Association for Applied Sport Psychology 28th Annual Conference, Atlanta, GA*
- Haapanen, S. Ruiz, M. "Psychobiosocial states in competitive athletes: Across cultures." Oral presentation, International Forum "Motivation and Emotions in Sport" University of Jyväskylä, Finland, May 27-28 2014.
- Haapanen, S. (2012). "Antecedents of psychobiosocial states in a cross cultural sample of competitive athletes". Oral presentations at *Southeast Regional AASP Student Conferences, Barry University, Miami Shores, FL*. February 2012.
- Haapanen, S. (2012). "Antecedents of psychobiosocial states in a cross cultural sample of competitive athletes". Oral presentations at *Southwest Regional AASP Student Conferences, University of Denver, Denver CO*. April 2012.

## 10 YHTEENVETO (SUMMARY IN FINNISH)

Tämän väitöskirjan tavoitteena oli tutkia valmentajan luoman autonomiaa tukevan ilmapiirin, koetun osaamisen, saavutustavoitteiden, kilpailuarvioinnin ja suoritukseen liittyvien psykobiososiaalisten tilojen suhdetta kahdessa eri otoksessa koskien sekä Suomen ( $n = 484$ ,  $M$  ikä = 20,3,  $SD = 4,21$ ). että Pohjois-Amerikan ( $n = 243$ ,  $M$  ikä = 19,49,  $SD = 6,06$ ) korkean tason urheilijoita.

Rakenneyhtälömallinnus osoitti, että hypoteesi oli osittain tuettu. Suomalaisille urheilijoille käsitykset autonomiaa tukevasta ilmastosta ennustivat positiivisesti mestaruuslähestymistapoja ja koettu osaaminen, joka oli positiivinen ennustaja lähestymistavoitteille, haastearvioinneille ja toiminnallisille psykobiososiaalisille tiloille. Välttämistavoitteet olivat positiivisia ennustajia uhkien arvioinnille, jotka puolestaan ennustivat positiivisesti dysfunktionaalisia psykobiososiaalisia tiloja. Autonomiaa tukeva ilmasto ennusti negatiivisesti mestaruuden välttämisen tavoitteita ja toimintahäiriöisiä psykobiososiaalisia tiloja, ja hallinnan välttämistavoitteet liittyivät negatiivisesti haastearviointiin. Samanlaisia tuloksia löydettiin Pohjois-Amerikan otoksesta lukuun ottamatta seuraavia kolmea suhdetta; 1) autonomian tuki ei liittynyt negatiivisesti mihinkään muuttujaan, 2) koettu osaaminen ei liittynyt merkittävästi suorituskyykyyn liittyviin tavoitteisiin ja 3) suorituslähestymistapatavoitteet ennustivat negatiivisesti haastearviointia.

Väitöskirjan toisena tavoitteena oli tutkia näitä suhteita 3 kuukauden ajanjaksolla. Ristiviivästetty paneelianalyysi osoitti, että hypoteesi oli osittain tuettu. Suomalaisurheilijoilla toimintahäiriöiden edellytyksiä tutkivassa mallissa käsitykset autonomiaa tukevasta ilmapiiristä, osaamisesta ja mestaruuden lähestymistavasta olivat positiivisia T1:n haastearviointien ennustajia. Mikä puolestaan ennusti toiminnallisia tiloja T1:ssä ja haastearvioita T2:ssa. Kompetenssi- ja hallinnan lähestymistavat ennustivat positiivisesti toimintatilat T1:ssä, mikä positiivisesti ennusti toiminnallisia tiloja T2:ssa. Pohjois-Amerikan urheilijoiden tapauksessa havaittiin samanlaisia tuloksia kahta suhdetta lukuun ottamatta: Kompetenssin ja toiminnallisten tilojen välillä ei ollut merkittävää yhteyttä, eikä suhdetta toiminnallisten tilojen välillä T1-T2.

Suomalaisille atleeteille toimintakyvyttömiä tilojen edellytyksiä tutkivassa mallissa autonomian tuki ja koettu osaaminen sekä negatiivisesti ennustet-

tuja uhka-arvioita että toimintahäiriöisiä tiloja T1:ssä. Molemmat välttämistavoitteet ennustivat positiivisesti uhkien arvioinnit hetkellä 1. Uhka-arvioinnit ajankohtana 1 ennustivat uhkien arvioinnit hetkellä T2, samoin kuin toimintahäiriöt tilassa T1 ennustivat T2:ta. Pohjois-Amerikan urheilijoille autonomiaa tukeva ilmasto ennusti negatiivisesti uhkien arvioinnit ja pätevyys negatiivisesti toimintahäiriöitä hetkellä 1. Molemmat välttämistavoitteet olivat positiivisia ennustajia uhkien arvioinnille T1:ssä, mikä puolestaan ennusti positiivisesti toimintahäiriöitä ajankohtana T1 ja uhkien arviointeja T2. T1:n toimintahäiriöt eivät ennustaneet toimintahäiriöitä T2:ssa.

Tämä tutkimus laajentaa aikaisempaa työtä tarjoamalla kattavamman mallin yksilöllisistä ja sosiaalisista muuttujista ja siitä, miten ne vaikuttavat toiminnallisiin ja toimintahäiriöllisiin psykobiososiaalisiin tiloihin. Sen lisäksi, kuinka tämä suhde toimii kolmen kuukauden aikana. Tulokset osoittavat, että valmentajat ja heidän luoma ilmasto voivat vaikuttaa urheilijoiden toiminnallisiin ja toimintahäiriöllisiin oloihin kahdesta eri kulttuurista peräisin olevassa näytteessä.

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## **12 APPENDICES**

## 12.1 Summary of peer-reviewed studies examining the relationships among the autonomy-supportive coach-created environment, motivation, and emotional experiences

Author(s)	Variables	Participants	Measures	Design/ Analysis
Adie et al. (2008)	Autonomy Support, Autonomy, Competence, Relatedness, Subjective Vitality, Exhaustion	539 athletes (268 female, 271 male, $M_{age}=24.25$ ) from the UK, competing at club level in field hockey, cricket, netball, ultimate frisbee, basketball, American Football, soccer, rugby, lacrosse, and volleyball	Modified Health Care Climate Questionnaire (Williams et al., 1996); Need for autonomy (Sheldon et al., 2001); and Subjective Vitality Scale (Ryan & Frederick 1997)	Cross-sectional design, Structural Equation Modeling (SEM) analysis
Adie et al. (2010)	Meta-perceptions of coach-athlete relationships (i.e., Commitment, Complementarity, Closeness), Approach and Avoidance Achievement Goals, and Intrinsic Motivation	194 track and field athletes (72 female, 122 male, aged 18–31 years, ( $M_{age}=21.5$ , $SD=2.80$ ) from the UK competing at club level	Coach-Athlete Relationship Questionnaire (Jowett & Ntoumanis, 2004); Achievement Goal Questionnaire for Sport (Conroy et al., 2003); Sport Motivation Scale (Pelletier et al., 1995)	Cross-sectional/ SEM



Adie et al. (2012)	Autonomy Support, Autonomy, Competence, Relatedness, Subjective Vitality, Exhaustion	54 male elite soccer players from the UK (aged 11–18 years, $M_{age}=13.82$ , $SD=1.99$ )	Health Care Climate Questionnaire (Williams et al., 1996); Most Satisfying Events Measure (Sheldon et al., 2001); Perceived Competence subscale of the Intrinsic Motivation Inventory (McAuley et al., 1989); Subjective Vitality Scale (Ryan & Frederick, 1997); Athlete Burnout Questionnaire (Raedeke & Smith, 2001)	Field-Based Longitudinal Analysis /
Barkoukis et al. (2013)	Perceived Autonomy Support, Perceptions of Learning and Performance Motivational Climate; Autonomous Motivation in PE, Autonomous Motivation in Leisure-Time, Theory of Planned Behavior Variables, Physical Activity	170 High School PE participants from Greece, (86 female, 84 male, $M_{age}=16.91$ , $SD=0.63$ )	Perceived Autonomy Support Scale for Exercise Settings (Hagger et al., 2007); Learning and Performance Orientations in Physical Education Classes Questionnaire (Digelidis et al., 2003); Perceived Locus of Causality Scale (Ryan & Connell, 1989); Behavioral Regulations in Exercise Questionnaire (Lonsdale et al., 2008); Theory of Planned Behavior Variables (Ajzen, 2002); Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985)	Three-Wave Prospective Design /SEM

Behavior, Past  
Behavior

Benita et al. (2014)	<p>Study 1: Autonomy-Supportive Context; Autonomy-Suppressive Context; Neutral Context</p> <p>Study 2: Approach and Avoidance Achievement Goals, Sense of Choice, Interest/Enjoyment, Behavioral Engagement</p>	<p>Study 1: 117 Undergraduate students from Israel, 106 female, 11 male (<math>M_{age}=23.83</math>)</p> <p>Study 2: 839 7th-8th grade students from Israel, 445 female, 394 male (<math>M_{age}=13.20</math>)</p>	<p>Study 1: Experimental Climate Scale (scale developed for study); Achievement Goals Questionnaire-Revised (Elliot &amp; Murayama, 2008); Intrinsic Motivation Inventory (Deci et al., 1994, and Ryan, 1982); Sense of Choice, Interest or Enjoyment, Pressure or Tension (Ryan, 1982);</p> <p>Study 2: Sense of Choice (Assor et al., 2004); Mastery Goals Subscale (Elliot &amp; Murayama, 2008); Performance-Approach Goals (Elliot &amp; Murayama, 2008); Academic Interest or Enjoyment (Roth et al., 2006); Behavioral Engagement (scale developed for study)</p>	<p>Study 1- experimental, ANOVAs, Study 2- ICC, multilevel analyses hierarchical linear modeling</p>
Benita et al. (2017)	<p>Self-Goal Condition, Autonomy Supportive or Suppressive or</p>	<p>Study 1: 133 Undergraduate students from Israel, 80 female, 53 male (<math>M_{age}=24.60</math>)</p> <p>Study 2: 129 Undergraduate students</p>	<p>Experimental Climate Scale (Benita et al., 2014); Self-Perceived Competence Scale (Williams et al. 1998); Achievement Goals</p>	<p>Experimental and ANOVAs</p>

	Neutral Context, Other-Goal Condition Performance Outcomes of Game Data	from Israel, 90 female, 39 male ( $M_{age}=23.62$ )	Questionnaire (AGQ, Elliot et al., 2011)	
Bortoli et al. (2009)	Goal Orientations, Perceived Motivational Climate; Psychobiosocial States	473 Youth Team participants from Italy (Basketball, Soccer, Volleyball, Rugby, or Individual Sports), 217 female, 256 male, aged 13–14 years ( $M_{age}=13.40$ , $SD=0.50$ )	Task and Ego Orientation in Sport Questionnaire (Duda & Nicholls, 1992); Perceived Motivational Climate in Sport Questionnaire (Newton et al., 2000); Psychobiosocial States list (Bortoli & Robazza, 2007)	Moderated Hierarchical Regression Analysis
Bortoli et al. (2017)	Mastery Climate, Performance Climate, Psychobiosocial States, Index, Motivation, Self-Determination	Study 1: 184 Youth PE participants from Italy, all female, aged 14–15 years ( $M_{age}=14.60$ , $SD=.49$ ) Study 2: 70 Youth PE participants from Italy, all female, aged 14–15 years ( $M_{age}=14.50$ , $SD=.50$ )	Physical Education Questionnaire (Papaioannou, 1998); List of Psychobiosocial descriptors (Bortoli & Robazza, 2007); Situational Motivation Scale (Guay et al., 2000)	Intervention/CF A
Bortoli et al. (2018)	Psychobiosocial States, Enjoyment, Motivational Climate, Motivation	Study 1: 1030 Middle/High school PE students from Italy, 582 female, 448 male, aged 10–19 years ( $M_{age}=15.68$ , $SD=2.50$ ) Study 2: 1025 Middle/High school PE students from Italy, 578 female, 447 male, aged 10–19 years ( $M_{age}=15.78$ , $SD=2.54$ )	Study 1: Individualized Profiling of Psychobiosocial States (Ruiz et al., 2016) Study 2: Two-factor, PBS-SPE scale drawn from the analysis conducted in Study 1; The Physical Activity Enjoyment Scale (Kendzierski & DeCarlo,	ESEM, CFA

Bortoli et al. (2015)	Task and Ego-Involving Climate, Psychobiosocial States, and Task and Ego Orientation	112 Middle/High school PE participants from Italy (ended with 108), all female, aged 14–15 years (M <sub>age</sub> =14.40)	1991); The Teacher-Initiated Motivational Climate in Physical Education Questionnaire (Papaioannou, 1998); The Situational Motivation Scale (Guay et al., 2000) Study 1: Teacher-Initiated Motivational Climate in Physical Education Questionnaire (Papaioannou, 1998); Task and Ego Orientation in Sport Questionnaire Modified, Walling & Duda, 1995); List of Psychobiosocial Descriptors (Bortoli & Robazza, 2007)	2x2 Framework Repeated-measures analysis of covariance (RM-ANCOVA)
Bortoli et al. (2011)	Perceived Competence, Actual Competence, Goal Orientations, Motivational Climate, and Pleasant Psychobiosocial States	320 Youth Team/Individual sport participants from Italy (Basketball, Soccer, Water Polo, Volleyball, or Individual Sports such as Track and Field, Gymnastics, Martial Arts, Swimming, Skating, and Tennis), 160 female, 160 male, aged 13–14 years (M <sub>age</sub> =13.40, SD=0.50)	Perceived Physical Ability Subscale of the Physical Self-Efficacy scale (Ryckman et al., 1982); Borg Category Ratio (CR-10) Scale (Borg, 2001); Task and Ego Orientation in Sports Questionnaire (Duda & Nicholls, 1992); Perceived Motivational Climate in Sport Questionnaire (Newton et al., 2000); Psychobiosocial Descriptors (Bortoli et al., 2009)	Three-way Interaction

Bortoli et al. (2014)	Motivational Climate, Task and Ego Orientation, Psychobiosocial States, Motivation	167 Middle/High school PE participants from Italy, 85 female, 82 male, aged 14–15 years ( $M_{age}=14.51$ , $SD=0.52$ )	Teacher-Initiated Motivational Climate in Physical Education Questionnaire (Papaioannou, 1998); Task and Ego Orientation in Sport Questionnaire (Duda & Nicholls, 1992); Situational Motivation Scale (Guay et al., 2000); Psychobiosocial States (Bortoli & Robazza, 2007)	Cross-Sectional
Bortoli et al. (2012)	Antisocial Behavior, Perceived Moral Atmosphere, Perceived Motivational Climate, Goal Orientation, Perceived Competence, Psychobiosocial States	388 Club level soccer players from Italy, all male, aged 14–16 years ( $M_{age}=14.9$ , $SD=0.80$ )	Perceived Motivational Climate in Sport Questionnaire (Newton et al., 2000); Task and Ego Orientation in Sport Questionnaire (Duda & Nicholls, 1992); Sports Competence Scale from the Physical Self-Description Questionnaire (Marsh et al., 1994); Psychobiosocial States, (Bortoli et al., 2009); Pleasant and Unpleasant Emotions (Bortoli & Robazza, 2007)	Cross-Sectional
Campo et al. (2018)	Pleasant / Unpleasant Emotion, Individual Performance,	6 Semi-Professional volleyball players from France, unknown genders, aged 18–20 years ( $M_{age}=20.14$ , $SD=1.25$ )	Modified version of Mouse Paradigm (Vallacher et al., 1994)	Hierarchical linear modeling analyses

Cece et al. (2020)	Personal/Team Identity Self-Determined Motivation, Everyday Appraisals, Discrete emotions, Subjective performance logs, Challenge, Loss, Benefit, Pleasant and Unpleasant Emotions	31 National/International youth tennis players from France, 11 female, 20 male ( $M_{age}=18.45$ , $SD=4.63$ )	Behavioral Regulation in Sport Questionnaire (Viladrich et al., 2013); Discrete Emotions (Saby et al., 2019); Everyday Appraisals (Doron & Martinent, 2017); Self-reported subjective performance rating via logbook	Hierarchical linear modeling analyses, Priori power analysis
Cetinkalp (2012)	Approach and Avoidance Achievement Goals; Self-description, Strength, Body Fat, Physical Activity, Endurance, Fitness, Sports Competence, Coordination, Health, Appearance, Flexibility, Global Physical Self-	208 Club level handball and volleyball players from Turkey, 120 female, 88 male ( $M_{age}=16.35$ , $SD=0.48$ )	2X2 Achievement Goals Questionnaire for Sport (Conroy et al., 2003); Physical Self-Description Questionnaire (Marsh et al., 1994)	Pearson product-moment correlations and regression analysis with stepwise methods

Concept, Global  
Self-Esteem

Chadha et al. (2019)	Irrational Beliefs, Challenge and Threat Appraisals, Positive and Negative Emotions, Cognitive Anxiety, Somatic Anxiety,	Phase 1: 287 Club, amateur, professional golf players from the UK, India, or other Ethnic Origins, 55 female, 232 male ( $M_{age}=38.7$ , $SD=15.20$ ) Phase 2: 212 Club, amateur, professional golf players from the UK, India, or other Ethnic Origins, 43 female, 169 male ( $M_{age}=38.55$ , $SD=15.08$ )	Irrational Performance Beliefs Inventory (Turner et al., 2018); Five single-item questions (David et al., 2002); Challenge and Threat in Sport scale (Rossato et al., 2016), Positive and Negative Affect Schedule (Watson et al., 1988); Competitive State Anxiety Inventory-2 (Jones & Swain, 1992)	Cross-sectional, single time-point atemporal design
Chang et al. (2019)	Experiential Avoidance, Perceived Coach Autonomy, Athlete Burnout,	180 National/International Youth participants from Taiwan (ended with 141) (Basketball, Volleyball, Tennis, Track and Field, Soccer, Taekwondo), 63 female, 78 male ( $M_{age}=21.14$ , $SD=1.68$ )	Acceptance and Action Questionnaire-II (Bond et al., 2011); Sport Climate Questionnaire (Deci, 2001); Athlete Burnout Questionnaire (Raedeke & Smith, 2001)	Experimental Cross-Lagged
Conti et al. (2020)	Functional and Distractonal Attention, Psychobiosocial States,	324 Club level participants from Italy (Track and Field, Combat Sports, Tennis, Swimming, Triathlon, Cycling, Motorcycling, Team Sports such as Basketball, American Football, Volleyball, Soccer, Water Polo, Futsal,	Attention Questionnaire of Rehabilitated Athletes Returning to Competition (Christakou et al., 2012); the Psychobiosocial States Scale (Robazza et al., 2016); Sport Performance Psychological	Cross-Sectional

	Concentration, Disruption	Handball, Rugby), 109 female, 215 male, aged 18–46 years ( $M_{age}=24.88$ , $SD=6.03$ )	Inventory (Robazza et al., 2009); and a Concentration Disruption Scale	
Conroy et al. (2003)	Performance, Failure, Approach and Avoidance Goals	356 College recreational athletes from unknown country origin (strength training, golf, jogging and walking), 106 female, 250 male, aged 18–34 years ( $M_{age}=21.57$ , $SD=1.92$ )	12-item 2x2 AGQ (Elliot & McGregor, 2001); Performance Failure Appraisal Inventory (Conroy, 2001)	Longitudinal
Conroy, & Elliot, (2004)	Performance, Failure, Approach and Avoidance, Achievement Goals	356 College recreational athletes from unknown country origin (strength training, golf, jogging and walking), 106 female, 250 male, aged 18–34 years ( $M_{age}=21.57$ , $SD=1.92$ )	Performance Failure Appraisal Inventory (Conroy, 2001); 2x2 Achievement Goals Questionnaire for Sport (Conroy, 2003)	Longitudinal, Cross-Lagged
Cumming et al. (2007)	Mastery and Ego Climates, Performance (Won-Lost, Percentage), Interactions	268 Recreational basketball players from unknown country origin, 105 female, 163 male, aged 10–15 years ( $M_{age}=11.99$ , $SD=1.50$ )	Perceived Motivational Climate in Sport Questionnaire 2 (Newton et al., 2000); Motivational Climate Scale for Youth Sports (Smith et al., 2006); Evaluative Reactions (Smith et al., 1993)	Hierarchical Linear Modeling (Multi-Level Modeling)
Cury et al. (2002)	Approach and Avoidance, Achievement Goals Incremental and Entity Beliefs about Sport	682 High School PE participants from France, all male, aged 13–16 years ( $M_{age}=14.3$ , $SD=0.70$ )	Approach and Avoidance Achievement in Sport Questionnaire (Elliot & Church, 1997); Intrinsic Motivation Inventory (McAuley et al., 1989); Conception of the	SEM



	Ability, Mastery and Performance Climate, Perception of Physical Education Competence		Nature of Athletic Ability Questionnaire (Sarrazin, et al., 1996); Perceived Motivational Climate Scale (Goudas & Biddle, 1994)	
D'Astous et al. (2020)	Perceived Competence, Approach and Avoidance Goals, Return to sport concerns, Renewed perspective	75 Club/Collegiate D1-D3 athletes from the United States (Basketball, Football, Hockey, Lacrosse, Rugby, Soccer, Softball, Volleyball, Ultimate Frisbee, Cheer, Field Hockey, Baseball, Individual Sports such as Swimming, Powerlifting, Skiing, Track and Field, Dance, Cross Country, Wrestling, Gymnastics, Golf), 30 female, 45 male (M <sub>age</sub> =21.00, SD=2.15)	Intrinsic Motivation Inventory (McAuley et al., 1989); 3 × 2 Achievement Goal Questionnaire for Sport (Mascret et al., 2015); Return to Sport After Serious Injury Questionnaire (Podlog et al., 2005)	Cross-Sectional bootstrap mediational analysis
Delrue et al. (2016)	Autonomous and Controlled Reasons, Challenge and Threat Appraisals, Aspired Performance, Positive and Negative Self-Talk, Autonomy Satisfaction, Competence	246 Running athletes from Belgium (ended with 180), 90 female, 156 male, unknown ages	Runners' Dominant or Preferred Achievement Goal (Van Yperen, 2006) via a rank order method (Vansteenkiste, Mouratidis et al., 2014); Challenge and Threat Construal Questionnaire (McGregor & Elliot, 2002); Automatic Self-Talk Questionnaire for Sports (Zourbanos, et al., 2009); Basic Need Satisfaction in Sport Scale (Lonsdale & Hodge, 2011); Flow	Prospective Design

	Satisfaction, Flow, Actual Performance		State Scale (Jackson & Marsh, 1996)	
Dewar, & Kavussanu (2012)	Goal Involvement, Happiness, dejection, pride, shame, hope, perceived performance, match outcome	358 International, national, county, regional, club level athletes from unknown country (Hockey, Football, Volleyball, Rugby, Basketball, American Football, Lacrosse, Netball, Indoor Cricket, Water Polo), 122 female, 236 male, unknown ages	Perception of Success Questionnaire (POSQ; Roberts et al., 1998); The Sport Emotion Questionnaire (Jones et al., 2005); State Shame and Guilt Scale (Marschall et al., 1994); Achievement Emotion Questionnaire (Pekrun et al., 2005); Perceived Performance measure of subjective improvement (Balaguer et al., 2002)	Regression analysis using the Hayes and Preacher (2011) mediate macro method
Dewar et al. (2013)	Excitement, Anxiety, Happiness, Perceived Performance, Actual Performance	120 International, national, county, regional, club level athletes from unknown country (Rugby, Soccer, American Football Hockey, Athletics, Netball, Tennis, Basketball, Dance, Kayaking, Cricket, Ski-Racing, Cross-Country Running, Golf, Gymnastics, Karate, Swimming, Australian rules Football, Cycling, Horse Riding, Korfball, Rowing, Short-Track Speed Skating, Squash, Trampoline,	Tango Drill (Davies, 2011)	Mixed Experimental Design

Triathlon, Volleyball, Water Polo, or no main sport), 60 female, 60 male (M<sub>age</sub>=20.56, SD=1.56)

Di Fronso et al. (2020)	Perceived Stress, Psychobiosocial States,	1132 Novice (Regional or University level), Elite/Expert (National or International level) athletes participating in Team Sports (e.g., Soccer, Basketball, Rugby) or Individual Sports (e.g., Tennis, Golf, Swimming) from Italy, 595 female, 537 male, aged 18+ years (M <sub>age</sub> =27.47, SD=8.47)	Perceived Stress Scale (Mondo et al., 2019); Psychobiosocial States scale (Ruiz et al, 2019)	Multivariate analysis of variance (MANOVA), CFA
Elliot, & Church, (1997)	Achievement Motivation, Fear of Failure, Competence Expectancy, Approach and Avoidance Goals, Perceived Competence, Intrinsic Motivation,	204 University psychology students from the United States (ended with 178), 122 female, 82 male (M <sub>age</sub> =20.01)	Achievement Motivation (Jackson, 1974); Fear of Failure Measure (Herman, 1990); Achievement Goal Questionnaire (Carver & White, 1994); Intrinsic Motivation, adapted from (Elliot & Harackiewicz, 1994)	Principal-Components Factor Analysis with Varimax Rotation

Graded  
Performance

Elliot, & McGregor (2001)	Approach and Avoidance Achievement Goals, Self-Determination	Study 1: 180 University psychology Students from the United States, 131 female, 49 male, aged 18+ years Study 2: 148 University psychology Students from the United States, 86 female, 62 male, aged 18+ years Study 3: 182 University psychology Students from the United States, 117 female, 65 male, aged 18+ years	Study 1: 2X2 Achievement Goal Questionnaire (Elliot, 1999) Study 2: Work and Family Orientation Scale (Spence & Helmreich, 1983); Self-Determination; Perceived Class Engagement (Elliot & Church, 1997); Anticipatory TA Scale (Spielberger, et al., 1970) (Study 1); Study strategy questionnaire (Elliot et al., 1999); Study 3 - Kind of Person Questionnaire (Dweck, 1999); Socialization Measure for Competence Valuation (Elliot et al.'s, 2000)	2X2 Framework (Exploratory factor analysis, Confirmatory Factor Analysis)
Elliot, et al. (2005)	Experiment 1A - Approach and Avoidance Achievement Goals, Contingency, Intelligence	Experiment 1A - 101 High school recreational participants from Germany, 44 female, 57 male, aged 15-21 years ( $M_{age}=17.31$ ) Experiment 1B - 36 High school recreational participants from Germany, 21 female, 15 male, aged 16-20 years ( $M_{age}=16.97$ )	Intelligence Structure Test 2000, (Amthauer et al. 1999); Achievement Goal Manipulation (Elliot & Harackiewicz, 1996); Achievement - Lexically Based Activity (Folger, et al., 1978); Contingency Manipulation (Raynor & Rubin, 1971)	One-Way Factorial, 3x2 Factorial Design

Experiment 2: 61 University psychology Students from the United States, 39 female, 22 male, aged 18–45 years ( $M_{age}=20.30$ )

Gaudreau, & Braaten (2016)	Achievement Goals, Underlying Reasons for Achievement, Perceived Goal Attainment, Sport Satisfaction, Positive and Negative Affect	515 Undergraduate students from an unknown country, participating in various sports (e.g., Hockey, Basketball, Track and Field), 353 female, 162 male, aged 17–48 years ( $M_{age}=19.02$ , $SD=2.27$ )	Two four-item subscales from the Orientation Sport Achievement Goals Scale (Verner-Filion & Gaudreau, 2010); Four Achievement Goal Statements (Gaudreau, 2012, and Vansteenkiste, Mouratidis, et al., 2010; Vansteenkiste, Smeets, et al., 2010); The Sport Achievement Goal Scale (Amiot et al., 2004); Multidimensional Student's Life Satisfaction Scale (Huebner et al., 1998); Positive and Negative Affect Schedule (Watson et al., 1988)	Cross-Sectional
Gómez-López et al. (2019)	Mastery and Performance Climate, Intrinsic and Extrinsic Motivation, Amotivation, Entity-Stable,	444 National championship (by region) handball players from Spain, 211 female, 233 male, aged 16–17 years ( $M_{age}=16.60$ , $SD=0.50$ )	Perceived Motivational Climate in Sport Questionnaire (Spanish version, Balaguer et al., 1997); Conceptions of the Nature of Athletic Ability Questionnaire-2 (Spanish version, Moreno et al., 2013); Sport Motivation Scale	Hierarchical cluster analysis

	Entity-Gift, Learning, Intention		(Spanish version, Nunez et al., 2006, and Balaguer et al., 2007); Intention to be Physically Active Questionnaire (Spanish version, Moreno et al., 2007)	
Gråstén et al. (2018)	Task and Ego Involving Climate, Approach and Avoidance Achievement Goals, Running Speed, Aerobic Endurance, Lower Limb Strength	283 Club level floorball players from Finland, all male, aged 12–13 years (M <sub>age</sub> =11.49, SD=0.27)	Motivational Climate in Physical Education Scale (Soini et al., 2014); Achievement Goal Questionnaire (Elliot & Murayama, 2008)	Longitudinal
Hooyman et al. (2014)	Autonomy Supportive, Controlling and Neutral Language, self-efficacy, positive and negative affect, perceive choice, throwing accuracy, pacing	48 Undergraduate students from the United States, 21 female, 37 male (M <sub>age</sub> =22.30, SD=2.40)	The Positive and Negative Affect Schedule (Watson et al., 1988); Self-Efficacy Measure self-rating	ANOVA

Isoard-Gauthier et al. (2013)	Reduced Accomplishment, Exhaustion, Sport Devaluation, Task and Ego-Involving Climate, Approach and Avoidance Achievement Goals, Competence, Reduced Accomplishment, Exhaustion, Sport Devaluation, Task or Ego Involving Climate,	309 Elite youth handball players from France, 157 female, 152 male (M <sub>age</sub> =15.40, SD=0.90)	Adaptation of Questionnaire of the Roles of Significant Others in the Involvement of Achievement Goals in Sport (LeBars et al., 2006); Perceived Competence in Life Domains Scale (Losier et al., 1993); 2X2 Achievement model (French Version, Conroy et al., 2003); Approach and Avoidance Questionnaire for Sport and Physical Education Settings (Schiano-Lomoriello et al., 2005); Athlete Burnout Questionnaire (French Version, Isoard-Gauthier et al., 2010)	Longitudinal
Jaakkola et al. (2016)	Task and Ego Climate Achievement Goals, Enjoyment, Perceived Ability	265 Premier junior league hockey players from Finland, all male (M <sub>age</sub> =17.03, SD=0.63)	Motivational Climate (Finnish version, Soini et al., 2014); Achievement Goals Questionnaire for Sport (Finnish Version, Conroy et al., 2003); Beliefs About Ability and the Expectancies for Success subscale of the Self- and Task-Perception Questionnaire (Finnish Version, Eccles et al., 1984)	Multigroup SEM

Jaakkola et al. (2017)	Motivational Climate, Motivation, Enjoyment, Physical Activity, Behavior	540 Middle school PE participants from Finland, 263 female, 277 male, aged 12-14 years ( $M_{age}=13.00$ )	Motivation Climate in Physical Education Questionnaire (Soini et al., 2014); Physical Education Motivation Scale (Jaakkola, 2002); Sport Enjoyment Scale (Scanlan et al., 1993); Health Behavior in School-aged Children Research Protocol was used (Currie et al., 2002)	Longitudinal cross-lagged
Jõesaar et al. (2012)	Task-Involving Peer Motivational Climate, Perceived Autonomy Support from the Coach, Intrinsic Motivation	362 National/Provincial level athletes participating in individual (e.g., Swimming, badminton) & team sports (e.g., Basketball, Soccer, Volleyball) from Estonia, 110 female, 252 male, aged 11-16 years ( $M_{age}=13.10$ , $SD=2.08$ )	Peer Motivational Climate in Youth Sport Questionnaire (Ntoumanis & Vazou, 2005); Sport Motivation Scale (Pelletier et al., 1995)	Prospective longitudinal design, SEM
Kipp, & Amorose (2008)	Self-Determined Motivation, Autonomy, Relatedness, Perceived Competence, Perceived Motivational Climate	200 Club/High school level athletes from the United States participating in Soccer, Volleyball, Gymnastics, Basketball, Softball, Track and Field, Tennis, Lacrosse, all female ( $M_{age}=15.84$ , $SD=1.31$ )	Sport Motivational Scale (Pelletier et al., 1995); Perceived Competence scale (Amorose, 2003); Perceived Autonomy scale (Hollembek & Amorose, 2005); Sport-Oriented version of the Feelings of Relatedness Scale (Hollembek & Amorose, 2005); Perceived Motivational Climate in Sport Questionnaire-2 (Newton et al., 2000)	SEM



Law et al. (2012)	Perceived Competence Expectancy, Performance, Approach and Avoidance Achievement Goals, Perceived Competence, Self-Efficacy	Study 1 - 225 Undergraduate psychology students from the United States, 150 female, 75 male ( $M_{age}=19.4$ ) Study 2 - 102 Online crowdsource (Mechanical Turk) participants from unknown country origin, 75 female, 26 male ( $M_{age}=36.00$ ) Study 3 - 51 Undergraduate students from the United States, 32 female, 19 male ( $M_{age}=19.90$ ) Study 4 - 38 Undergraduate students from the United States, 29 female, 9 male ( $M_{age}=20.00$ )	Perceived Competence subscale of the Multidimensional Self-Esteem Inventory (O'Brien & Epstein, 1988); Competence Expectancy (Elliot & Church, 1997); Revised 2 × 2 Achievement Goal Questionnaire (Elliot & Murayama, 2008); Achievement Goal Grid Measure (Larsen et al., 2009)	Study 1 - Between subjects' correlation Study 2 - Within-subject correlation Study 3 & 4 - Experimental Design
Liukkonen et al. (2010)	Autonomy, Relatedness, Motivational Climate, Somatic Anxiety, Cognitive Process	338 Elementary school PE participants from Finland, 163 female, 175 male, aged 11–12 years	Motivational Climate in Physical Education Questionnaire (Soini, 2006); Physical Education State Anxiety Scale (Barkoukis et al., 2005, and Barkoukis, 2007); Four-item Sport Enjoyment Scale (Scanlan et al., 1993)	Confirmatory factor analyses
McGregor, & Elliot (2002)	Mastery and Performance Goals, Challenge and Threat, Perceived Control, Procrastination, Anticipatory TA,	Study 1 -1: 150 Undergraduate students from the United States, 82 female, 68 male, aged 17–27 years ( $M_{age}=19.71$ ) Study 2 -2: 174 Undergraduate students from the United States, 108 female, 66 male, aged 17–35 years	Achievement Goal Questionnaire (Elliot & Church, 1997); Challenge and Threat Construal Measure, revised items from existing measures (Ptacek et al., 1994, and Tomaka et al., 1993); Threat affect	Empirical, Longitudinal

Michou et al. (2016)	Coping and Preparedness, % hours spent studying Motivation, Psychological Needs, Approach and Avoidance Achievement Goals, Learning Strategies	(M <sub>age</sub> =19.77) Study 3 - 177 Undergraduate students from the United States, 104 female, 73 male, aged 17–48 years (M <sub>age</sub> =20.01) Sample 1 -1: 226 Undergraduate students from Turkey, 152 female, 74 male (M <sub>age</sub> =22.36, SD=3.92) Sample 2 -2: 331 Undergraduate students from Turkey, 179 female, 152 male (M <sub>age</sub> =19.50, SD=1.50)	scale and revised items (Folkman & Lazarus, 1985)  Achievement Motivation Scale (Lang & Fries, 2006); Balanced Measure of Psychological Needs Questionnaire (Sheldon & Hilpert, 2012); Revised Achievement Goal Questionnaire (Elliot & Murayama, 2008); Motivated Strategies for Learning Questionnaire (Pintrich et al., 1993)	MANOVA, ANOVA
Michou et al. (2013)	Social Desirability, Need for Achievement, Fear of Failure, Approach and Avoidance Achievement Goals, Learning Strategies	189 Elementary students from Greece, 98 female, 91 male (M <sub>age</sub> =11.55, SD=0.66)	Marlowe–Crowne Social Desirability Scale (Thompson & Phua, 2005); Achievement Motivation Scale (Lang & Fries, 2006); Achievement Goal Questionnaire (Elliot & Murayama, 2008); Patterns of Adaptive Learning Strategies (Midgley et al., 2000; Urdan, 2004); Learning strategies (as outlined by Pintrich and De Groot, 1990)	Multi-Variable Analysis, ANOVA

Moore et al. (2019)	Competitive, Organizational and Personal Stressors, Challenge and Threat Appraisals	1813 Roller derby players of varying skill levels (International/ Advanced/Intermediate/Rookie) from various world regions (European - 902, North American - 787, Australian - 81, Other - 15, Did not report - 28), 1625 female 140 male, 48 unknown, aged 18–78 ( $M_{age}=33.00$ , $SD=7.00$ )	Cognitive Appraisal Ratio (Tomaka et al., 1993); Stressor Appraisal Scale (Schneider, 2008); Two Subsets of Potentially Stressful Vignettes (Lucas et al., 2012)	Variance Components Analyses
Morano et al. (2020)	Basic needs, Psychobiosocial States, Competence, Autonomy, Choice, Relatedness Emotional/Physical Exhaustion, Reduced Sense of Accomplishment, Sport Devaluation, Burnout	507 National, Regional and Local level athletes from Italy (Gymnastics, Track and Field, Rhythmic Gymnastics, Tennis, Swimming, Fencing, Skiing, Basketball, Rugby, Futsal, Handball) in two age groups: 116 female 160 male, aged 13–15 ( $M_{age}=13.93$ , $SD=0.81$ ) 104 female, 127 male, aged 16–18 ( $M_{age}=17.17$ , $SD=0.78$ )	Basic Needs Satisfaction in Sport Scale (Ng et al., 2008); Psychobiosocial States Scale (Ruiz et al., 2019); Athlete Burnout Questionnaire (Isoard-Gauthier et al., 2010)	Cross-sectional and correlational study design
Morris, & Kavussanu (2008)	Motivational Climate Approach and Avoidance Achievement Goals, Perceived Competence	230 University sport participants from England/Wales (Football, Cricket, Rugby Union, Volleyball, Rowing, Ultimate Frisbee, Basketball, Field Hockey, Netball), 103 female, 127 male, aged 18–25 ( $M_{age}=20.3$ , $SD=1.50$ )	Achievement Goals Questionnaire-Sport (Conroy et al., 2003); Perceived Competence Subscale of the Intrinsic Motivation Inventory (Ryan, 1982); Perceived Motivational Climate in Sport Questionnaire-2	Multiple regression analyses

			(Newton et al., 2000); Parent-Initiated Motivational Climate Questionnaire-2 (White et al., 1992)	
Mulvenna et al. (2020)	Challenge and Threat Appraisals, Cognitive Anxiety, Somatic Anxiety, Competence, Enjoyment	114 Novice basketball players from the UK, 52 female, 62 male ( $M_{age}=23.53$ , $SD=4.56$ )	3 × 2 Achievement Goal Questionnaire for Sport (Mascret et al., 2015); Adapted 4-item modified version of the Experimental Climate Questionnaire (Williams & Deci, 1996); Challenge and Threat Measure (McGregor & Elliot, 2002); Cognitive and Somatic Anxiety subscale of the Competitive State Anxiety Inventory-2 (Martens et al., 1990); Enjoyment subscale of the Intrinsic Motivation Inventory (McAuley et al., 1989); Perceived Competence subscale of the IMI (McAuley et al., 1989)	3 × 2 (Goal [task-, self-, other-approach] x Context [autonomy support/controling context]) experimental design

Neil et al. (2011)	Physiological measures (Heart Rate, Blood Pressure) Challenge and Threat Appraisals, Anxiety Enjoyment, Competence	12 District, National, International level athletes from the UK (Rowing, Hockey, Swimming, Snooker, Rugby Union, Mtn Bike Riding, Soccer, Surf-Lifesaving, Tennis), 6 female, 6 male, aged 19–56 years ( $M_{age}=23.67$ , $SD=10.32$ )	3 adapted items from the 3 × 2 Achievement Goal Questionnaire for Sport (Mascret et al., 2015); Modified version of the Experimental Climate Questionnaire (Williams & Deci, 1996)	3 × 2 (Goal [task-/self-/other-approach] x Context [autonomy-supportive/controlling]) repeated measures experimental design SEM
Nicholls et al. (2014)	Approach and Avoidance Achievement Goals Threat, Motivational Relevance, Pleasant and Unpleasant Emotions, Coping techniques	827 Participants of various skill levels (International, national, county, club, beginner) in various individual, contact and noncontact sports, 373 female, 437 male, aged 16-64 years ( $M_{age}=23.64$ , $SD=8.25$ )	Achievement Goals Questionnaire for Sport (Conroy et al., 2003); Stress Appraisal Measure (Peacock & Wong, 1990); Sport Emotion Questionnaire (Jones et al., 2005); Coping Inventory for Competitive Sport (Gaudreau & Blondin, 2002)	
Nicholls et al. (2012)	Centrality, Stressfulness, Control, Challenge and Threat, Challenge, Unpleasant and Pleasant Emotions, Coping,	557 Participants of various skill levels (International, national, county, club, beginner) in various individual, contact and noncontact sports from an unknown country, 139 female, 418 male ( $M_{age}=22.28$ , $SD=5.72$ )	Stress Appraisal Measure (Peacock & Wong, 1990); Sport Emotion Questionnaire (Jones et al., 2005); Coping Inventory for Competitive Sport (Gaudreau & Blondin, 2002)	Cross-Sectional

Performance  
Satisfaction

Pope, J. P., & Wilson, P. M. (2012)	Autonomy Support, Structure, Involvement, Competence, Autonomy, Relatedness to Team, Motivation, Perceived Effort	102 Various skill level (High School/university/club/provincial/national) rugby players from Canada (ended with 82), 44 female, 38 male, aged 18–27 years ( $M_{age}=20.17$ , $SD=1.60$ )	Health Care Climate Questionnaire (Reinboth et al., 2004); Perceived Structure and Involvement (Markland & Tobin, 2010); Intrinsic Motivation Inventory- Perceived Competence (Deci et al., 1994)	SEM
Quested, & Duda, (2011)	Autonomy Support, Basic Needs, Subjective Vitality, Exhaustion, Accomplishment, Dance Evaluation, Global Burnout	614 Vocational school dancers from the UK (ended with 219), 453 female, 156 male, 5 unknown ( $M_{age}=18.44$ , $SD=2.29$ )	Health Care Climate Questionnaire (Reinboth et al., 2004); Intrinsic Motivation Inventory (McAuley et al., 1989); Athlete Burnout Questionnaire (Raedeke & Smith, 2001)	SEM
Reinboth et al. (2004)	Autonomy Support, Motivational Climate Self Determination, Subjective Vitality, Satisfaction/Intere	265 Adolescent soccer and cricket players from the UK, all male ( $M_{age}=16.44$ , $SD=1.32$ )	Health-Care Climate Questionnaire (Williams et al., 1996); Perceived Motivational Climate in Sport Questionnaire-2 (Newton et al., 2000); Social Support Questionnaire (Sarason et al., 1987); Need Satisfaction at Work Scale (Deci et al., 2001);	SEM

	st, Physical Symptoms		Intrinsic Motivation Inventory (McAuley et al., 1989); Subjective Vitality Scale (Ryan & Frederick, 1997); Satisfaction/Interest in Sport Scale (Duda & Nicholls, 1992); Physical symptom checklist (Emmons, 1991)	
Ruiz et al. (2017)	Motivational Involvement, Self-Determined Motivation, Psychobiosocial States	494 National/International level athletes participating in team (e.g., Ice Hockey, Soccer, Floorball, Basketball) and individual sports (e.g., Swimming, Karate, Track and Field) from Finland, 211 female, 283 male ( $M_{age}=20.28$ , $SD=4.21$ )	Multi-scale questionnaire package, standardized protocol (Duda et al., 2013); Perceived Motivational Climate in Sport Questionnaire-2 (Newton et al., 2000); Behavior Regulation in Sport Questionnaire (Lonsdale et al., 2008); Affective modality items of the Individualized Profiling of Psychobiosocial States (Ruiz et al., 2016)	Confirmatory Factor Analyses
Ruiz et al. (2019)	Perceived Motivational Climate, Self-Determined Motivation, Psychobiosocial States	217 National/International level athletes participating in team (e.g., Ice Hockey, Soccer, Floorball, Basketball) and individual sports (e.g., Swimming, Karate, Track and Field) from Finland, 91 female, 126 male ( $M_{age}=21.24$ , $SD=4.53$ )	Perceived Motivational Climate in Sport Questionnaire-2 (Newton et al., 2000); Behavior Regulation in Sport Questionnaire (Lonsdale et al., 2008); Psychobiosocial states scales (Ruiz et al., 2016, 2018);	SEM

Ruiz, Robazza, et al. (2019)	Psychobiosocial Performance States	483 National/International level athletes participating in team (e.g., Floorball, Basketball, Volleyball, Futsal) and individual sports (e.g., Figure Skating, Gymnastics, Orienteering) from Finland, 206 female, 277 male ( $M_{age}=20.27$ , $SD=4.23$ )	Psychobiosocial States Scale (Ruiz et al., 2016)	MANOVA, ESEM two-factor
Ruiz et al. (2021)	Perceptions of a coach-created motivational climates, Goal orientations, Motivational Regulation, Emotion	281 National and Regional level athletes (ended with 262) competing in team (n=165) and individual sports (n=116) from Britain the UK, 146 female, 139 male ( $M_{age}=22.75$ , $SD=6.92$ )	Empowering and Disempowering Motivational Climate Questionnaire (Appleton et al., 2016); Behavioral Regulation in Sport Questionnaire (Lonsdale et al., 2008); Task and Ego Orientation Questionnaire (Duda, 1989); The Sport Emotion Questionnaire (Jones et al., 2005)	Cross-sectional / Structural Equation Modeling
Sarrazin et al. (2002)	Self-Determined Motivation, Perceived Competence, Perceived Autonomy, Perceived Relatedness, Behavioral Intentions, Ego-Involving Climate,	335 Regional level handball players from France, all female, aged 13-15 years ( $M_{age}=14.07$ , $SD=0.79$ )	Sport Motivation Scale (Pelletier et al., 1995); Perceived Motivational Climate in Sport Questionnaire (Newton et al., 2000); Perceived Competence in Life Domains Scale (Losier et al., 1993); Feelings of Relatedness Scale (Richer & Vallerand, 1998); Four item measurement for future sport intentions (Ajzen & Driver, 1992)	SEM



	Task-Involving Climate			
Senko, & Tropiano, (2016)	Achievement Goals, Normative Goals, Self-Handicapping and Avoidance, Self-Efficacy, Interest, Grade Point Average	Study 1 -1: 168 Undergraduate psychology students from the United States, 139 female, 29 male (M <sub>age</sub> =22.00) Study 2 -2: 160 Undergraduate psychology students from the United States, 139 female, 21 male (M <sub>age</sub> =21.60)	Achievement Goal Questionnaire (Elliot & Murayama, 2008); Patterns of Adaptive Learning Survey (Midgley et al., 2000)	Empirical Study
Spray et al. (2006)	Task and Ego Involvement, Choice, Responsibility, Task Enjoyment, Performance	147 Novice level golfers from the UK, 67 female, 80 male, aged 11-16 years (M <sub>age</sub> =13.43, SD=1.26)	Perception of Success Questionnaire (Roberts et al., 1998); Sport Competence Subscale of the Physical Self-Perception Profile (Whitehead, 1995)	MANCOVA
Stebbing et al. (2015)	Positive Affect, Motivation, Burnout, Coach Behaviors, Negative Affect, Devaluation, Autonomy Supportive and Controlling Behaviors, Social Desirability Index	195 Various skill level coaches (Recreational/Club/Regional/National/International/Professional) instructing 26 different sports from the UK, 41 female, 154 male, aged 18-75 years (M <sub>age</sub> =46.24, SD=13.26)	Positive and Negative Affect Schedule (Watson et al., 1988); Work Motivation Inventory (Blais et al., 1993); Athlete Burnout Questionnaire (Raedeke & Smith, 2001); Health Care Climate Questionnaire (Williams et al., 1996); Controlling Coach Behaviors Scale (Bartholomew et al., 2010); Marlowe-Crowne Social Desirability Scale (Strahan & Gerbasi, 1972)	Longitudinal

Standage et al. (2003)	Origin Climate, Mastery and Performance Climate, Need Satisfaction, Perceived Competence, Self-Determined Motivation, Intention to partake in Physical Activity	328 Elementary school PE participants from the UK, 138 female, 160 male, 30 Unk, aged 12–14 years ( $M_{age}=13.56$ , $SD=0.59$ )	Origin Climate Questionnaire (deCharms, 1976); The Motivational Climate Perception Scale (Biddle et al., 1995); Intrinsic Motivation Inventory (McAuley et al., 1989); Acceptance subscale of the Need for Relatedness Scale (Richer & Vallerand, 1998); SMS (Pelletier et al., 1995)	Cross-sectional/Confirmatory factor analysis CFA
Stenling et al. (2014)	Incremental, Entity, Approach and Avoidance Achievement goals, Cognitive Anxiety	315 Regional/National level team sports athletes (Ice Hockey, Floorball) in an unknown country, 163 female ( $M_{age}=19.4$ , $SD=3.00$ ), 152 male ( $M_{age}=20.6$ , $SD=4.00$ )	Conceptions of the Nature of Athletic Ability Questionnaire-2 (Biddle et al., 2003); Achievement Goals Questionnaire for Sport (Conroy et al., 2003); Competitive State Anxiety Inventory-2R (Cox et al., 2003)	Cross-Sectional
Stoeber et al. (2008)	Approach and Avoidance Achievement goals, Perfectionism	Study 1 -1: 204 High School students ("Spoortgymnasien") participating in various sports (e.g., Soccer, Volleyball, Track and Field) from Germany, 73 Female, 131 male, aged 14–18 years ( $M_{age}=15.8$ , $SD=0.9$ ) Study 2 -2: 147 Sport & exercise undergraduate students from	Multidimensional Inventory of Perfectionism in Sport (Stober et al., 2004); Scales for the Assessment of Learning and Performance Motivation (Spinath et al., 2002)	Study 1 -1: Cross-sectional correlational design Study 2 -2: Longitudinal correlational design

Germany, 57 female, 90 male, aged 19-42 years ( $M_{age}=22.80$ ,  $SD=3.00$ )

Thompson et al. (2020)	Goal Relevance, Goal Congruence, Coping Potential, Future Expectations, Blame/Credit, Challenge and Threat Appraisals, Pleasant and Unpleasant Emotions, Coping Mastery Goals, Self-Referenced Goals, Normative Goals	Study 1 -1: 192 Various skill level athletes (Beginner, Club, County, National, International) in team (e.g., Football, Basketball) and individual sports (e.g. Golf, Triathlon) from an unknown country, 47 female, 144 male, 1 unknown, aged 16-73 years ( $M_{age}=23.01$ , $SD=10.32$ ) Study 2 -2: 30 Club cycling athletes from an unknown country, 15 female, 15 male, aged 16-55 years ( $M_{age}=34.67$ , $SD=10.40$ )	Pre-competitive Appraisal Measure (Wolf et al., 2015); Stress Appraisal Measure (Peacock & Wong, 1990); Sports Emotion Questionnaire (Jones et al., 2005); Coping Inventory for Competitive Sports (Gaudreau & Blondin, 2002); Attainment of Sport Achievement Goals Scale (Amiot et al., 2004)	Experimental, Prospective field and laboratory-based studies
Turner et al. (2014)	Cognitive Appraisal, Challenge and Threat Appraisals, Control, Self-Efficacy, Approach and Avoidance Achievement goals	Study 1 -1: 46 Undergraduate students/academic staff from the UK, 22 female, 24 male ( $M_{age}=21.7$ , $SD=3.40$ ) Study 2 -2: 46 Undergraduate students from the UK, 8 female, 38 male ( $M_{age}=21.02$ , $SD=3.40$ )	Emotion Questionnaire (Jones et al., 2005); Achievement Goals Questionnaire (Conroy et al., 2003); Self-Efficacy Scale (Bandura, 2006); Academic Control Scale (Perry et al., 2001); One Item to measure cognitive	Shapiro-Wilk's tests, Independent T Tests, Chi - Squared tests, Regression Analysis

	Anxiety, Excitement, Happiness and Helpfulness of Emotion,		appraisal (based on Tomaka et al., 1997)	
Trenz, R.C. & Zusho (2011)	Performance, Approach and Avoidance Achievement Goals, Satisfaction, Persistence, Practice Avoidance	119 Varying skill level athletes (Age Group Championships, Silver Championships, Junior Olympics, Senior Metropolitan Championships, Speedo Championships Series-Sectionals, Junior Nationals, Olympic Trials) in Swimming from the United States, 77 female, 42 male, aged 11-18 years ( $M_{age}=14.76$ , $SD=1.72$ )	Perceived Motivational Climate in Sport Questionnaire-2 (Newton et al., 2000); Achievement Goal Questionnaire for Sport (Conroy et al., 2003)	Regression Analysis
Vansteenkiste, M., Smeets, S., et al. (2010)	Autonomous and controlled regulation, mastery-approach goals, performance-approach goals, perfectionism and educational outcomes (self-regulated learning, performance, cheating attitude	Study 1 -1: 150 High school students from Belgium, 96 female, 54 male, Grades 10-12 Study 2 -2: 190 High school students from Belgium, 87 female, 103 male, Grades 11-12	Learning and Study Strategy Inventory (Weinstein & Palmer, 1987); Self-reported cheating and attitude towards cheating (Anderman et al., 1998, and Newstead et al., 1996); Achievement Goal Questionnaire (Elliot & McGregor, 2001); A single procedure (developed by Sheldon & Kasser, 1995)	Independent samples t-tests, hierarchical multiple regression analyses
			Study 2- Same measures to study 1 in addition to the	

and cheating  
behavior)

Multidimensional Perfectionism  
Scale (Frost et al., 1990);  
Achievement measured through  
Exam Results and Cheating  
Measure (Anderman et al., 1998)

Vansteenkiste, Mouratidis et al. (2014)	Dominant Situational Goal, Approach and Avoidance Achievement Goals, Intrinsic Motivation, Game-Specific Outcomes, Game Enjoyment, Performance Satisfaction, Interpersonal Predictors, Victory or Loss	67 National level volleyball players from Belgium, 26 female, 41 male (M <sub>age</sub> =19.45, SD=5.13)	AGQ-S (Conroy et al., 2003); Prosocial and Antisocial Behavior in Sport Scale (Kavussanu & Boardley, 2009); Intrinsic Motivation Inventory (McAuley et al., 1989)	Series of multilevel models
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Vazou et al. (2006)	Peer and coach created motivational climate Improvement, Relatedness Support, Effort, Intra-Team Conflict, Intra-Team Competition/ Ability, Coach Task and Ego Climate, Physical Self-Worth, Enjoyment, Effort, Trait-Anxiety	493 School/Club/County level athletes competing in individual and team sports (Rugby, Soccer, Basketball, Hockey, Netball, Swimming) from the UK, 124 female, 369 male, aged 12-17 years ( $M_{age}=14.08$ , $SD=1.29$ )	Peer MCYSQ (Ntoumanis & Vazou, 2005); Perceived Motivational Climate in Sport Questionnaire-2 (Newton et al., 2000); Interest-Enjoyment Subscale of the Intrinsic Motivation Inventory (McAuley et al., 1989); Sport Anxiety Scale (Smith et al., 1990); Physical Self-Worth Scale of the Children Physical Self-Perception Profile (Whitehead, 1995); Teacher Rating of Academic Achievement Motivation Questionnaire (adapted version, Stinnett et al., 1991)	Cross-Sectional
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## 12.2 Ethical Approval from the University of Jyväskylä



JYVÄSKYLÄN YLIOPISTO

Eettinen toimikunta

### LAUSUNTO

Lehtori Montserrat Ruiz Cerezo on pyytänyt Jyväskylän yliopiston eettiseltä toimikunnalta lausuntoa tutkimukselle ”Psychobiosocial states in sport achievement settings: A study of their antecedents with a focus on motivational aspects”. Eettinen toimikunta edellyttää oman lausuntonsa perusteeksi saatekirjeen, lausuntoa hakevan hankkeen tutkimussuunnitelman ja sen tiivistelmän, tiedotteen ja suostumuslomakkeen tutkittaville sekä rekisteriselostelomakkeen.

Tutkittaville jaettavasta informaatiosta tulee ilmetä:

1. tutkijoiden yhteystiedot sekä vastuullinen tutkija
2. tutkimuksen taustatiedot soveltuvin osin: tutkimuslaitos tai -laitokset, tukiorganisaatiot tai -henkilöryhmät
3. tutkimusaineiston säilyttäminen
4. tutkimuksen tarkoitus, tavoite ja merkitys
5. menettelyt, joiden kohteiksi tutkittavat joutuvat
6. hyödyt ja haitat, joita tutkittavat/koehenkilöt kohtuudella voivat odottaa; erityisesti tutkimuksen aiheuttamat mahdolliset rasitteet tai terveydelliset riskit tutkittaville sekä niiden todennäköisyys
7. miten ja mihin tietoja aiotaan käyttää
8. tutkittavien oikeudet: että he voivat kieltäytyä osallistumasta tutkimukseen, että he voivat missä tahansa vaiheessa kysyä lisätietoja tutkimuksesta ja että he voivat missä vaiheessa tahansa perua osallistumisensa tutkimukseen
9. onko tutkittavat vakuutettu tutkimusprojektin puolesta vai oletetaanko, että tutkittavat osallistuvat tutkimukseen omien henkilökohtaisten vakuutustensa varassa.
10. tutkittavan tai hänen huoltajansa/laillisen edustajansa suostumus tutkimukseen osallistumisesta

Eettinen toimikunta on käsitellyt Ruiz Cerezon lausuntopyynnön kokouksessaan 11.5. Ruiz Cerezo on täydentänyt lausuntopyyntöä toimikunnan edellyttämällä tavalla, eikä toimikunta näe tutkimushankkeen toteuttamiselle estettä, mikäli se suoritetaan tutkimussuunnitelmassa esitetyllä tavalla.

Laki lääketieteellisestä tutkimuksesta (488/1999) edellyttää, että lain soveltamisalaan kuuluvalla tutkimuksella saadaan sairaanhoitopiiriin eettisen toimikunnan suostumus. Eettisen toimikunnan käsityksen mukaan lausuntopyynnön kohteena ei ole laissa tarkoitettu lääketieteellinen tutkimus.

Jyväskylässä 18.5.2011

Sirpa Leppänen  
puheenjohtaja

Visa Hiltunen  
sihteeri

Postiosoite:  
PL 35  
40014 Jyväskylän yliopisto

Puhelin:  
\*(014) 260 1211  
Telefax:  
(014) 260 1021

www.jyu.fi  
Y-tunnus  
0245894-7